



P R O J E C T M A N U A L

**FRANKLIN ROAD BRIDGE REPLACEMENT
OVER NS RAILWAY
ROANOKE, VIRGINIA**

ITB No. 17-02-04

Date: August 26, 2016

**VDOT 0220-128-R34
UPC 104248**

**Purchasing Division
Monica Cole, Senior Buyer
215 Church Avenue, S.W., Room 202
Roanoke, Virginia 24011
(540) 853-2871
Fax (540) 853-1513**

CITY OF ROANOKE, VIRGINIA

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**FRANKLIN ROAD BRIDGE REPLACEMENT OVER NS RAILWAY
ROANOKE, VIRGINIA**

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*** Note that the 1935 plans are to be used as a guide. Accuracy of plans has not been verified.
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NOTICE OF INVITATION TO BID

CITY OF ROANOKE, VIRGINIA

Sealed Bids for: **FRANKLIN ROAD BRIDGE REPLACEMENT
OVER NS RAILWAY
ROANOKE, VIRGINIA**

ITB NO. 17-02-04

This project includes the complete demolition and replacement of the existing bridge. Replacement includes installation of subsurface piles/shafts, two abutments, 4 piers, steel superstructure, concrete deck and associated work. The bridge, which is approximately 560 ft long by 57 ft wide, is located near the intersection of Reserve Avenue and Franklin Road.

Sealed bids will be received by the City of Roanoke by the Purchasing Division, or a designee, 215 Church Avenue, S.W., Room 202, Roanoke, Virginia 24011, at or before 2:00 p.m., local time, on October 5, 2016. Bids received after 2:00 p.m. will not be accepted or considered. If the Noel C. Taylor Municipal Building is closed for business at the time scheduled for the proposal opening, the sealed proposal will be accepted and opened on the next business day of the City, at the originally scheduled hour.

The Invitation to Bid, Instructions to Bidders, plans, specifications, the Contract, and other Contract Documents may be examined during business hours at the Office of the City Engineer, 215 Church Avenue, S.W., Room 350, Roanoke, Virginia 24011 (Phone: 540-853-2731); or in the City of Roanoke Purchasing Division office, 215 Church Avenue, S.W., Room 202, Roanoke, Virginia 24011 (Phone: 540-853-2871).

Documents may be viewed and/or downloaded from the City of Roanoke Purchasing Division's Vendor Self Service system at <https://vss.roanokeva.gov> or from the Purchasing Division's website at www.roanokeva.gov/purchasing.

A non-mandatory pre-bid conference will be conducted on September 12, 2016, at 10:00 a.m., local time, in the EOC Conference Room, Noel C. Taylor Municipal building, 215 Church Avenue SW, Room 159, Roanoke, Virginia.

The Project and the work, services, and materials for such Project are subject to a Virginia Department of Transportation (VDOT or Department) Programmatic Project Administration Agreement dated September 9, 2013, between VDOT and the City and Extension Addendum, Revenue Sharing Projects dated May 31, 2016 (VDOT Agreement or Department Agreement), and various VDOT, local, State and/or Federal terms and provisions as set forth therein or referred to therein and in the bid documents and/or any resultant contract documents.

Bids may not be withdrawn for a period of sixty (60) calendar days after the opening of bids unless the bid is substantially lower than the other bids because of a clerical error as defined in Section 2.2 - 4330, of the Code of Virginia (1950), as amended. Pursuant to Section 2.2 - 4330 (B)(1), the bidder shall give notice in writing and shall submit the original work papers with such notice to the City of its claim of right to withdraw the bid within two (2) business days after the opening of bids.

The City expressly reserves the right to cancel this ITB and/or reject any or all bids, to waive any informality or irregularity in the bids received, and to accept a bid which is deemed to be in the best interest of the City.

Simone Knowles, Manager
Purchasing Division
City of Roanoke, Virginia

INVITATION TO BID

CITY OF ROANOKE, VIRGINIA

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This project includes the complete demolition and replacement of the existing bridge. Replacement includes installation of subsurface piles/shafts, two abutments, 4 piers, steel superstructure, concrete deck and associated work. The bridge, which is approximately 560 feet long by 57 feet wide, is located near the intersection of Reserve Avenue and Franklin Road.

Sealed bids will be received by the City of Roanoke by Monica Cole, Senior Buyer, Purchasing Division, or a designee, Noel C. Taylor Municipal Building, 215 Church Avenue, S.W., Room 202, Roanoke, Virginia 24011, at or before 2:00 p.m., local time, on October 5, 2016, at which time all bids received will be publicly opened and read. Bids received after 2:00 p.m. will not be accepted or considered. The time of receipt shall be determined by the time clock stamp in the Purchasing Office, or if it is not working, such time shall be determined by the Purchasing official who is to open the bids. If the Noel C. Taylor Municipal Building is closed for business at the time scheduled for the proposal opening, the sealed proposal will be accepted and opened on the next business day of the City, at the originally scheduled hour. This project is generally described as set forth above.

The Instructions to Bidders, plans, specifications, the Contract, and other Contract Documents are incorporated herein by reference. Copies of these items may be examined during business hours at the Office of the City Engineer, Noel C. Taylor Municipal Building, 215 Church Avenue, S.W., Room 350, Roanoke, Virginia 24011 (Phone: 540-853-2731); or in the City of Roanoke Purchasing Division office, 215 Church Avenue, S.W., Room 202, Roanoke, Virginia 24011 (Phone: 540-853-2871). Bidders are cautioned to review bid documents thoroughly before submitting a bid.

Copies of the documents may be viewed and/or downloaded from the City of Roanoke Purchasing Division's Vendor Self Service system at <https://vss.roanokeva.gov> or from the Purchasing Division's website at www.roanokeva.gov/purchasing. If you have any problems accessing the documents, you may contact Purchasing at 853-2871 or purchasing@roanokeva.gov. The City will not be responsible for documents obtained from any other source.

All Contract Documents prepared and/or furnished by the City Engineer shall be the exclusive property of the City of Roanoke, Virginia, and shall not be used for any other project(s).

Each bidder is solely responsible for ensuring that such bidder has the current complete version of the Bid Documents prepared for the project, including any addenda issued by the City, before submitting a bid.

A non-mandatory pre-bid conference will be conducted on September 12, 2016, at 10:00 a.m., local time, in the EOC Conference Room, Noel C. Taylor Municipal building, 215 Church Avenue SW, Room 159, Roanoke, Virginia.

The Project and the work, services, and materials for such Project are subject to a Virginia Department of Transportation (VDOT or Department) Programmatic Project Administration Agreement dated September 9, 2013, between VDOT and the City and Extension Addendum, Revenue Sharing Projects dated May 31, 2016 (VDOT Agreement or Department Agreement), and various VDOT, local, State and/or Federal terms and provisions as set forth therein or referred to therein and in the bid documents and/or any resultant contract documents.

Bidders and all subcontractors are required to comply with all applicable city, state, and federal laws, ordinances, and regulations; and are required to be properly licensed under Sections 54.1-1100, *et seq.*, Code of Virginia (1950), as amended. If applicable, Bidders shall deposit with their bid a Bid Security executed in the amount and form stipulated in the Instructions to Bidders.

The City expressly reserves the right to cancel this ITB and/or reject any or all bids, to waive any informality or irregularity in the bids received, and to accept a bid from the lowest responsive and responsible bidder which is deemed to be in the best interest of the City.

If an award of a contract is made, notice of the award, or the announcement of the decision to award, will be made by posting a notice of such award or announcement in the foyer area of the second floor of the Noel C. Taylor Municipal Building at 215 Church Avenue, S.W., Roanoke, Virginia 24011 and also on the City website at www.roanokeva.gov/purchasing (select the Awarded Bids link).

To determine the lowest responsive and responsible bidder who may be awarded a Contract for the Work, the criteria set forth in or requested pursuant to the Instructions to Bidders or in the Bid Documents may be considered.

By submitting a bid, each bidder agrees that this is a solicitation of bids and each bidder agrees to be solely responsible for the cost or expense of its bid and the City shall have no responsibility for such costs or expenses.

If a certain brand, make, item or manufacturer is specifically and exclusively required or called for in the plans, specifications, or other contract documents, then that brand, make, item, or manufacturer shall be used unless otherwise agreed to by the City, in its sole discretion. Otherwise, an equivalent item can be requested as set forth in Section 10 of the Instructions to Bidders, or other Contract Documents.

If the bid by the lowest responsive and responsible bidder exceeds available funds, the City reserves the right to negotiate with the apparent low bidder pursuant to Section 2.2-4318 of the Code of Virginia. The conditions and procedures under which such negotiation may be undertaken are set forth in Section 2.2-4318, and Section 14.3 of Instructions to Bidders. Any such negotiated Contract shall be subject to final approval by the City in its sole discretion

Bids may not be withdrawn for a period of sixty (60) calendar days after the opening of bids unless the bid is substantially lower than the other bids because of a clerical error as defined in Section 2.2 - 4330, of the Code of Virginia (1950), as amended. Pursuant to Section 2.2 - 4330 (B)(1), the bidder shall give notice in writing and shall submit the original work papers with such notice to the City of its claim of right to withdraw the bid within two (2) business days after the opening of bids.

The successful bidder shall comply with the Code of Virginia nondiscrimination provisions of Section 2.2-4311 and the Drug-free workplace provisions of Section 2.2-4312.

Pursuant to Code of Virginia, Section 2.2 - 4343.1, be advised that the City of Roanoke does not discriminate against faith-based organizations.

CITY OF ROANOKE, VIRGINIA

INSTRUCTIONS TO BIDDERS

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CITY OF ROANOKE, VIRGINIA

INSTRUCTIONS TO BIDDERS

SECTION 1. DEFINITIONS

Definitions contained in Section 1 of the General Conditions are incorporated herein by reference. The bidder should refer to the General Conditions for definitions used in the Contract Documents. "Successful Bidder" is defined as the bidder to whom the City makes an award.

SECTION 2. EXAMINATION OF SITE AND CONTRACT DOCUMENTS

- 2.1 Each bidder is responsible for examining carefully the site of the Work and the Contract and Bid Documents relating to the Work. By submitting a bid, the bidder acknowledges and agrees that it has examined and considered the conditions to be encountered at and adjacent to the site, the character, quality, and quantities of work to be performed, the material to be furnished, other requirements of the Contract Documents, and to have waived any claim or objection based thereon. Claims as a result of failure to have done such examination will not be considered by the City. See Section 8 of the General Conditions entitled "Conditions at Site."
- 2.2 Each bidder shall promptly notify, in writing, the Purchasing Division and Engineering Division of any ambiguity, inconsistency, or error which may be discovered upon examination of the Invitation to Bid, any Bid Documents, and/or any related documents.

SECTION 3. CLARIFICATION AND ADDENDA

- 3.1 **Questions on Contract Documents:** All questions about the meaning or intent of the Contract Documents shall be directed to the Purchasing Department. Questions received less than seven (7) calendar days prior to the date for opening bids may not be answered. Bidders may only rely upon written addenda issued by the Purchasing Department and no other communication or interpretation, whether oral or written, shall have any effect or efficacy.
- 3.2 **Addenda:** Any changes, interpretations, or clarifications that may be made to the Contract Documents will be in the form of an addendum. Receipt by the bidder of such addendum shall be acknowledged on the Bid Form. **However, all bidders are solely responsible for making sure that they have received and reviewed any and all addenda that may have been issued for this Invitation to Bid.**
- 3.3 **Interpretation:** All decisions made in good faith by the City Engineer on the meaning or interpretation of the Contract Documents shall be final.
- 3.4 **Bidders Responsibility:** All bidders are responsible for ensuring that they have received and examined all bid documents, including all addenda, if any, that may have been issued before submitting their bid. The City is not responsible for any Invitation to

Bid documents obtained from any source other than the City. If you have any questions, contact the Purchasing Division by telephone at (540) 853-2871, by fax at (540) 853-1513, or by email at monica.cole@roanokeva.gov.

- 3.5 Quantities:** Where the bid documents stipulate a unit price, the quantities of the work and material set forth in the bid form or on the plans approximately represent the work to be performed and material to be furnished and are for the purpose of comparing the bids on a uniform basis. Payment shall be made to the Contractor only for the actual quantities of work performed or material furnished in accordance with the plans and specifications and it is understood that the quantities may be increased or decreased as provided in the General Conditions without in any way invalidating the bid prices.

SECTION 4. TIME FOR COMPLETION

- 4.1 Time for Completion:** Unless otherwise stated or a specific time period is set forth on the Bid Form, each bidder shall indicate in the appropriate blank the number of consecutive calendar days required by such bidder to substantially complete the specified Work, with Final Acceptance to be achieved within thirty (30) consecutive calendar days thereafter. However, no such time period may exceed the number of consecutive calendar days set forth in the Bid Form.
- 4.2 Weather:** The bidder, in preparing and submitting its bid, is required to take into consideration normal weather conditions. Normal weather means a range of weather conditions which might be anticipated, based on weather data for the past ten years. Unusual weather is weather which could not be anticipated based on such data. Normal weather conditions shall be determined from the public historical records available from the National Weather Service. The data sheets to be used shall be for the locality or localities closest to the site of the Work. No additional compensation will be paid to the Contractor because of unusual weather conditions; however, an extension of time for unusual weather may be considered by the City as indicated in the General Conditions.
- 4.3 Liquidated Damages:** The amount indicated on the Bid Form as liquidated damages as described in the General Conditions (Section 21) shall be due from and paid by the Contractor to the City and/or, in the City's discretion, shall be withheld from the Contractor's Request for Payment, and/or retainage, for each consecutive calendar day of delay in excess of the stated time required to complete the Work, unless modified by a Change Order.

SECTION 5. CONTRACTORS' LICENSES, PERMITS, FEES, AND TAXES

- 5.1 State License:** Bidders and all subcontractors are required to comply with all applicable city, state, and federal laws, ordinances, and regulations, including, but not limited to, registration with the Virginia State Corporation Commission if required by law; and are required to be properly licensed in accordance with Sections 54.1-1100, *et seq.*, of the Code of Virginia, which presently requires one to be licensed as a "Class A Contractor" before submitting a bid of One Hundred Twenty Thousand Dollars (\$120,000) or more;

or to be licensed as a "Class B Contractor" before submitting a bid of Ten Thousand Dollars to One Hundred Twenty Thousand Dollars (\$10,000 to \$120,000); or to be licensed as a "Class C Contractor" before submitting a bid of One Thousand Dollars to Ten Thousand Dollars (\$1,000 to \$10,000). There are also cumulative total amounts which can require a certain class of license and bidders should check these requirements as well. (See also Section 7 of the General Conditions.)

5.2 Other Licenses, Permits, Fees, and Taxes:

- a. Successful Bidder is responsible for paying on time for all licenses, permits, fees, and taxes applicable to the project. Such charges and fees include, but are not limited to the applicable building permits, mechanical and electrical permits, hauling and dumping of material, and such bidder will have to possess a City business license and be responsible for paying City of Roanoke business license taxes, as applicable. See Section 3 of the General Conditions.
- b. Right of Way Excavation Permit – Bidders are advised that all work within the public rights of way requires a Right of Way Excavation Permit from the City's Department of Public Works and/or the City's Department of Planning, Building and Development. The Successful Bidder, at its cost, shall be responsible for obtaining such permit(s) and providing a separate Excavation Permit Bond(s) in accordance with the requirements of the City's Right of Way Excavation and Restoration Standards, Revised July 1, 2013. Any such Bond(s) or other items are in addition to the Performance Security and Labor and Material Payment Security required for this Project.

- 5.3 Virginia State Corporation Commission:** Each Bidder/Offeror who is a stock or nonstock corporation, limited liability company, business trust, or a limited partnership or other business entity shall be authorized to transact business in the Commonwealth of Virginia as a domestic or foreign business entity if required by law. Each such Bidder/Offeror shall include in its bid response/proposal response the Identification Number issued to it by the Virginia State Corporation Commission (SCC) and should list its business entity name as it is listed with the SCC. Any Bidder/Offeror that is not required to be authorized to transact business in the Commonwealth as a domestic or foreign business entity as required by law shall include in its bid response/proposal response a statement describing why the Bidder/Offeror is not required to be so authorized. (See Va. Code Section 2.2-4311.2).

SECTION 6. PREPARATION AND SUBMISSION OF BIDS

- 6.1 Bid Form:** Bids shall be submitted on the Bid Form furnished, or copy thereof, and shall be completed and signed in ink. A copy of the Bid Form is provided in these specifications for the information of bidders only. Except as may be otherwise stated, all blank spaces in the Bid Form should be filled in and no changes shall be made to the Bid Form. Erasures or other changes in a bid amount must be explained or noted over the initials of the bidder. Bids containing any conditions, omissions, unexplained erasures, alterations or items not called for in the bid documents, or irregularities of any kind, may be rejected by the City as being incomplete and/or non-responsive. **NO CHANGES MADE TO THE BID FIGURES BY NOTATIONS ON THE OUTSIDE OF THE ENVELOPE WILL BE CONSIDERED IN THE REVIEW AND TABULATION OF BIDS OR FOR ANY OTHER PURPOSE.**

- 6.2 Escrow:** In accordance with Section 2.2 - 4334, of the Code of Virginia, for bids of \$200,000 or more for construction of highways, roads, streets, bridges, parking lots, demolition, clearing, grading, excavating, paving, pile driving, miscellaneous drainage structures, and the installation of water, gas, sewer lines and pumping stations, the Bid Form will include a space for the bidder to indicate an option to use the escrow account procedure in order to have retained funds paid to an escrow agent. Otherwise, unless stated in the Supplemental General Conditions, no escrow will be provided.
- 6.3 Signatures:** Each bid must give the full business address of the bidder and be signed by bidder with its usual signature. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by one of the members of the partnership or an authorized representative, followed by the signature and designation of the person signing. Bids by corporations must be signed with the legal name of the corporation followed by the name of the state in which they are incorporated and by the signature and designation of the president or other person authorized to bind it in the matter. The name of each person signing shall also be typed or printed below each signature. A bid by a person who affixes to his signature the word "President," "Authorized Agent," or other designation without disclosing such principal firm or employer, may be held to be the bid of the individual signing. Satisfactory evidence of the authority of the president or authorized agent signing on behalf of the corporation shall be furnished upon request by the City.
- 6.4 Bid Amounts:** Bidders shall indicate in the appropriate blank spaces on the Bid Form the amounts for the base bid and any alternates, written with ink or typed, in both words and figures. In the event of a discrepancy between the words and figures expressed in the base bid or alternates, the word amount shall govern. Any unit prices for separate items as called for on the Bid Form shall be written with ink or typed in figures in the appropriate blanks.
- 6.5 Bid Package Checklist:** Bidders should include with their bid the documents or information set forth in the Bid Package Checklist. See Section 16.

SECTION 7. RECEIPT AND OPENING OF BIDS

- 7.1 Delivery of Bid:** It is the responsibility of the bidder to assure that its bid is delivered to the place designated for receipt of bids and prior to the time set for receipt of bids. No bids received after the time designated for receipt of bids will be considered.
- 7.2 Receipt of Bid:** The Bid Form, the Bid Security, and all other documents required to be submitted with the bid shall be enclosed in a sealed opaque envelope and addressed as follows:

Monica Cole, Senior Buyer
Purchasing Division
Noel C. Taylor Municipal Building
215 Church Avenue, S.W., Room 202
Roanoke, Virginia 24011

Place in front lower left-hand corner of envelope the project title and bid number as indicated at the top of the Invitation to Bid. Place in the upper left-hand corner of the envelope the bidder's name, mailing address, and Virginia Contractor number.

- 7.3 Opening of Bid:** Bids will be opened and read at the time and place stated in the Invitation to Bid. The contents may be made public in accordance with Section 2.2-4342 of the Code of Virginia. The officer or agent of the City, whose duty it is to open them, will decide when the specified time has arrived. No responsibility will be attached to any officer or agent for the premature opening of a bid not properly addressed and identified.
- 7.4 Withdrawing Bid:** After the date of opening of bids, no bid may be withdrawn for at least sixty (60) calendar days after such opening date, except as provided in Section 12 of these Instructions to Bidders.

SECTION 8. BID SECURITY

Each bid of \$100,000 or more must be accompanied by a Bid Security in an amount equal to five (5%) percent of the maximum possible bid price in accordance with Sections 2.2-4336 and 2.2-4338 of the Code of Virginia. The Bid Security shall be furnished in one of the following forms:

- a. Bid Bond, in a form substantially similar to the one provided in the Contract Documents, made payable to the City of Roanoke and properly executed by the bidder as Principal and a Corporate Surety authorized to transact business in the Commonwealth of Virginia. Attorneys-in-fact who execute Bid Bonds must file with the bond a certified copy of their Power of Attorney.
- b. Certified check, cashier's check, or cash escrow deposited with the City of Roanoke Treasurer in the face amount required for the Bid Security and made payable to the City of Roanoke.
- c. Personal Bond or Letter of Credit issued by an authorized financial institution in the face amount required for the Bid Security, made payable to the City of Roanoke. These forms of security shall be submitted for review and must be approved by the City Attorney, in his/her sole discretion, at least three (3) business days prior to receipt of bids. Approval will be based upon a determination that the form of security offered will adequately protect the interests of the City as equivalent to a corporate surety's bond.
- d. For return of Bid Security, see Sections 13 and 14 of these Instructions to Bidders.

SECTION 9. INTENT

- 9.1 Work Required:** The City requires that the Successful Bidder perform a complete and satisfactory job in accordance with the Contract Documents.
- 9.2 Conflicts in Contract Documents:** Anything called for by one of the Contract Documents and not called for by the others shall be of like effect as if required or called for by all Contract Documents. In the case of conflict between the Contract Documents, the Contract Documents shall take precedence in the following order: The Contract;

addenda starting with the last issued addendum; the Supplemental General Conditions; the General Conditions; the Special Conditions; the specifications with attachments; and the drawings.

9.3 Work Not Described: All work not specifically described in the Contract Documents, yet required to produce a fully functional and properly operating project shall be provided even though every item or minor detail for the proper installation or successful operation of the entire Work is not mentioned in the Contract Documents.

9.4 Completion of Work: The Successful Bidder acknowledges and agrees that it has taken into account in its bid the requirements of the bid and Contract Documents, local conditions, availability of material, equipment, labor, and any other factors which may affect the performance of the Work. The Successful Bidder agrees and warrants that it will complete the Work not later than the time period or date indicated for completion.

SECTION 10. MATERIAL AND WORKMANSHIP

10.1 "Or Equal" Clause: The particular brand, make of material, device, or equipment described in the Contract Documents establishes a standard of required function, economy of operation, dimension, appearance, and quality to be met by any proposed substitution. No substitution will be considered unless a written request for approval has been submitted by the bidder and has been received by the Purchasing Department at least ten (10) calendar days prior to the date for receipt of bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data, and any other information necessary or required by the City Engineer for an evaluation. A statement setting forth any changes in other material, equipment, or work that incorporation of the substitute would require shall be included. The burden of proof of merit of the proposed substitute is upon the bidder.

10.2 Approval of Substitution: The City Engineer's decision of approval or disapproval of a proposed substitution shall be in his sole discretion and shall be final. If the City Engineer approves any proposed substitution, such approval will be set forth in an addendum issued to all recorded bidders. Bidders shall not rely on approvals made in any other manner.

10.3 Adaptation Due to Substitution: The Successful Bidder shall be responsible for making all changes in the Work necessary to adapt and accommodate any equivalent product or item which it uses. The necessary changes shall be made at the Successful Bidder's sole expense.

SECTION 11. STATEMENT OF QUALIFICATIONS

Each bidder shall be prepared to submit evidence of qualifications, experience, and financial ability to perform the Work set forth in the Contract Documents, should such be required by the Contract Documents or requested by the City Engineer. Furthermore, each bidder must notify the Purchasing Division and Engineering Division if bidder has been terminated from any contract or job in the last three (3) years and/or if bidder has been during the last three (3) years debarred from bidding on or performing any federal, state or local procurement or job. If so, bidder must supply details of such matters by separate written statements included with bidder's response. Any bidder who is currently debarred will not be eligible to bid on this project.

SECTION 12. ERRORS IN BIDS

- 12.1 Withdrawal of Bid:** A bidder may withdraw its bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor, or material made directly in the compilation of a bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents, and material used in the preparation of the bid sought to be withdrawn.
- 12.2 Withdrawal Procedure:** The bidder shall give notice in writing and shall submit the original work papers with such notice to the City of its claim of right to withdraw its bid within two (2) business days after the conclusion of the opening of bids as set forth in Section 2.2 - 4330 (B)(1), of the Code of Virginia.
- 12.3 Withdrawal Requirements:** Other applicable provisions of Section 2.2 - 4330 of the Code of Virginia shall apply to any errors in bids or any requested withdrawal due to errors in bids.

SECTION 13. REJECTION OF BIDS

- 13.1 Rejection of Bids:** The City reserves the right to cancel the Invitation to Bid, to reject any or all bids, to reject the bid of a bidder who is not in a position to perform the contract, or to waive any informalities in any bid.
- 13.2 Bid Security Return for Rejected Bids:** The Bid Security will be returned to all rejected bidders after the City has issued and posted an Award.
- 13.3 Bid Security Return for Unsuccessful Bids:** Should a bid not be accepted by the City within sixty (60) consecutive calendar days after the opening of bids, or within such other time specified in the Bid Documents, each bidder may obtain its Bid Security from the City.

SECTION 14. ACCEPTANCE OF BIDS, EVALUATION OF BIDS, AWARD OF CONTRACT, AND SECURITY REQUIREMENTS

- 14.1 Acceptance of Bids:** Each bidder should submit with its bid documentation the bidder's legal name and indicate the type of business entity bidder is operating under; i.e., if a corporation, bidder should enclose a copy of the Certificate of Incorporation issued by the State Corporation Commission; if a partnership, bidder should enclose a copy of the relevant portions of the Partnership Agreement; if a limited liability company, bidder should enclose a copy of the Certificate of Organization.
- 14.2 Evaluation and Award to Lowest Responsive and Responsible Bidder:** To determine the lowest responsive and responsible bidder with respect to this bid, the following items, may be considered so as to protect the interest of the City:
- a.** The total base bid plus any alternates (aka - additive bid item) the City elects to accept, if any. The City reserves the right to accept alternates in any order or combination.

- b. If a unit price contract is requested, the total amount based on the estimated quantities as set forth in the Bid Form will be considered. (The listed unit prices for each item will control and any mathematical errors may be adjusted by the Purchasing Division using the proper estimated quantities.)
- c. The ability, capacity and skill of the bidder to perform the contract or provide the services and/or items required.
- d. Whether the bidder can perform the contract promptly and within the time specified, without delay or interference.
- e. The character, integrity, reputation, judgment, experience and efficiency of the bidder.
- f. The quality of performance of previous contracts or services.
- g. The previous and existing compliance by the bidder with laws and ordinances relating to the contract, purchase or service.
- h. The equipment and facilities available to the bidder to perform the contract or provide the services and/or items.
- i. The sufficiency of the financial resources and ability of the bidder to perform the contract or provide the services and/or items.
- j. The quality, availability and adaptability of the supplies, materials, equipment or services to the particular use required.
- k. The ability of the bidder to provide future maintenance, parts and service for the use of the subject of the purchase or contract, if required.
- l. Bids shall be evaluated based on the requirements set forth in this Invitation to Bid, and other criteria to determine acceptability such as inspection, testing, quality, workmanship, delivery, suitability for a particular purpose and life cycle cost. The City, in its sole discretion, may elect to waive an informality in any bid.

Should a Contract be awarded to a bidder, it will be awarded to the lowest responsive and responsible bidder. If an award of a contract is made, notice of the award, or the announcement of the decision to award, will be made by posting a notice of such award or announcement in the foyer area of the second floor of the Noel C. Taylor Municipal Building at 215 Church Avenue, S.W., Roanoke, Virginia 24011. Said notice or announcement will also be posted on the Purchasing web page at www.roanokeva.gov/purchasing (select Awarded Bids link).

14.3 Negotiation of Bid: If the bid by the lowest responsive and responsible bidder exceeds available funds, the City reserves the right to negotiate with the apparent low bidder pursuant to Section 2.2-4318 of the Code of Virginia. The conditions and procedures under which such negotiation may be undertaken are that the appropriate City officials shall determine that the lowest responsive and responsible bid exceeds available funds

and notify such bidder in writing of its desire to negotiate. Thereafter, negotiations with the apparent low bidder may be held to obtain a Contract within available funds involving discussions of reduction of quantity, quality, or other cost saving mechanisms. Any such negotiated Contract shall be subject to final approval of the City, in the sole discretion of the City

14.4 Contract Execution: The Successful Bidder shall be required, within fourteen (14) consecutive calendar days after receipt of the Contract, to return the signed Contract, and furnish to the City all other documents as enumerated hereinafter:

- a. Performance Security (if applicable)
- b. Labor and Material Payment Security (if applicable)
- c. Certificate of Insurance
- d. Escrow Agreement (if applicable)

14.5 Security: A Performance Security and a Labor and Material Payment Security each in the amount of one hundred percent (100%) of the contract amount for all contracts in excess of One Hundred Thousand Dollars (\$100,000) in accordance with Sections 2.2-4337 and 2.2-4338 of the Code of Virginia, shall be furnished by the Successful Bidder in one of the following forms:

- a. A Performance Bond and a Labor and Material Payment Bond, on forms as provided in the Contract Documents, made payable to the City of Roanoke, properly executed by the Successful Bidder as Principal and a Corporate Surety authorized to transact business in the Commonwealth of Virginia. Attorneys-in-fact who execute the bonds must file with each bond a certified copy of their Power of Attorney.
- b. Certified checks, cashier's check, or cash escrow in the face amount required for the Performance Security and the Labor and Material Payment Security each made payable to the City of Roanoke.
- c. Personal Bond or Letter of Credit issued by an authorized financial institution in the face amount required for the Performance Security and the Labor and Material Payment Security, made payable to the City of Roanoke. These forms of security must be approved by the City Attorney, in his/her sole discretion. Approval will be based upon a determination that the form of security offered will adequately protect the interests of the City as equivalent to a corporate surety's bond.

14.6 Escrow Agreement Form: In the event the Contract meets the requirements as stipulated in Section 6.2 of these Instructions to Bidders and the Successful Bidder elects to use the escrow account procedure, the Escrow Agreement Form, as provided in the Contract Documents, shall be executed and submitted to the City within fifteen (15) calendar days after receipt of written notification of bid acceptance. If the executed Escrow Agreement Form is not submitted within the fifteen-day period, the Successful Bidder shall forfeit and waive the rights to the use of the escrow account procedure.

14.7 Bid Security Return for Successful Bid: Upon the execution of the Contract and approval of the Performance and Payment Securities, the Bid Security shall be returned to the Successful Bidder. Should the Successful Bidder fail or refuse to execute the Contract or furnish the required Performance and Payment Securities within the stipulated time, the Bid Security shall be due and paid to the City and the City shall be entitled to collect the Bid Security. In addition, the City may pursue any and all other remedies available to it at law or in equity against said bidder.

SECTION 15. ETHICS IN PUBLIC CONTRACTING

The provisions, requirements, and prohibitions as contained in Sections 2.2 - 4367 through 2.2-4377, of the Code of Virginia, pertaining to bidders, offerors, contractors, and subcontractors are applicable to this project.

SECTION 16. BID PACKAGE CHECKLIST

The following items must be completed and included in your bid package. Failure to include all required forms may result in rejection of the bid. If any of these documents were not included with your Project Manual, please contact the Office of the Purchasing Division at (540) 853-2871.

- a. Completed Bid Form (all pages).
- b. Properly Executed Bid Security (Bid Bond, Certified or Cashier's Check, etc., if applicable).

SECTION 17. PROTESTS

Any bidder who wishes to protest or object to any award made or other decisions made pursuant to the Invitation to Bid may do so only in accordance with the provisions of Sections 2.2-4357, 2.2-4358, 2.2-4359, 2.2-4360, 2.2-4363, and 2.2-4364 of the Code of Virginia, and only if such is provided for in such Code Section. Any such protest or objection must be in writing signed by a representative of the entity making the protest or objection and contain the information required by the applicable Code Sections set forth above. Such writing must be delivered to the City Purchasing Manager within the required time period.

SECTION 18. MISCELLANEOUS

- a. No bidder shall confer on any public employee having official responsibility for a purchasing transaction any payment, loan, subscription, advance, deposit or money, service, or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value is exchanged.
- b. The City may make investigations to determine the ability of the bidder to perform or supply the services or items as described in this Invitation to Bid. The City reserves the right to reject any bid if the bidder fails to satisfy the City that it is qualified to carry out the obligations of the proposed contract.
- c. The Successful Bidder must comply with the nondiscrimination provisions of Section 2.2-4311 of the Code of Virginia, which are incorporated herein by reference.

- d. The Successful Bidder must comply with the drug-free workplace provisions of Section 2.2-4312 of the Code of Virginia, which are incorporated herein by reference.
- e. It is the policy of the City of Roanoke to maximize and encourage participation by local, Small, Minority-Owned, Women-Owned, and Service Disabled Veteran-Owned businesses in all aspects of City contracting opportunities.
- f. The Successful Bidder shall comply with all applicable City, State, and Federal laws, codes, provisions, and regulations.
- g. Providers of any outside services shall be subject to the same conditions and requirements as the Successful Bidder in regards to law, code or regulation compliance. The City reserves the right of approval for any subcontract work, including costs thereof.
- h. This Invitation to Bid and all responses are subject to Section 2.2-4342 of the Code of Virginia regarding public inspection of records and the procedures a bidder must follow to protect trade secrets and proprietary information and could also be subject to the Virginia Freedom of Information Act.
- i. Conflict of Interests Act. The provisions, requirements and prohibitions as contained in Sections 2.2-3100, et. seq. of the Code of Virginia are applicable to this Invitation to Bid.
- j. The procurement provisions of the Code of the City of Roanoke (1979), as amended, Sections 23.2-1, et. seq., as well as the City Procurement Manual, apply to this Invitation to Bid, unless specifically modified herein. The City's Procurement Manual can be reviewed at the Purchasing office.
- k. Insurance. Successful Bidder, and any of its subcontractors, shall, at its or their sole expense, obtain and maintain during the life of the resultant contract the insurance policies and bonds required. Any required insurance policies and bonds shall be effective prior to the beginning of any work or other performance by Successful Bidder, or any of its subcontractors, under any resultant contract. The policies and coverages required are those as may be referred to in the sample contract and/or the general conditions or other documents of this Invitation to Bid.
- l. Each bidder is to notify in writing the Purchasing Division if any of bidder's owners, officers, employees, or agents, or their immediate family members, is currently, or has been in the past year, an employee of the City of Roanoke or has any responsibility or authority with the City that might affect the procurement transaction or any claim resulting therefrom. If so, please provide the Purchasing Division with the complete name and address of each such person and their connection to the City of Roanoke. Each bidder is advised that the Ethics in Public Contracting and Conflict of Interests Act of the Code of Virginia, as set forth in this Invitation to Bid, apply to this Invitation to Bid. Such information should be provided in writing before the bid opening date or may also be provided with the bid response.

SECTION 19. SUPPLEMENTAL INSTRUCTIONS AND/OR ADDITIONAL INFORMATION FOR BIDDERS

These Supplemental Instructions to Bidders modify, change, and/or add to the Instructions to Bidders as indicated below.

- A. The Virginia Department of Transportation (VDOT) requires that certain forms and documents be included in the ITB and any resultant contract for this Project. Therefore, these items together with any documents or items provided by the City or referred to in any of the documents are intended to be and should be construed to be consistent with each other whenever possible. If a court or agency of competent jurisdiction determines that a conflict should exist between them, and to the extent of any such conflict, the VDOT documents shall take precedence unless any Federal and/or State rules, regulations, terms, and/or provisions shall require otherwise, in which case they will take precedence. Furthermore, each Bidder, as well as the Successful Bidder, shall notify the City Engineer, in writing, if any such conflict(s) should arise among the ITB and/or resultant contract documents and identify such conflict(s) to the City Engineer. References in any VDOT documents to State, VDOT, Department, and/or Department Engineer or similar terms shall also be deemed to include the City and/or City Engineer where applicable and the Successful Bidder hereby acknowledges and agrees that the City can enforce all such items against the Successful Bidder for this Project. Bidders are advised to refer to the other parts of the ITB, especially the Supplemental General Conditions, for further information on the above items.

- B. Bidders are advised that this ITB and any information or documents provided pursuant to this ITB are subject to the Virginia Freedom of Information Act and the Federal Freedom of Information Act and the Bidder must comply with the provisions of those Acts to protect any documents the Bidder may want protected from disclosure pursuant to the provisions of those Acts.

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ADOPTED FEBRUARY 22, 2005

CITY OF ROANOKE, VIRGINIA

**Plan for Participation in Procurement
Transactions of Small Businesses and
Businesses Owned by Women and Minorities**

1. POLICY STATEMENT

It is the policy of the City of Roanoke to encourage participation by small businesses and minority-owned and women-owned business enterprises in all aspects of City contracting opportunities. In order to demonstrate its commitment to this policy, the procedures set forth in this document shall be followed whenever possible.

2. DEFINITIONS

A minority business enterprise (“MBE” or “MBES” in the plural form) is a business that is both owned and controlled by minorities. This means that minorities must own fifty-one percent of the business, and that they must control the management and daily operations of the business.

A women business enterprise (“WBE” or “WBES” in the plural form) is a business that is both owned and controlled by women. This means that women must own fifty-one percent of the business, and that they must control the management and daily operations of the business.

A small business (“SB” or “SBS” in the plural form) is a United States business that does not exceed fifty employees, is independently owned and operated, and is not dominant in its field or operation or an affiliate or subsidiary of a business dominant in its field of operation.

A minority is an individual who is a citizen or lawful resident of the United States and is Black, Hispanic, Asian American, American Indian, Alaskan Native or a member of another group who the Small Business Administration has determined is economically and socially disadvantaged under Section 8 (a) of the Small Business Act.

3. EMPLOYMENT DISCRIMINATION PROHIBITED

Every contract of over ten thousand dollars (\$10,000.00) to which the City is a party shall contain the provisions in subparagraphs (a) and (b) herein:

(a) During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
 2. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
 3. Notices, advertisement and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.
- (b) The contractor will include the provisions of the foregoing subparagraphs (a)(1), (2) and (3) in every subcontract or purchase order of over ten thousand dollars (\$10,000), with regard to the contract with the City, so that the provisions will be binding upon each subcontractor or vendor.

4. LIST OF MBEs, WBEs AND SBs

The City's Purchasing Division will establish and maintain a list of minority-owned and women-owned business enterprises. As appropriate, this list may include vendors at regional, state and national levels. A separate list of local MBES and WBES shall be established and, when established, be made available or the master list shall be searchable for local vendors. The local area shall consist of the Roanoke Valley, which shall include those areas included in the metropolitan statistical area as defined by the United States Office of Management and Budget for Census Bureau data purposes. The regional area shall include all cities, counties and towns, within the Commonwealth of Virginia, any part of which fall within a 50 mile radius of the City of Roanoke.

The City's Purchasing Division will establish and maintain a list of small businesses at the regional level.

The Purchasing Division shall serve as the primary contact for businesses to request to be added to the MBE/WBE list or the small business list and for businesses, organizations or individuals desiring access to the lists.

In maintaining these lists, the City's Purchasing Division will cooperate with the Virginia Department of Minority Business Enterprise, the United States Small Business Administration and other public or private agencies.

The Purchasing Division will maintain a list of agencies and organizations that provide assistance and/or education to MBES, WBES and SBS and inform such businesses of the resources available to them. The list will contain the types of services offered and contact information. The Purchasing Division will assist other organizations in publicizing training opportunities for MBES, WBES and SBS.

5. ALL CONTRACTS

In procuring goods and services for the City, all City employees shall follow the guidelines and mandates contained in the Purchasing Division's Procurement Manual with regard to solicitation of MBES and WBES.

When bids or proposals are solicited directly from potential contractors, solicitations shall include, when possible, appropriate businesses from the lists maintained by and/or available to the Purchasing Division, including but not limited to the list from the Virginia Department of Minority Business Enterprise.

All solicitation, addenda and award actions over \$30,000 shall be posted on the City of Roanoke's web site <http://www.roanokeva.gov>

Invitation to Bid solicitation notices over \$50,000 and Requests for Proposals estimated to be over \$30,000 shall be advertised in both The Roanoke Times and The Roanoke Tribune whenever possible. Such Invitation to Bid solicitation notices and Requests for Proposals shall also be advertised on RVTV.

6. CONSTRUCTION CONTRACTS

This paragraph shall apply to all construction contracts whenever advertising of the Invitation to Bid is required.

The bid documents will contain a list of, or a reference to a list of, MBES, WBES and SBS. The list will be provided to assist and encourage the general contractors' use of the listed businesses as subcontractors.

The City will provide a copy of the plans and specifications for all construction projects to the Southwest Virginia Community Development Fund, F. W. Dodge of Roanoke, and Valley Construction News plan room(s) so that MBES, WBES and SBS can review the documents. The documents will also be available for review, at no charge, at the Office of the City Engineer.

The City Engineer, the Purchasing Manager and the Project Engineer will require that general contractors make a "best or good faith effort" to seek the participation of and utilize MBES, WBES and SBS as suppliers and subcontractors. General contractors will be required to show that they have made efforts to recruit MBES, WBES and SBS by incorporating into the bid or proposal form:

- a. Statements indicating efforts to negotiate with MBES, WBES and SBS and the results of such efforts. Bidders will be required to list those MBES, WBES and SBS from whom quotations for labor, materials, and/or services have been solicited, and state which MBES, WBES and SBS, if any, the contractor will use on the project if awarded the bid; and
- b. A certification that the contractor has made a good faith effort to utilize MBES, WBES and SBS whenever possible.

A bid response that does not contain such statements and certification will be deemed non-responsive and will be rejected.

If the contractor listed MBES, WBES and/or SBS that it would use on the project if awarded the bid and the contractor is awarded the bid, the contractor will be required to use his or her best efforts to utilize the MBES, WBES and SBS identified by the contractor unless the contractor can demonstrate a nondiscriminatory, sound, business reason for not using the MBE, WBE or SB. The City Engineer, in his or her sole discretion, will determine whether or not the contractor has demonstrated a nondiscriminatory, sound, business reason.

The contractor, in every monthly request for payment, shall submit a status report of MBE, WBE, and SB participation in the project to date. Payment shall not be issued to the contractor until such status report is submitted.

The Purchasing Manager will closely monitor the requirements of this section.

7. RACIAL DISCRIMINATION IN CONSTRUCTION CONTRACT BONDING AND INSURANCE

In construction contracting, if any person is found by the City Manager or a designee to have engaged in discrimination on the basis of race or gender in the granting of bonds or insurance to persons who contract with or desire to contract with the City, or to persons who receive subcontracts or desire to receive a subcontract in connection with a City contract, the person shall be deemed unqualified to submit a bond or insurance for any City construction contract unless and until the City Manager or designee determines that the discrimination has been purged and that adequate assurances have been made that it will not recur. Any determination by the City Manager of a violation of this section shall be reported in writing to City Council.

8. FEDERAL, STATE OR OTHER GRANT REQUIREMENTS

In addition to the provisions of this Plan, when the City is using funds subject to federal, state or other grant requirements with regard to MBES, WBES and/or SBS, the City's Department managing the specific solicitation will take all necessary affirmative steps to assure that the requirements of the grant or program are met.

9. ECONOMIC DEVELOPMENT

The Department of Economic Development will assist the Purchasing Division by providing MBES, WBES and SBS with information regarding the resources available to them and by referring such businesses to the Purchasing Division for additional information.

The Department of Economic Development will also include MBES, WBES and SBS in any programs it has to introduce and familiarize businesses with opportunities in the City.

10. DEBARMENT

Any offeror or bidder, or any principal thereof or person associated therewith, found to have engaged in substantial and intentional misrepresentation concerning either good faith MBE, WBE and/or SB participation efforts or its status as a minority owned, women owned or small business shall be debarred from any City contracting for a period of two (2) years. This debarment shall also extend to any successor firm substantially controlled or managed, whether directly or indirectly, by any debarred individual. This determination shall be made by the City Manager or a designee; and any debarment shall be reported in writing to Council.

11. REPORTING

The Purchasing Manager shall, at the conclusion of each fiscal year, report to the City Manager for report to City Council on the Purchasing Division's compliance with this Plan and efforts made pursuant to the Plan. The report shall also include the level of participation by MBES, WBES and SBS in contracts that have been awarded by the City through formal solicitations during that fiscal year.

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CITY OF ROANOKE, VIRGINIA

BID FORM

DATE: _____

SUBMITTED BY: _____
(Exact Legal Name of Bidder)

NOTE: ALL PAGES OF THE BID FORM ARE TO BE INCLUDED IN THE COMPLETED BID. ALSO, BIDS CONTAINING ANY CONDITIONS, OMISSIONS, UNEXPLAINED ERASURES, ALTERATIONS OR ITEMS NOT CALLED FOR IN THE BID, OR IRREGULARITIES OF ANY KIND, MAY BE REJECTED BY THE CITY AS BEING NON-RESPONSIVE. NO CHANGES ARE TO BE MADE TO THE BID FORM. ANY CHANGES TO A BID AMOUNT MUST BE INITIALED BY THE AUTHORIZED PERSON SIGNING THE BID FORM.

The undersigned hereby proposes and agrees, if this bid is accepted by the City of Roanoke, to enter into a Contract with the City of Roanoke, Virginia, (hereafter - City or Owner) to furnish all equipment, materials, labor, and services necessary to perform the **Franklin Road Bridge Replacement over NS Railway Bridge, ITB No.17-02-04**, in accordance with the Contract Documents as prepared by or for the Office of the City Engineer, Roanoke, Virginia.

The quantities of work to be done at the unit prices indicated are approximate only and are intended principally to serve as a guide in evaluating bids. Subject to the constraints of the General Conditions and other Contract Documents, the quantities of work to be done and material furnished at the unit prices bid may be increased or decreased as considered necessary by the City Engineer to fully complete the Work as planned.

BASE BID SCHEDULE

ITEM DESCRIPTION	ESTIMATED QUANTITIES	UNIT	UNIT PRICE	TOTAL AMOUNT
Mobilization	1	LS		
Construction Surveying	1	LS		
Erosion and Sediment Control	1	LS		
Maintenance of Traffic and Work Area Protection	1	LS		
Dismantle And Remove Existing Structure	1	LS		
Material Disposal	1	LS		
Environmental And Worker Protection	1	LS		
Bridge Pylons	1	LS		
Concrete Surface Color Coating	1	LS		
Electrical Facilities	1	LS		
Traffic Signalization	1	LS		
Landscaping	1	LS		
Structural Steel, A709 Gr. 50W	1	LS		
Earthwork	1	LS		
Concrete, Class A4	1,134	CY		
CRR Reinf Steel, Class I	277,200	LBS		
Concrete Railing	1,479	LF		
Deck Expansion Joint	152	LF		
Bridge Deck Grooving	2,618	SY		
Concrete, Class A3	3,392	CY		
Concrete, Class C1	42	CY		
Reinforcing Steel	204,700	LBS		
Structure Excavation	5,590	CY		
Rock Excavation	18	CY		

Select Material, Type I	8,570	CY		
Drilled Shaft Std. Excavation (48" Dia.)	660	LF		
Drilled Shaft Rock Socket (42" Dia.)	144	LF		
Permanent Steel Casing	240	LF		
Cross Hole Sonic Log Testing	12	EA		
Steel Piles, HP12x53	3,230	LF		
Steel Piles, HP14x73	2,140	LF		
Architectural Treatment	543	SY		
Flowable Backfill	17	CY		
15" Concrete Pipe	52	LF		
18" Concrete Pipe	8	LF		
24" Concrete Pipe	333	LF		
30" Concrete Pipe	8	LF		
Drop Inlet DI-3B, L=10'	1	EA		
Drop Inlet DI-3B, L=12'	2	EA		
Drop Inlet DI-3BB, L=8'	1	EA		
Manhole MH-1 or 2	31	LF		
End Walls	1	EA		
Frame and Cover MH-1	4	EA		
Reconstruct Existing Manhole	1	EA		
Erosion Control Stone Cl. 2, EC-1	30	TON		
Aggr. Base Material, Type I No. 21B	1,973	TON		
Asphalt Concrete Type SM-12.5D	508	TON		
Asphalt Concrete Type BM-25.0A	606	TON		
Std. Curb CG-2	110	LF		
Radial Curb CG-2	54	LF		
Comb. Curb & Gutter CG-6	753	LF		
Radial Comb. Curb & Gutter CG-6	148	LF		

CG-12 Detectable Warning Surface	32	SY		
Concrete Sidewalk (4")	1,058	SY		
Brick Banding	580	LF		
Metal Railing	70	LF		
Flexible Pavement Planing 2"-4"	2,849	SY		
Demolition of Pavement (Flexible)	1,994	SY		
Saw Cut Pavement (Full Depth)	993	LF		
Ty. A Pave. Mark Elong. Arrow (Single)	3	EA		
Ty. A Pave. Mark Elong. Arrow (Double)	7	EA		
Pavement Line Marking (Type A, Cl. 1, 4")	5,239	LF		
Pavement Line Marking (Type A, Cl. 1, 6")	294	LF		
Pavement Line Marking (Type A, Cl. 1, 24")	80	LF		
Pavement Message Mark Bicycle Lane Symbol	6	EA		
	TOTAL BASE BID			\$

The undersigned hereby acknowledges the receipt of the following addenda to the Contract Documents:

Addendum Number _____	Dated _____
Addendum Number _____	Dated _____
Addendum Number _____	Dated _____

The undersigned hereby agrees, if this bid is accepted by the City, to commence work with an adequate force and equipment on the date stipulated in the written "Notice to Proceed" from the Office of the City Engineer and to substantially complete the work within seven hundred and twenty days (720) consecutive calendar days from the date stipulated in the written "Notice to Proceed" and to achieve Final Acceptance within thirty (30) consecutive calendar days thereafter, and to pay as liquidated damages the sum of One Thousand Dollars (\$1,000) per day to the City of Roanoke for each consecutive calendar day in excess of the time indicated to substantially complete the work as indicated above and then to reach Final Acceptance as set forth above to fully and satisfactorily complete the Work. (See Section 21 of the General Conditions.).

The Project and the work, services, and materials for such Project are subject to various VDOT, local, State terms and provisions as set forth in or referred to in the bid documents and/or any resultant contract documents.

The Bidder, by submission of this bid, hereby certifies that such Bidder has read all of the bid documents and such Bidder is making the certifications contained in and/or referred to in the bid documents and agrees to be bound by such certifications. Such Bidder further agrees that Bidder, if awarded a contract for this Project, shall provide the work, services, materials, and any other items as required by the bid documents and in compliance with such bid documents, including, but not limited to, any VDOT documents, local, State, regulations, and/or procedures contained in the bid documents and/or any resultant contract, or referred to therein. Furthermore, if there is any conflict in any of the documents, the more stringent provisions shall take precedence unless otherwise required by VDOT, and/or State documents, regulations, rules, and/or procedures, in which case they will take precedence in that order unless otherwise required by law.

By submitting a bid, the undersigned agrees it will not withdraw its bid during the time period provided for in the Invitation to Bid, except as provided for therein.

The undersigned agrees that if this bid is accepted by the City, the failure or refusal of the undersigned to execute the Contract with the City and furnish to the City the required bonds and certificates of insurance within fourteen (14) consecutive calendar days from receipt of the Contract Documents may result in a payment of the Bid Security to the City as liquidated damages.

The attention of each bidder is directed to Code of Virginia, Sections 54.1-1100, et. seq., which requires certain licenses for contractors, tradesmen, and others. Each bidder is required to determine which license, if any, it is required to have under such sections.

Complete the following:

Bidder _____ does have _____ does not have a Virginia Contractor's License. (Check appropriate blank.)

If bidder has a Virginia Contractor's License, circle the class bidder has and list the number.
Licensed "Class A", "Class B", or "Class C" Virginia Contractor Number _____
Identify Specialty _____

If bidder has another type of Virginia License, please list the type and number:
Type of license: _____ Number: _____

Bidder is a ___ resident or ___ nonresident of Virginia. (Check appropriate blank. See Code of Virginia, Sections 54.1-1100, et. seq.)

The attention of each Bidder/Offeror is directed to Virginia Code Section 2.2-4311.2, which requires a bidder or offeror organized or authorized to transact business in the Commonwealth of Virginia pursuant to Title 13.1 or Title 50 of the Code of Virginia, as amended, or as otherwise required by law, shall include in its bid or proposal the Identification Number issued to such bidder or offeror by the Virginia State Corporation Commission (SCC). Furthermore, any bidder or offeror that is not required to be authorized to transact business in the Commonwealth of Virginia as a domestic or foreign business entity under Title 13.1 or Title 50 or as otherwise required by law shall include in its bid or proposal a statement describing why the bidder or

offeror is not required to be so authorized. Please complete the following by checking the appropriate line that applies and providing the requested information:

- A. _____ Bidder/Offeror is a Virginia business entity organized and authorized to transact business in Virginia by the SCC and such bidder's/offeror's Identification Number issued to it by the SCC is _____.
- B. _____ Bidder/Offeror is an out-of-state (foreign) business entity that is authorized to transact business in Virginia by the SCC and such bidder's/offeror's Identification Number issued to it by the SCC is _____.
- C. _____ Bidder/Offeror does not have an Identification Number issued to it by the SCC and such bidder/offeror is not required to be authorized to transact business in Virginia by the SCC for the following reason(s):

Please attach additional sheets of paper if you need more space to explain why such bidder/offeror is not required to be authorized to transact business in Virginia.

The undersigned states that it has made a best or good faith effort to seek the participation of and utilize local, Small, Minority-Owned, Women-Owned, and Service Disabled Veteran-Owned Businesses as suppliers and subcontractors whenever possible for this Project. State the complete legal name of the bidder, exactly as it is recorded with the State Corporation Commission, if recorded there.

LEGAL NAME _____

BY _____ TITLE _____
(TYPED NAME: _____)

SIGNED NAME _____

DELIVERY ADDRESS _____

MAILING ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

TELEPHONE _____ FAX _____

CONTACT EMAIL ADDRESS _____

ESCROW ACCOUNT REQUESTED (if applicable): YES _____ NO _____

DELIVERY OF BIDS: See Section 7.1 of the Instructions to Bidders.

Monica Cole, Senior Buyer
Purchasing Division
215 Church Avenue, S.W.
Room 202, Noel C. Taylor Municipal Building
Roanoke, Virginia 24011

Place in lower left-hand corner of envelope the project title and ITB No. as indicated below .
Place in the upper left-hand corner of the envelope the bidder's name and mailing address.

FRANKLIN ROAD BRIDGE REPLACEMENT OVER NS RAILWAY
ROANOKE, VIRGINIA
ITB NO. 17-02-04

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

CITY OF ROANOKE, VIRGINIA

BID BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WE, THE UNDERSIGNED, _____, as Principal, and _____, as Surety, are hereby held and firmly bound unto _____, as City or Owner, in the penal sum of _____ (\$_____) for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns. Signed, sealed, and delivered this ____ day of _____, 20____.

The condition of the above obligation is such that whereas the Principal has submitted to the a certain bid, attached hereto and hereby made a part hereof, to enter a contract in writing for the _____.

NOW, THEREFORE, if the bid shall be rejected, or if the bid shall be accepted and the Principal shall execute and deliver to the City a Contract substantially in the Form of the Contract contained in the proposed Contract Documents, properly completed in accordance with the bid, and shall furnish any required bond(s) for Principal's faithful performance of the Contract and for the payment of all persons performing labor or furnishing materials in connection herewith within the specified time period, and shall in all other respects perform the agreement created by the acceptance of the bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and its bond shall be in no way impaired or affected by any extension of the time within which the City may accept such bid; and the Surety does hereby waive notice of any such extension.

This Bond shall be governed by, and construed in accordance with, the laws of the Commonwealth of Virginia, without application of Virginia's conflict of law provisions. Venue and any actions for any litigation, suits, and claims arising from or connected with this Bond and/or the Contract referred to herein shall only be proper in the Roanoke City Circuit Court, or in the Roanoke City General District Court if the amount in controversy is within the jurisdictional limit of such court, and all parties to this Bond and/or such Contract voluntarily submit themselves to the jurisdiction and venue of such courts, regardless of the actual location of such parties.

IN WITNESS WHEREOF, the Principal and the Surety have hereunder set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Attest: _____(SEAL)
Principal

By _____
Title

Witness to signature of
Attorney-in-Fact: _____(SEAL)
Surety

_____ Witness By _____
Attorney-in-Fact

(Attorneys-in-fact affix seal and attach current original or certified copy of power of attorney.)

III.

The City shall from time to time pursuant to its contract pay to the Escrow Agent amounts retained by it under the contract. Except as to amounts actually withdrawn from escrow by the City, the Contractor shall look solely to the Escrow Agent for the payment of funds retained under the contract and paid by the City to the Escrow Agent.

The risk of loss by diminution of the principal of any funds invested under the terms of this contract shall be solely upon the Contractor.

Funds and securities held by the Escrow Agent pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien, or other process whatsoever. Contractor agrees not to assign, pledge, discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety.

IV.

Upon receipt of checks drawn by the City and made payable to it as escrow agent, the Escrow Agent shall promptly notify the Contractor, negotiate the same and deposit or invest and reinvest the proceeds in approved securities in accordance with the written instructions of the Contractor. In no event shall the Escrow Agent invest the escrowed funds in any security not approved, as set forth in Section V. below.

V.

The following securities, and none other, are approved securities for all purposes of this Agreement:

- (1) United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills,
- (2) Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States,
- (3) Bonds or notes of the Commonwealth of Virginia,
- (4) Bonds of the City of Roanoke, Virginia, if such bonds carried, at the time of purchase by the Escrow Agent or deposit by the Contractor, a Standard and Poor's or Moody's Investor Service rating of at least "A", and
- (5) Certificates of deposit issued by commercial Banks located within the Commonwealth, including, but not limited to, those insured by the Escrow Agent and its affiliates.

- (6) Any bonds, notes, or other evidences of indebtedness listed in Sections (1) through (3) may be purchased pursuant to a repurchase agreement with a bank, within or without the Commonwealth of Virginia having a combined capital, surplus and undivided profit of not less than \$25,000,000, provided the obligation of the Bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the Bank is collateralized by the securities themselves, and the securities have on the date of the repurchase agreement a fair market value equal to at least 100% of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

No security is approved hereunder which matures more than five years after the date of its purchase by the Escrow Agent or deposit by the Contractor.

VI.

The Contractor may from time to time withdraw the whole or any portion of the escrowed funds by depositing with the Escrow Agent approved securities as set forth in Section V. above in an amount equal to, or in excess of, the amount so withdrawn. Any securities so deposited or withdrawn shall be valued at such time of deposit or withdrawal at the lower of par or market value, the latter as determined by the Escrow Agent. Any securities so deposited shall thereupon become a part of the escrowed fund.

Upon receipt of a direction signed by the City Manager or Assistant City Manager, the Escrow Agent shall pay the principal of the fund, or any specified amount thereof, to the City or the Contractor as the City may direct. If payment is to be made to the City, it shall be made in cash. However, if payment has been authorized to be made to the Contractor, the Contractor may specify to the Escrow Agent if payment is to be made in cash or in kind. Such payment and delivery shall be made as soon as is practicable after receipt of the direction.

VII.

For its services hereunder the Escrow Agent shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Escrow Agent and the Contractor. Such fee and any other costs of administration of this Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

VIII.

The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the Escrow Agent's fee or any other costs of administration such income shall be deemed a part of the principal of the fund.

IX.

The Surety undertakes no obligation hereby but joins in this Agreement for the sole purpose of acknowledging that its obligations as surety for the Contractor's performance of the contract are not affected hereby.

X

This Escrow Agreement shall be governed by, and construed in accordance with, the laws of the Commonwealth of Virginia, without application of Virginia's conflict of law provisions. Venue and any actions for any litigation, suits, and claims arising from or connected with this Escrow Agreement and/or Contract referred to herein shall only be proper in the Roanoke City Circuit Court, or in the Roanoke City General District Court if the amount in controversy is within the jurisdictional limit of such court, and all parties to this Escrow Agreement and/or such Contract voluntarily submit themselves to the jurisdiction and venue of such courts, regardless of the actual location of such parties.

SIGNATURE PAGE TO FOLLOW

IN WITNESS WHEREOF, the parties hereto have signed this Escrow Agreement by their authorized representatives.

Attest: (if corporation)
Witness: (if individual)

Typed Name of Contractor

President/Vice-President;
Partner or Owner (Seal)

Attest:

Typed Name of Escrow Agent

Bank Officer

Vice President

Witness:

Typed Name of Surety Company

By: _____
Attorney-In-Fact

Attest:

City of Roanoke, Virginia

City Clerk/Deputy City Clerk

City Manager

Approved as to form:

City Attorney/Assistant City Attorney

Approved as to execution:

City Attorney/Assistant City Attorney

CITY OF ROANOKE, VIRGINIA

SAMPLE CONTRACT

THIS CONTRACT is dated _____, 20____, between _____, hereinafter referred to as the "Contractor", and the City of Roanoke, Virginia, a Virginia municipal corporation, hereinafter referred to as the "City" or "Owner";

RECITALS:

WHEREAS, the Contractor has been awarded a contract by the City for

all in a proper and timely manner and in accordance with the Contract Documents, hereinafter and in the Contract Documents referred to as the "Work"; [and]

[WHEREAS, the Contractor has entered into a performance and a payment bond, with surety, each in the penalty of One Hundred Percent (100%) of the Contract sum, payable to the City of Roanoke as required by the Contract Documents;]

WHEREAS, this Project and the work, services, and materials for such Project are subject to a Virginia Department of Transportation (VDOT or Department) Programmatic Project Administration Agreement, dated September 9, 2013, between VDOT and the City, and Extension Addendum, Revenue Sharing Projects dated May 31, 2016 (VDOT Agreement or Department Agreement), and various VDOT, Federal, State, and/or Local terms and provisions as set forth therein or referred to therein and in any of the Contract Documents and the Contractor agrees to comply with all such terms and provisions.

THEREFORE, in consideration of the terms and provisions set forth herein, the Parties agree that the above Recitals are incorporated into this Contract and made a part hereof and the Parties further agree as follows:

ARTICLE 1. WORK TO BE PERFORMED AND DOCUMENTS.

For and in consideration of the sums of money hereinafter specified to be paid by the City to the Contractor for the Work provided for in this Contract and in the Contract Documents to be performed by the Contractor, the Contractor hereby covenants and agrees with the City to fully construct, perform, and complete the Work in a good and workmanlike manner in accordance with this Contract and the Contract Documents to produce a fully functional and properly operating project within the time stipulated, time being made of the essence of this Contract. It is also agreed by the parties hereto that the Contract Documents consist of this Contract and those items set forth in the definition of Contract Documents in Section 1 of the General Conditions and includes the following, all of which are and constitute a part of this Contract as if attached hereto or set out in full herein, viz:

Project Manual ITB# 17-02-04 dated August 26, 2016 including:

Invitation to Bid;

Instructions to Bidders;

General Conditions;

Supplemental General Conditions, if any;

Addendum No. _____ dated _____;

Plans and Drawings;

Specifications;

Special Conditions or similar documents, if any;

Bid Form completed by Contractor for this project;

[Ordinance No. _____ adopted _____;]

Contractor's Performance Security;

Contractor's Labor and Material Payment Security;

[Escrow Agreement, if any.]

The terms, conditions, and provisions as contained in the VDOT Agreement dated September 9, 2013 between the City and VDOT and Extension Addendum, Revenue Sharing Projects dated May 31, 2016.

ARTICLE 2. CONTRACT AMOUNT.

The City agrees to pay the Contractor for the Contractor's complete, timely, and satisfactory performance of the Work, in the manner and at the times set out in the Contract Documents the Contract Amount (or Sum) of _____ Dollars (\$ _____), as provided for in the Contract Documents and as the Contract Amount may be increased or decreased by additions and/or reductions in the Work or as the Contract Amount may be decreased by the City's assessment of liquidated damages against Contractor, or by setoff or as provided for in the Contract Documents or as allowed by law.

ARTICLE 3. TIME OF COMMENCEMENT AND COMPLETION.

The Contractor shall commence the Work to be performed under this Contract on such date as is established and fixed for such commencement by written notice to proceed given by the City Engineer to the Contractor, and the Contractor covenants and agrees to properly construct, perform, and substantially complete the Work within _____ (_____) consecutive calendar days after the date of commencement fixed and established by such notice, and to achieve Final Acceptance within thirty (30) consecutive calendar days thereafter. The Contractor further agrees that the Work shall be started promptly upon receipt of such notice and shall be prosecuted regularly, diligently, and uninterruptedly at a rate of progress that will ensure full completion thereof in the shortest length of time consistent with the Contract Documents.

ARTICLE 4. LIQUIDATED DAMAGES.

City and Contractor recognize that time is of the essence in the completion of the Work and that the City will suffer loss or damages if the Work is not completed within the period of time stipulated above, plus any extensions thereof allowed in accordance with the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving the actual loss or damages suffered by City if the Work is not completed on time. Accordingly, if such Work is not fully and satisfactorily substantially completed within the period of time set forth in Article 3, the Contractor agrees it shall owe to and pay to City as liquidated damages for loss of City's full use or occupancy of the Work, but not as a penalty, the sum of _____ Dollars (\$_____) for each consecutive calendar day during which substantial completion of the Work is delayed or exceeds the date of substantial completion identified in Article 3 of this Contract to complete the Work and then to reach Final Acceptance as set forth above to fully and satisfactorily complete the Work. Provided, however, if Final Acceptance is not achieved by the Contractor within such additional time period, then the above mentioned sum of liquidated damages shall be due and paid by the Contractor to the City as additional liquidated damages for each consecutive calendar day Contractor does not achieve such Final Acceptance. Liquidated damages are defined in Section 21 of the General Conditions. Contractor further agrees that any liquidated damages City assesses against Contractor may also be withheld by City from any retainage or other sums City may otherwise owe to Contractor. Contractor hereby waives any defense as to the validity of any liquidated damages stated herein on the grounds such liquidated damages could be void as penalties or are not reasonably related to actual damages. All such liquidated damages are in addition to any other damages the City may be entitled to recover from Contractor.

ARTICLE 5. PAYMENT FOR WORK.

Construction estimates for payment, including the final payment request, submitted by the Contractor shall be in accordance with the provisions of Sections 20, 21, and 22 of the General Conditions and such other provisions of the Contract Documents that may be applicable. Final payment will not be made until the Work has been fully and satisfactorily completed, the Contract duly performed, and a Certificate of Final Acceptance has been issued by the City Engineer, all as provided for in the Contract Documents.

ARTICLE 6. NONWAIVER.

Contractor agrees that the City's waiver or failure to enforce or require performance of any term or condition of this Contract or the City's waiver of any particular breach of this Contract by the Contractor extends to that instance only. Such waiver or failure is not and shall not be a waiver of any of the terms or conditions of this Contract or a waiver of any other breaches of the Contract by the Contractor and does not bar the City from requiring the Contractor to comply with all the terms and conditions of the Contract and does not bar the City from asserting any and all rights and/or remedies it has or might have against the Contractor under this Contract or by law.

ARTICLE 7. FORUM SELECTION AND CHOICE OF LAW.

This Contract shall be governed by, and construed in accordance with, the laws of the Commonwealth of Virginia, without application of Virginia's conflict of law provisions. Venue and

any actions for any litigation, suits, and claims arising from or connected with this Contract shall only be proper in the Roanoke City Circuit Court, or in the Roanoke City General District Court if the amount in controversy is within the jurisdictional limit of such court, and all parties to this Contract voluntarily submit themselves to the jurisdiction and venue of such courts, regardless of the actual location of such parties.

ARTICLE 8. SEVERABILITY.

If any provision of this Contract, or the application of any provision hereof to a particular entity or circumstance, shall be held to be invalid or unenforceable by a court of competent jurisdiction, the remaining provisions of the Contract shall not be affected and all other terms and conditions of the Contract shall be valid and enforceable to the fullest extent permitted by law.

ARTICLE 9. NONDISCRIMINATION.

A. During the performance of this Contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any Subcontractor, employee, or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by State law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
2. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal employment opportunity employer.
3. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

B. The Contractor will include the provisions of the foregoing Subsections A (1), (2), and (3) in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

ARTICLE 10. FAITH-BASED ORGANIZATIONS.

Pursuant to the Code of Virginia, Section 2.2 - 4343.1, be advised that the City of Roanoke does not discriminate against faith-based organizations.

ARTICLE 11. COMPLIANCE WITH FEDERAL IMMIGRATION LAW.

Contractor agrees that Contractor does not, and shall not during the performance of this Contract, knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

ARTICLE 12. COMPLIANCE WITH STATE LAW, FOREIGN AND DOMESTIC BUSINESSES AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH OF VIRGINIA.

Contractor shall comply with the provisions of Virginia Code Section 2.2-4311.2, as amended, which provides that a contractor organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership shall be authorized to transact business in the Commonwealth as a domestic or foreign business entity if so required by Title 13.1 or Title 50 or as otherwise required by law. Contractor shall not allow its existence to lapse or its certificate of authority or registration to transact business in the Commonwealth, if so required under Title 13.1 or Title 50, to be revoked or cancelled at any time during the term of the Contract. The City may void the Contract if the Contractor fails to remain in compliance with the provisions of this section.

ARTICLE 13. CONTRACT SUBJECT TO FUNDING.

This Contract is or may be subject to funding and/or appropriations from federal, state and/or local governments and/or agencies and/or from the Council of the City of Roanoke. If any such funding is not provided, withdrawn, or otherwise not made available for this Contract, the Contractor agrees that the City may terminate this Contract on 7 days written notice to Contractor, without any penalty or damages being incurred by the City. Contractor further agrees to comply with any applicable requirements of any grants and/or agreements providing for such funding.

ARTICLE 14. HEADINGS.

The captions and headings in this Contract are for convenience and reference purposes only and shall not affect in any way the meaning and interpretation of this Contract.

ARTICLE 15. COUNTERPART COPIES.

This Contract may be executed in any number of counterpart copies, each of which shall be deemed an original, but all of which together shall constitute a single instrument.

ARTICLE 16. CONSTRUCTION OF TERMS.

The terms and conditions in all parts of this Contract shall be in all cases construed according to their fair meaning and not strictly for or against any party.

ARTICLE 17. COMPLIANCE WITH VDOT AGREEMENT AND OTHER DOCUMENTS.

- A. Contractor shall fully, properly, and timely provide and perform all the Work, services, materials, and other items required for this Project in accordance with the Contract, including the VDOT Agreement (a copy of which is attached as Exhibit A to this Contract), Federal, State, and/or Local documents included or referred to in the bid documents and/or this Contract, and in the ITB. Such VDOT Agreement is hereby deemed a part of this Contract for this Project and is binding on the Contractor. Notwithstanding anything else in the ITB and/or in the Contract, the Contractor is advised and shall at all times comply with the VDOT Agreement and all applicable terms, provisions, and requirements of any VDOT, Federal, State, and/or Local documents,

rules, regulations, policies, procedures, and directives, as they now exist or may be amended or promulgated from time to time during the term of this Contract, including without limitation those listed directly and/or by reference in the Contract and Contract Documents. The Contractor's failure to so comply shall constitute a material breach of this Contract. Furthermore, if the Contractor discovers that there are any conflicts between the terms and provisions of any Contract Documents, the Contractor shall immediately notify the City Engineer, in writing, of any such conflict(s). However, the provisions of the VDOT Agreement are intended to be and shall be construed to be consistent with all other terms and provisions in the Contract and the Contract Documents, but if a court or agency of competent jurisdiction determines that a conflict should exist between them, and to the extent of any such conflict, the more stringent requirements shall apply unless otherwise required by the rules, regulations, and/or procedures of VDOT, the law, or the Federal and/or State agencies involved in the Project, in which case those items will take precedence in that order unless otherwise required by law. Furthermore, Contractor shall incorporate this Contract and the VDOT Agreement into all subcontracts and tiers of subcontractors for this Project.

- B. Recovery of funds paid for unauthorized and/or unapproved Work. Contractor shall repay to the City any funds Contractor may have received for any Work, services, and/or materials Contractor provided and/or performed for this Project if any such items were not properly authorized and approved by the City, VDOT, and any other approving local, State, or Federal agency, and/or for any funds the City may have to repay to VDOT and/or any Federal or State agency due to the actions and/or omissions of the Contractor, including but not limited to, any reporting or record keeping requirements.

- C. Incorporation of VDOT, Federal, State, and/or Local terms. The Contract terms and provisions include certain standard terms and conditions required by VDOT, Federal, State, and/or Local agencies, whether or not expressly set forth in the Contract provisions. All contractual provisions required by VDOT, Federal, State, and/or Local agencies involved in this Project are hereby incorporated by reference. Anything to the contrary notwithstanding, all Federal, VDOT, State, and/or Local mandated terms shall be deemed to control in the event of a conflict with other provisions contained in the Contract with the order of precedence being in that order unless otherwise required by law. The Contractor agrees to and shall not perform any act, fail to perform any act, or refuse to comply with any request that would cause the City to be in violation of any Federal, VDOT, State, and/or Local terms and conditions.

ARTICLE 18. ENTIRE CONTRACT.

This Contract, including any attachments, exhibits, and referenced documents, constitutes the complete understanding between the parties. This Contract may be modified only by written agreement properly executed by the parties.

SIGNATURE PAGE TO FOLLOW

IN WITNESS WHEREOF, the parties hereto have signed this Contract by their authorized representatives.

Attest/Witness:

Typed Legal Name of Contractor

By _____
President/Vice-President; Partner or Owner

Typed or Printed Name and Title

Typed or Printed Name and Title
(Contractor's Corporate Seal)

Attest/Witness:

CITY OF ROANOKE, VIRGINIA

By _____

Typed or Printed Name and Title

Typed or Printed Name and Title

Appropriation and Funds Required
for this Contract Certified

Approved as to form:

Director/Deputy Director of Finance

City Attorney/Assistant City Attorney

Date: _____

Account #: _____

Approved as to execution:

City Attorney/Assistant City Attorney

EXHIBIT A

To Contract Dated _____

Between City of Roanoke and

For Franklin Road Bridge Replacement over NS Railway
ITB No. 17-02-04

VDOT Standard Project Administration Agreement
Dated September 9, 2013
(5 pages in length)

And

Extension Addendum
Dated May 31, 2016
(1 page in length)

PROGRAMMATIC PROJECT ADMINISTRATION AGREEMENT
Revenue Sharing Projects

00924513810139 BR RVD

09-15-13A11:19 RCVD

THIS AGREEMENT, made and executed in triplicate this 9th day of September 2013, by and between the City of Roanoke, Virginia, hereinafter referred to as the LOCALITY and the Commonwealth of Virginia, Department of Transportation, hereinafter referred to as the DEPARTMENT.

WHEREAS, the LOCALITY may, in accordance with §33.1-23.05 of the *Code of Virginia* (1950), as amended (the *Code*), and Commonwealth Transportation Board (CTB) policy, submit application(s) for Revenue Sharing funding and may also administer projects approved for Revenue Sharing funding by the CTB; and

WHEREAS, Appendix A documents the funding allocated to each Project and shall be developed and included as an attachment to this agreement. Such attachment may be amended, revised or removed or an additional Appendix A may be added as additional projects or funding is approved by the CTB and allocated to the LOCALITY to finance the Project(s) within the term of this Agreement without the need to execute an additional project administration agreement; and

WHEREAS, current and future projects approved for Revenue Sharing funding by the CTB within the term of this agreement and subject to the terms and conditions specified herein shall be identified on a list which will be included as an attachment to this Agreement as Appendix B. Such attachment may be amended as additional projects are approved by the CTB and shall be signed by an authorized LOCALITY and VDOT official, without the need to execute an additional project administration agreement. If any active project with an existing agreement is incorporated herein, the original project agreement shall automatically terminate upon inclusion in this programmatic agreement of an updated Appendix A and an amended Appendix B to reflect that project; and

WHEREAS, both parties have concurred in the LOCALITY's administration of the phase(s) of work for the respective Project(s) listed in the attachments in accordance with applicable federal, state and local laws and regulations and that the locality will certify compliance with those laws and regulations as prescribed by the Department.

NOW THEREFORE, in consideration of the mutual premises contained herein, the parties hereto agree as follows:

1. This agreement shall be effective for an initial period of THREE fiscal years and may be extended by an addendum signed by each party for one additional term of THREE fiscal years unless a change in policy or the *Code* necessitates a change in terms and conditions before the term of this agreement shall have passed. This Agreement shall NOT extend beyond SIX fiscal years. In the event that a new agreement becomes necessary during the life of this Agreement, Appendix A and Appendix B may be incorporated within the new approved agreement upon mutual agreement by both parties.

2. The LOCALITY shall:
- a. Be responsible for all activities necessary to complete the noted phase(s) of each Project shown on the Appendix B and on the respective Project's Appendix A, except for activities, decisions, and approvals which are the responsibility of the DEPARTMENT, as required by federal or state laws and regulations or as otherwise agreed to, in writing, between the parties.
 - b. Receive individual prior written authorization from the DEPARTMENT to proceed with each project.
 - c. Administer the Project(s) in accordance with guidelines applicable to state funded Locally Administered Projects as published by the DEPARTMENT.
 - d. Provide certification by a LOCALITY official of compliance with applicable laws and regulations on the State Certification Form for State aid projects or in another manner as prescribed by the DEPARTMENT for each project included in Appendix B.
 - e. Maintain accurate and complete records of each Project's development of all expenditures and make such information available for inspection or auditing by the DEPARTMENT. Records and documentation for items for which reimbursement will be requested shall be maintained for not less than three (3) years following acceptance of the final voucher on each Project.
 - f. No more frequently than monthly, submit invoices with supporting documentation to the DEPARTMENT in the form prescribed by the DEPARTMENT. The supporting documentation shall include copies of related vendor invoices paid by the LOCALITY and also include an up-to-date Project summary and schedule tracking payment requests and adjustments.
 - g. Reimburse the DEPARTMENT all Project expenses incurred by the DEPARTMENT if, due to action or inaction solely by the LOCALITY, the project becomes ineligible for state reimbursement, or in the event the reimbursement provisions of Section 33.1-44 or Section 33.1-70.01 of the *Code*, or other applicable provisions of state law or regulations require such reimbursement.
 - h. Pay the DEPARTMENT the LOCALITY's matching funds for eligible Project expenses incurred by the DEPARTMENT in the performance of activities set forth in paragraph 3.a.
 - i. Administer the Project in accordance with all applicable federal, state, and local laws and regulations. Failure to fulfill these obligations may result in the forfeiture of state-aid reimbursements. DEPARTMENT and LOCALITY staffs will work together to cooperatively resolve any issues that are identified so as to avoid any forfeiture of state-aid funds.

- j. If legal services other than those provided by staff counsel are required in connection with condemnation proceedings associated with the acquisition of Right-of-Way, the LOCALITY will consult the DEPARTMENT to obtain an attorney from the list of outside counsel approved by the Office of the Attorney General. Costs associated with outside counsel services shall be reimbursable expenses of the project.
 - k. For projects on facilities not maintained by the DEPARTMENT, provide, or have others provide, maintenance of the Project upon completion, unless otherwise agreed to by the DEPARTMENT.
3. The DEPARTMENT shall:
- a. Perform any actions and provide any decisions and approvals which are the responsibility of the DEPARTMENT, as required by federal or state laws and regulations or as otherwise agreed to, in writing, between the parties.
 - b. Upon receipt of the LOCALITY's invoices pursuant to paragraph 2.f, reimburse the LOCALITY the cost of eligible Project expenses, as described in Appendix A. Such reimbursements shall be payable by the DEPARTMENT within 30 days of an acceptable submission by the LOCALITY.
 - c. If appropriate, submit invoices to the LOCALITY for the LOCALITY's share of eligible Project expenses incurred by the DEPARTMENT in the performance of activities pursuant to paragraph 2.a.
 - d. Audit the LOCALITY's Project records and documentation as may be required to verify LOCALITY compliance with applicable laws and regulations.
 - e. Make available to the LOCALITY guidelines to assist the parties in carrying out responsibilities under this Agreement.
4. Appendix A identifies the specific funding sources for each Project under this Agreement, phases of work to be administered by the LOCALITY, and additional project-specific requirements agreed to by the parties. There may be additional elements that, once identified, shall be addressed by the parties hereto in writing, which may require an amendment to this Agreement.
5. If designated by the DEPARTMENT, the LOCALITY is authorized to act as the DEPARTMENT's agent for the purpose of conducting survey work pursuant to Section 33.1-94 of the *Code*.
6. Nothing in this Agreement shall obligate the parties hereto to expend or provide any funds in excess of funds agreed upon in this Agreement or as shall have been included in an annual or other lawful appropriation. In the event the cost of a Project under this agreement is anticipated to exceed the allocation shown for such Project on the respective Appendix A, both parties agree to cooperate in providing additional funding for the Project or to terminate the Project before its cost exceeds the allocated amount, however

the DEPARTMENT and the LOCALITY shall not be obligated to provide additional funds beyond those appropriated pursuant to an annual or other lawful appropriation.

7. Nothing in this agreement shall be construed as a waiver of the LOCALITY's or the Commonwealth of Virginia's sovereign immunity.
8. The Parties mutually agree and acknowledge, in entering this Agreement, that the individuals acting on behalf of the Parties are acting within the scope of their official authority and the Parties agree that neither Party will bring a suit or assert a claim against any official, officer, or employee of either party, in their individual or personal capacity for a breach or violation of the terms of this Agreement or to otherwise enforce the terms and conditions of this Agreement. The foregoing notwithstanding, nothing in this subparagraph shall prevent the enforcement of the terms and conditions of this Agreement by or against either Party in a competent court of law.
9. The Parties mutually agree that no provision of this Agreement shall create in the public, or in any person or entity other than parties, rights as a third party beneficiary hereunder, or authorize any person or entity, not a party hereto, to maintain any action for, without limitation, personal injury, property damage, breach of contract, or return of money, or property, deposit(s), cancellation or forfeiture of bonds, financial instruments, pursuant to the terms of this of this Agreement or otherwise. Notwithstanding any other provision of this Agreement to the contrary, unless otherwise provided, the Parties agree that the LOCALITY or the DEPARTMENT shall not be bound by any agreements between either party and other persons or entities concerning any matter which is the subject of this Agreement, unless and until the LOCALITY or the DEPARTMENT has, in writing, received a true copy of such agreement(s) and has affirmatively agreed, in writing, to be bound by such Agreement.
10. This agreement may be terminated by either party upon 30 days advance written notice. Eligible Project expenses incurred through the date of termination shall be reimbursed in accordance with paragraphs 2.f, 2.g, and 3.b, subject to the limitations established in this Agreement and Appendix A. Should the LOCALITY unilaterally cancel a project agreement, the LOCALITY shall reimburse the DEPARTMENT all state funds reimbursed and expended in support of the project, unless otherwise mutually agreed-upon prior to termination.

THE LOCALITY and DEPARTMENT acknowledge and agree that this Agreement has been prepared jointly by the parties and shall be construed simply and in accordance with its fair meaning and not strictly for or against any party.

THE LOCALITY and the DEPARTMENT further agree that should Federal-aid Highway funds be added to any project, this agreement is no longer applicable to that project and the applicable Appendix A shall be removed from this agreement and the Standard Project Administration Agreement for Federal-aid Projects executed for that project.

THIS AGREEMENT, when properly executed, shall be binding upon both parties, their successors, and assigns.

THIS AGREEMENT may be modified in writing by mutual agreement of both parties.

IN WITNESS WHEREOF, each party hereto has caused this Agreement to be executed as of the day, month, and year first herein written.

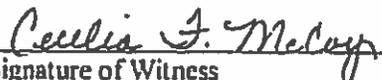
CITY OF ROANOKE, VIRGINIA:

Authorized by Resolution No. 39730-080513

By 

Christopher P. Morrill
Typed or printed name of signatory

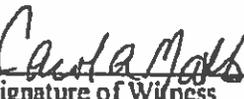
City Manager 8/21/13
Title Date

 8/21/13
Signature of Witness Date

NOTE: The official signing for the LOCALITY must attach a certified copy of his or her authority to execute this agreement.

COMMONWEALTH OF VIRGINIA, DEPARTMENT OF TRANSPORTATION:

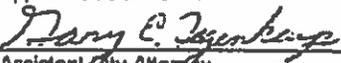
 9/9/13
Commissioner of Highways Date
Commonwealth of Virginia
Department of Transportation

 9/9/13
Signature of Witness Date

Attachments
Appendix A (for each project covered under this Agreement)
Appendix B (listing Project(s) covered under this Agreement)

Appendix A will be made available to successful bidder upon request

Appropriation and Funds Required for this Contract Certified
for 
City Director of Finance
Date: 8/20/13
Account No.: Various Accounts

Approved as to Form: indication (7-15-13)

Assistant City Attorney 8-15-13

**PROGRAMMATIC PROJECT ADMINISTRATION AGREEMENT
EXTENSION ADDENDUM
Revenue Sharing Projects**

THIS ADDENDUM is made and executed in triplicate this 31 day of May, 2016, by and between the City of Roanoke Virginia, hereinafter referred to as the LOCALITY and the Commonwealth of Virginia, Department of Transportation, hereinafter referred to as the DEPARTMENT.

WHEREAS, the LOCALITY and the DEPARTMENT, entered into a Programmatic Project Administration Agreement for Revenue Sharing Projects on September 9, 2013; and

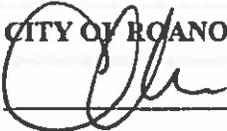
WHEREAS, said agreement has an initial term of three fiscal years (each year beginning July 1st - June 30th), and will expire on June 30, 2016, and may be extended for one additional term of three fiscal years; and

WHEREAS, the parties to the agreement hereby declare their intent to extend said agreement as provided in Paragraph 1 of said agreement and further declare that such terms and provisions provided therein shall remain unchanged.

NOW THEREFORE, in consideration of the mutual premises contained therein and in this Addendum, the parties agree to extend said agreement for one additional term of three fiscal years with a new expiration date of June 30, 2019.

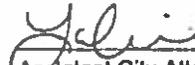
IN WITNESS WHEREOF, each party hereto has caused this Addendum to be executed as of the day, month, and year first herein written.

CITY OF ROANOKE, VIRGINIA: Authorized by Resolution No. 40493-050216



Christopher P. Morrill
Typed or printed name of signatory

Approved as to Form:

 5-6-16
Assistant City Attorney

City Manager _____

Title _____


Signature of Witness

5-9-16
Date

05/09/2016
Date

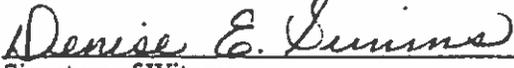
NOTE: The official signing for the LOCALITY must attach a certified copy of his or her authority to execute this addendum.

COMMONWEALTH OF VIRGINIA, DEPARTMENT OF TRANSPORTATION:



Chief of Policy
Commonwealth of Virginia
Department of Transportation

5/31/16
Date


Signature of Witness

5/31/16
Date

CITY OF ROANOKE, VIRGINIA
CONTRACTOR'S PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

that _____

(Insert full name or legal title and address of Contractor)

as Principal, (hereinafter referred to as "Contractor"),

and _____

(Insert full name or legal title and address of Surety)

Telephone: _____ Fax: _____

as Surety (hereinafter referred to as "Surety"), are held and firmly bound unto the City of Roanoke, Virginia, a municipal corporation, 215 Church Avenue, S.W., Noel C. Taylor Municipal Building, Room 350, Roanoke, Virginia 24011, as Obligee (hereinafter referred to as "City" or "Owner"), in the amount of _____

Dollars (\$ _____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents to the terms of this bond.

WHEREAS, Contractor has entered into a Contract with the City dated _____, 20____, incorporating certain specifications and drawings prepared by:

(Insert full name or legal title and address)

(which Contract, specifications, drawings, and other Contract Documents are hereinafter referred to collectively as the "Contract") for a fully functional and properly operating project, namely _____

_____ all in a proper and timely manner and in accordance with the Contract Documents, which Contract is expressly incorporated herein by reference and made a part of this bond.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall promptly and faithfully perform the Contract, in strict conformity with each and every requirement of the Contract, then this obligation shall be null and void; otherwise, this Performance Bond shall remain in full force and effect and is subject to the following conditions:

- a. Any alteration which may be made in the terms of the Contract, including, without limitation, the amount to be paid or the work to be done under it, or the giving by the City of any extension of time for the performance of the Contract or any other forbearance of any nature whatsoever on the part of either the City or the Contractor to the other shall not in any way release the Contractor and the Surety, or either of them, their heirs, executors, administrators, successors, or assigns from their liability hereunder, and notice of such alteration, extension, or forbearance is hereby expressly waived by Surety.
- b. IT IS NOT INTENDED BY ANY OF THE PROVISIONS OF ANY PART OF THIS BOND TO CONFER A BENEFIT UPON ANY OTHER PERSON OR ENTITY NOT A PARTY TO THIS PERFORMANCE BOND OR TO AUTHORIZE ANY PERSON OR ENTITY NOT A PARTY TO THIS BOND TO MAINTAIN A SUIT PURSUANT TO THE TERMS OR PROVISIONS OF THIS BOND OTHER THAN THE CITY OR ITS SUCCESSORS OR ASSIGNS.
- c. This Bond shall be governed by, and construed in accordance with, the laws of the Commonwealth of Virginia, without application of Virginia's conflict of law provisions. Venue and any actions for any litigation, suits, and claims arising from or connected with this Bond and/or the Contract referred to herein shall only be proper in the Roanoke City Circuit Court, or in the Roanoke City General District Court if the amount in controversy is within the jurisdictional limit of such court, and all parties to the Bond and/or Such Contract voluntarily submit themselves to the jurisdiction and venue of such courts, regardless of the actual location of such parties.
- d. Any suit under this bond must be instituted within one (1) year after (i) completion of the Contract, including the expiration of all warranties and guarantees, or (ii) discovery of the defect or breach of warranty, if the action be for such, whichever period is longer.

SIGNED AND SEALED this ____ day of _____, 20____, in the presence of:

WITNESS:

CONTRACTOR

By: _____ (Seal)

(Type Name and Title)

WITNESS:

SURETY

By: _____ (Seal)

Attorney-in-Fact

(Type Name and Title)

(Attorneys-in-fact affix seal and attach original or certified copy of current power of attorney.)

CITY OF ROANOKE, VIRGINIA

CONTRACTOR'S LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

that _____

(Insert full name or legal title and address of Contractor)

as Principal, (hereinafter referred to as "Contractor"),

and _____

(Insert full name or legal title and address of Surety)

Telephone: _____ Fax: _____

as Surety (hereinafter referred to as "Surety"), are held and firmly bound unto the City of Roanoke, Virginia, a municipal corporation, 215 Church Avenue, S.W., Noel C. Taylor Municipal Building, Room 350, Roanoke, Virginia 24011, as Obligee (hereinafter referred to as "City" or "Owner"), for the use and benefit of Claimants as herein below defined, in the amount of _____

Dollars (\$ _____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents to the terms of this bond.

WHEREAS, Contractor has entered into a Contract with the City dated _____, 20____, incorporating certain specifications and drawings prepared by:

(Insert full name or legal title and address)

(which Contract, specifications, drawings, and other Contract Documents are hereinafter referred to collectively as the "Contract") for providing a fully functional and properly operating project, namely _____

_____ all in a proper and timely manner and in accordance with the Contract Documents, which Contract is expressly incorporated herein by reference and made a part of this bond.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall promptly make payment to all Claimants, as hereinafter defined, for all material furnished or labor supplied or performed in the prosecution of the work provided for in the Contract, then this obligation shall be void; otherwise this Labor and Material Payment Bond shall remain in full force and effect and is subject to the following conditions:

- a. Any alteration which may be made in the terms of the Contract, including, without limitation, the amount to be paid or the work to be done under it, or the giving by the City of any extension of time for the performance of the Contract or any other forbearance of any nature whatsoever on the part of either the City or the Contractor to the other shall not in any way release the Contractor and the Surety, or either of them, their heirs, executors, administrators, successors, or assigns from their liability hereunder, and notice of such alteration, extension, or forbearance is hereby expressly waived by Surety.
- b. A Claimant is defined as one who has and fulfills a contract to supply labor or materials, or both, to the Contractor or to any of the Contractor's subcontractors, in the prosecution of work provided for in the Contract, labor and material being construed to include, without limitation, public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the site, or who may otherwise be allowed by law to file a claim against the Contractor and/or Surety.
- c. The Contractor and Surety hereby jointly and severally agree with City that every Claimant, as defined in paragraph b, **who has a direct contractual relationship with the Contractor and** who has performed labor or furnished material in accordance with the Contract in the prosecution of the work provided for in the Contract and who has not been paid in full therefore before the expiration of ninety (90) days after the day on which such Claimant performed the last such labor or furnished the last of such materials for which Claimant claims payment, or as may otherwise be allowed by law, may bring an action on this payment bond to recover any amount due Claimant for such labor or material, and may prosecute such action to final judgment and have execution on the judgment. The Contractor and Surety expressly agree that City shall not be liable for the payment of any judgment, costs, or expenses resulting from any such suit and that neither Contractor nor Surety shall cause City to be named as a party in any such suit.
- d. The Contractor and Surety hereby jointly and severally agree with City that every Claimant, as defined in paragraph b, who has direct contractual relationship with any subcontractor, but who has no contractual relationship, express or implied, with such Contractor, may bring an action on this bond only if the Claimant has given written notice to the Contractor within **ninety (90)** days from the day on which the Claimant performed the last of the labor or furnished the last of the materials for which payment is claimed, stating with substantial accuracy the amount claimed and the name of the person for whom the work was performed or to whom the material was furnished, or as may otherwise be allowed by law. **Notice to the Contractor shall be given as set forth in Virginia Code §2.2-4341 and Claimants are advised to review such Code Section.** The Contractor and Surety expressly agree that City shall not be liable for the payment of any judgment, costs, or expenses resulting from any such suit and that neither Contractor nor Surety shall cause City to be named as a party in any such suit.

- e. This Bond shall be governed by, and construed in accordance with, the laws of the Commonwealth of Virginia, without application of Virginia's conflict of law provisions. Venue and any actions for any litigation, suits, and claims arising from or connected with this Bond and/or the Contract referred to herein shall only be proper in the Roanoke City Circuit Court, or in the Roanoke City General District Court if the amount in controversy is within the jurisdictional limit of such court, and all parties to this Bond and/or such Contract voluntarily submit themselves to the jurisdiction and venue of such courts, regardless of the actual location of such parties.

- f. Any suit or action hereunder shall be brought within one year after the day on which the person bringing such action last performed labor or last furnished or supplied materials, or within such other time period as may be allowed by law, whichever is longer.

SIGNED AND SEALED this ____ day of _____, 20____, in the presence of:

WITNESS:	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> CONTRACTOR
<hr style="border: 0; border-top: 1px solid black; margin-top: 20px;"/>	By: _____ (Seal)
	<hr style="border: 0; border-top: 1px solid black; margin-top: 10px;"/> (Type Name and Title)
WITNESS:	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> SURETY
<hr style="border: 0; border-top: 1px solid black; margin-top: 20px;"/>	By: _____ (Seal)
	Attorney-In-Fact
	<hr style="border: 0; border-top: 1px solid black; margin-top: 10px;"/> (Type Name and Title)

(Attorneys-in-fact affix seal and attach current original or certified copy of power of attorney.)

CITY OF ROANOKE, VIRGINIA

CERTIFICATE OF SUBSTANTIAL COMPLETION

The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the City Engineer when construction is sufficiently complete, in accordance with the Contract Documents, so the City of Roanoke, Virginia (City or Owner) can occupy or utilize the Work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

ITB NO.: _____

PROJECT: _____

CONTRACTOR: _____

PROJECT OR DESIGNATED PORTION SHALL INCLUDE: _____

The Work or portion thereof designated above performed under this Contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby established as _____. The City will assume possession thereof at _____ a.m./p.m. on that date.

A list of items ("punch list"), prepared by the A/E and/or City Engineer, to be completed or corrected by the Contractor, is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The Contractor will complete any portion of the Work that is not substantially complete and will complete or correct the work on the punch list in accordance with the Contract Documents.

The establishment of a date of substantial completion and/or the acceptance of the Work or designated portion thereof does not relieve the Contractor of any responsibility for any faulty materials or workmanship or operate to relieve the Contractor or its Surety from any obligation under the Contract with the City or the Performance Bond or Labor and Material Payment Bond.

This Certificate is subject to the terms and conditions of the Contract Documents, including but not limited to Section 20.8 of the General Conditions.

_____ Contractor	By _____	_____ Date
_____ City of Roanoke, Virginia City	By _____	_____ Date

CITY OF ROANOKE, VIRGINIA
AFFIDAVIT OF PAYMENT OF CLAIMS

By: _____

(Insert Exact Name and Address of Firm)

This day _____ personally appeared before me,
_____, a Notary Public in and for the City (County) of
_____, and, being by me first duly sworn states that all subcontractors
and suppliers of labor and materials have been paid all sums due them for work performed or
materials furnished in the performance of the Contract between the City of Roanoke, Virginia,
and _____, Contractor, dated _____, 20____, for

_____ or arrangements have been made by the Contractor satisfactory to such subcontractors and
suppliers with respect to the payment of such sums as may be due from the Contractor to the
subcontractors and suppliers.

CONTRACTOR: _____
BY: _____
PRINTED OR TYPED NAME AND TITLE: _____

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF _____

I, _____, a Notary Public in and for the Commonwealth of
Virginia, do hereby certify that _____,
whose name is signed to the foregoing, has subscribed, sworn to and acknowledged the same
before me this _____ day of _____, 20_____.

Seal: _____
Notary Public
Registration #: _____
My Commission Expires: _____

CITY OF ROANOKE, VIRGINIA

**SMALL BUSINESS, MINORITY-OWNED BUSINESS, WOMEN-OWNED BUSINESS,
SERVICE DISABLED VETERAN-OWNED BUSINESS (SB/MB/WB/SDVB)
USAGE STATUS FORM**

FORM TO BE SUBMITTED WITH FINAL REQUEST FOR PAYMENT.

Section I:

ITB No: _____ Date: _____

Project: _____

Prime Contractor: _____

List all SB/MB/WB/SDVB contractors or subcontractors and/or suppliers used on this project / solicitation and indicate what type of entity it is (i.e. SB, MB, WB, or SDVB):

_____ Type: _____ Amount : _____

_____ Type: _____ Amount : _____

_____ Type: _____ Amount : _____

Attach additional sheet(s) if necessary.

Section II:

Total Project Value: _____

Total SB/MB/WB/SDVB Value: _____

Percent SB/MB/WB/SDVB Work: _____

Section III:

I hereby certify that the above figures are true and reflective of the amount of SB/MB/WB/SDVB work used on this project / solicitation.

Legal Name of Contractor

Typed or Printed Name and Title

Signature

Date

CITY OF ROANOKE, VIRGINIA

CERTIFICATE OF FINAL ACCEPTANCE

This Certificate is subject to the terms and conditions of the Contract Documents, including but not limited to Section 20.8 of the General Conditions. The City and Contractor hereby agree that the date fixed for Final Acceptance of the Work by the City is _____.

The establishment of a date of Final Acceptance and/or the acceptance of the Work does not relieve the Contractor of any responsibility for any faulty materials or workmanship or operate to relieve the Contractor or its Surety from any obligation under the Contract with the City, including, but not limited to, any guaranties or warranties, or the Performance Bond or Labor and Material Payment Bond.

ITB NO. _____

PROJECT: _____

CONTRACTOR: _____

_____ Contractor	_____ By	_____ Date
_____ City of Roanoke, Virginia City	_____ By	_____ Date

CITY OF ROANOKE, VIRGINIA

GENERAL CONDITIONS

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CITY OF ROANOKE, VIRGINIA

GENERAL CONDITIONS

SECTION 1. DEFINITIONS

Whenever used in these General Conditions or in the Contract Documents, the following terms have the meanings indicated, which are applicable to both the singular and plural and the male and female gender thereof, and where applicable to any other legal entity such as a corporation, partnership, limited liability company, etc.

The section and paragraph headings are inserted for convenience only.

Architect, Engineer, Architect/Engineer or A/E: The term used to designate the Architect and/or the Engineer who contracts with the City to provide the Architectural and Engineering services for the project. The Architect/Engineer is a separate Contractor and is referred to herein as the Architect/Engineer or abbreviated as A/E. The term includes any associates or consultants employed by the firm to assist in providing the A/E services.

Bidder: The person, firm, corporation, or other entity interested in submitting a bid for the Work to be performed.

Change Order: A document issued by the City Engineer on or after the effective date of the Contract which is agreed to by the Contractor and approved by the City, and which authorizes an addition, deletion, or revision in the Work, including any adjustment in the Contract Price and/or the Contract Time.

City or Owner: The City of Roanoke, Virginia, or its authorized representative.

City Code: Refers to the Code of the City of Roanoke (1979), as amended.

City Engineer: The City Engineer or his authorized representative.

City Manager: The City Manager or his authorized representative.

Code of Virginia: Refers to the Code of Virginia (1950), as amended. (Sometimes referred to as Va. Code or Virginia Code.)

Contract Documents: These documents include, but are not limited to, the Project Manual, Invitation to Bid, the Instructions to Bidders, the Bid Form, the Contract, the Bonds or other Bid Security, the Escrow Agreement, the General Conditions, Supplemental General Conditions, Special Conditions, the Specifications, Addenda or Change Orders, the Plans and Drawings, any Supplemental Drawings, and any additional documents incorporated by reference in the above.

Contract: The written agreement between the parties concerning the performance of the Work and consisting of the Contract Documents.

Contractor: The person, firm, corporation, or other entity entering into a contractual agreement with the City to perform the Work.

Defect, Defective, or Deficient: An adjective or noun which when modifying or referring to the word Work refers to Work or any part thereof that is unsatisfactory, faulty, or does not conform to the Contract Documents, or does not meet the requirements of any inspections, standards, tests, or approvals referred to in the Contract Documents.

Document(s): This term includes, but is not limited to: writings, drawings, items on which words, symbols, or marks are recorded; electronic data of any type; videotapes, recordings, photographs and negatives, digital or otherwise; and any other form of data, writing, or information compilation, however recorded or stored, and regardless of physical form or characteristics.

Field Order: A written order issued by the City Engineer which clarifies the requirements of the Contract by giving a more complete expression of the drawings or specifications or other documents without any change in the design, the Contract price, or the Contract time.

Final Acceptance: The City's acceptance of the project from the Contractor upon confirmation from the City Engineer and the Contractor that the project is apparently complete in accordance with the Contract requirements.

Notice: All written notices, demands, instructions, claims, approvals, and disapprovals required to obtain compliance with the Contract requirements. Any written notice by either party to the Contract shall be sufficiently given if delivered to or at the last known business address of the person, firm, or corporation constituting the party to the Contract, or to his, her, their, or its authorized agent, representative, or officer.

Notice to Proceed: A written notice given by the City at the City's discretion to the Contractor fixing the date on which the Contract time will commence for the Contractor to begin the prosecution of the Work in accordance with the requirements of the Contract Documents.

Project Inspector: One or more individuals employed by the City to inspect the Work and/or to act as Resident Inspector to the extent required by the City. The City shall notify the Contractor of the appointment of such Project Inspector(s).

Provide: Shall mean to furnish and install ready for its intended use.

Subcontractor: A person, firm, partnership, corporation, or other entity having a direct contract with the Contractor or with any other Subcontractor for the performance of the Work. It includes one who provides on-site labor, but does not include one who only furnishes or supplies material for the project.

Submittals: All drawings, diagrams, illustrations, brochures, schedules, samples, electronic data and other data required by the Contract Documents which are specifically prepared by or for the Contractor, Subcontractor, or Supplier, and submitted by the Contractor to illustrate the material, equipment, or layouts, or some other portion of the Work.

Substantial Completion: The date certified by the City Engineer when construction is sufficiently complete, in accordance with the Contract Documents, so the City can occupy or utilize the Work or designated portion thereof for the purposes for which it is intended.

Supplier: A manufacturer, fabricator, distributor, materialman, or vendor who provides only material or supplies for the project, but does not provide on-site labor.

Utilities: Utilities include all public and private lines, cables, conduit, pipelines, and appurtenances, whether underground, on the surface, and/or aerial, that may exist on the project site and/or adjoining public streets and/or rights-of-way for the purpose of providing communications, gas, petroleum, electricity, water, sanitary sewer, storm sewer, drainage, energy, signals, or lighting service to the site or adjoining properties.

Work or Project: The entire completed construction or the various separately identifiable parts thereof as required by the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating material and equipment into the construction.

SECTION 2. INDEMNITY PROVISION

2.1 Indemnity: Contractor shall indemnify and hold harmless City and its officers, agents, and employees against any and all liability, losses, damages, claims, causes of action, suits of any nature, costs, and expenses, including reasonable attorney's fees, resulting from or arising out of Contractor's or its employees, agents, or subcontractors actions, activities, or omissions, negligent or otherwise, on or near City's property or easement or arising in any way out of or resulting from any of the work to be provided under this Contract, and this includes, without limitation, any fines or penalties, violations of federal, state, or local laws or regulations, personal injury, wrongful death, or property damage claims or suits, breach of contract claims, indemnity claims, and any other damages, losses, and/or claims of any type.

2.2 Hazardous Material: While on City's property or easement and in its performance of this Contract, Contractor shall not transport, dispose of or release any hazardous substance, material, or waste, except as necessary in performance of its Work under this Contract and in any event Contractor shall comply with all federal, state, and local laws, rules, regulations, and ordinances controlling air, water, noise, solid wastes, and other pollution, and relating to the storage, transport, release, or disposal of hazardous material, substances or waste. Regardless of City's acquiescence, Contractor shall indemnify and hold City, its officers, agents, and employees harmless from all costs, claims, damages, causes of action, liabilities, fines or penalties, including reasonable attorney's fees, resulting from Contractor's violation of this paragraph and agrees to reimburse City for all costs and expenses incurred by City in eliminating or remedying such violations. Contractor also agrees to reimburse City and hold City, its officers, agents, and employees harmless from any and all costs, expenses, attorney's fees and all penalties or civil judgments obtained against the City as a result of Contractor's use or release of any hazardous substance or waste onto the ground, or into the water or air from or upon City's premises. (See also Section 13.2 of these General Conditions.)

2.3 Patents: The Contractor shall protect, indemnify, and hold harmless the City from any and all demands for fees, claims, suits, actions, causes of action, or judgments based on the alleged infringement or violation of any patent, invention, article, trademark, arrangement, or other apparatus that may be used in the performance of the Contract or the Work.

SECTION 3. LAWS, REGULATIONS, PERMITS, AND IMMIGRATION LAW

3.1 Regulations: The Contractor shall fully comply with all local, state, and federal ordinances, laws, and regulations, including without limitation all applicable building and fire code sections of the Occupational Safety and Health Act (OSHA), and the Virginia Uniform Statewide Building Code, and obtain all required licenses and permits, including business license, building permits, and pay all charges and expenses connected

therewith. Contractor further agrees that Contractor does not, and shall not during the performance of this Contract, knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

- 3.2 Permits:** The Contractor shall, at its sole cost, obtain all required permits from the appropriate authorities, including a Right of Way Excavation Permit(s) from the City of Roanoke. Contractor shall obtain an additional separate Excavation Permit Bond(s) in accordance with the requirements of the City's Right of Way Excavation and Restoration Standards. Revised July 1, 2013, together with any other documents and/or items that may be required by the City's Department of Public Works and/or Department of Planning, Building and Development. No delay or extension of time or any claim for additional compensation of any type shall be granted for failure to obtain any required permits.
- 3.3 Litter:** In accordance with the Virginia Anti-Litter Law, receptacles sufficient to contain workmen's litter and construction wastes capable of being spread by wind or water shall be located on the construction site. The number and size of receptacles required shall be determined by the Contractor.
- 3.4 Asbestos License:** The Contractor, if not licensed as an asbestos abatement contractor or a Roofing, Flooring, and Siding (RFS) contractor in accordance with Section 54.1-514, of the Code of Virginia, shall have all asbestos related work performed by subcontractors who are duly licensed as asbestos contractors or RFS contractors as appropriate for the work required.

SECTION 4. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

Neither the Contractor nor any subcontractor shall commence work under this Contract until the Contractor has obtained and provided proof of the required insurance under this Section to the City, and such proof has been approved by the City. The Contractor confirms to the City that all subcontractors have provided the Contractor with proof of insurance, or will do so prior to commencing any work under this Contract. Contractor further warrants that proof of coverage as provided to the City responds on a primary basis in the event of an uninsured or underinsured subcontractor. All such insurance shall be primary and non-contributory to any insurance or self-insurance the City may have in force.

4.1 For All Contracts, the following minimum insurance requirements apply:

a. Workers' Compensation and Employers' Liability:

The Contractor shall obtain and maintain the following limits:

Workers' Compensation: Statutory coverage for Virginia

Employers' Liability: \$100,000 Bodily Injury by Accident each occurrence
\$500,000 Bodily Injury by Disease Policy Limit
\$100,000 Bodily Injury by Disease each employee

b. Commercial General Liability:

Coverage is to be written on an "occurrence" basis and such coverage shall include broad form extension endorsements for both liability and property damage.

Completed Operations coverage will be required to be maintained for the life of the Contract.

For Limits of Liability see Sections 4.2 and 4.3 of these General Conditions.

c. Automobile Liability:

Limits for vehicles owned, non-owned, hired or borrowed shall not be less than:

- \$1,000,000 Bodily Injury and Property Damage combined single limit per occurrence.

d. Additional Insurance Requirements:

Additional specific insurance coverage minimum requirements to be provided by Contractor may include the following or as detailed in the Supplemental General Conditions or in other Contract Documents:

- 1) Builders Risk: At the discretion of the City, the Contractor, at its cost, shall obtain and maintain in the names of the City and the Contractor "all-risk" builders risk insurance (if approved by the City) upon the entire structure or structures on which the Work of this Contract is to be done and upon all material in or adjacent thereto or those that are "off-site" but which are intended for use thereon, to one hundred percent (100%) of the completed value thereof.
- 2) Property Coverage: Installation Floater (and Rigger's Form, if applicable) will be required for the installation of contents or equipment, coverage will begin with supplier and continue until equipment/contents has been fully installed. Floater will be valued for the replacement cost value of equipment/contents including all costs. The Contractor shall provide coverage for portions of the work stored off-site after written approval of the City at the value established in the approval and for portions of the work in transit.
- 3) Special Hazards: In the event special hazards are evident in the work contemplated, or if required by the Contract Documents, the Contractor shall obtain and maintain during the life of the Contract a rider to the policy or policies required, in an amount not less than that stipulated under the above Paragraphs. Should any unexpected special hazards be encountered during the performance of this Contract, the Contractor shall, prior to performing any work involving the special hazard, immediately obtain this insurance as instructed by the City. In the event the special hazard requiring the additional coverage was not a part of the original bid, the expense of such insurance shall be reimbursed to the Contractor by

the City, otherwise the Contractor shall assume full responsibility for the purchase with no charge back to the City.

- 4) Deductible: Deductible/self-insured retention amounts shall be reduced or eliminated upon written request from City. The insurer's cost of defense (and appeal), including attorney's fees, shall not be included within the coverages provided but shall remain the insurer's responsibility.
- 5) Term: Insurance shall remain in effect until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective work.
- 6) Limit of Liability: Nothing contained in these insurance requirements is to be construed as limiting the liability of Contractor or Contractor's insurance carriers. City does not in any way represent that the coverages or the limits of insurance specified is sufficient or adequate to protect Contractor's interests or liabilities, but are merely minimums. The obligation of the Contractor to purchase insurance herein shall not in any way limit the obligation of the Contractor in any event and/or in the event that the City should suffer an injury or loss in excess of the amount recoverable through insurance.

4.2 Contracts of \$100,000 or More: The following minimum insurance requirements apply in addition to the above requirements:

a. Limits of Liability: For the Commercial General Liability policy:

- \$2,000,000 general aggregate
- \$1,000,000 products/completed operations aggregate
- \$1,000,000 personal and advertising injury
- \$1,000,000 each occurrence

Coverage is to be written on an "occurrence" and "per project" basis and such coverage shall include:

b. Umbrella Liability Insurance:

This coverage shall be written for minimum limit of:

- \$5,000,000 each occurrence for Personal and Bodily Injury and Property Damage

This Policy shall apply in excess and follow the form of employer's liability, commercial general liability, and auto liability.

4.3 Contracts Less Than \$100,000: The following minimum insurance limits apply unless specified otherwise in the Supplemental General Conditions:

a. Limits of Liability: For the Commercial General Liability policy:

- \$1,000,000 general aggregate
- \$1,000,000 products/completed operations aggregate
- \$1,000,000 personal and advertising injury
- \$1,000,000 each occurrence

- 4.4 Proof of Insurance Coverage:** The policies of insurance required by Sections 4.1, 4.2, or 4.3 shall be purchased from a reputable insurer licensed to do business in Virginia and maintained for the life of the Contract by the Contractor. Other insurance requirements include the following:
- a. The Contractor shall furnish the City with the required certificates of insurance showing the insurer, type of insurance, policy number, policy term, deductible, and the amount insured for property coverages and the limits for liability coverages.
 - b. The Contractor shall notify the City Engineer and Risk Manager in writing within five (5) consecutive calendar days if any of the insurance coverages or policies are cancelled or materially altered and Contractor shall immediately replace such policies and provide documentation of such to the City Engineer and Risk Manager.
 - c. The required insurance policies and coverages, excluding those for Workers' Compensation and Professional Liability, shall name the City of Roanoke, its officers, agents, volunteers and employees as additional insureds, and the certificate of insurance shall show if the policies provide such coverage. Waiver of subrogation is required with respect to any policy of workers' compensation and employers' liability insurance required under this Section. The certificate of insurance shall show if the policies provide such waiver. Additional insured and waiver endorsements shall be received by the City's Risk Manager from the insurer with the certificate of insurance unless the City's Risk Manager agrees to another process. The City's Risk Manager may approve other documentation of such insurance coverages.
 - d. Insurance coverage shall be in a form and with an insurance company approved by the City which approval shall not be unreasonably withheld. Any insurance company providing coverage under this Contract shall be authorized to do business in the Commonwealth of Virginia.

SECTION 5. EMPLOYMENT AND CONDUCT OF PERSONNEL

- 5.1 City Residents:** The Contractor is encouraged to try to use City residents, and local, Small, Minority-Owned, Women-Owned, and Service Disabled Veteran-Owned businesses, when practical.
- 5.2 Employee Qualifications:** Only skilled and reliable workers shall be employed for the Work. Should any person employed on the Work by the Contractor appear to the City Engineer to be incompetent, unable to perform the Work, or disorderly, such person shall be removed from the Work immediately upon proper notice to the Contractor from the City Engineer and such person shall not again be used for this Contract.
- 5.3 Superintendence:** The Contractor shall have a competent foreman or superintendent, satisfactory to the City Engineer, on the jobsite at all times during the progress of the Work. The Contractor shall notify the City, in writing, of any proposed change in the foreman or superintendent including the reason therefore prior to making such change.
- 5.4 Drug-free Workplace:** During the performance of this Contract, the Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in

conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purpose of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a Contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the Contract.

The Contractor shall post a copy of the policy in a conspicuous place at the jobsite and assure that all Contractor, subcontractor, and supplier personnel entering the jobsite are informed of the policy.

SECTION 6. EMPLOYMENT DISCRIMINATION BY CONTRACTOR PROHIBITED

Every Contract of over \$10,000 to which the City is a party shall contain the provisions in Sections 6.1 and 6.2 herein:

6.1 Nondiscrimination: During the performance of this Contract, the Contractor agrees as follows:

- a. The Contractor will not discriminate against any Subcontractor, employee, or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by State law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal employment opportunity employer.
- c. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

6.2 Nondiscrimination by Subcontractor or Vendor: The Contractor will include the provisions of the foregoing Subsections 6.1 (a), (b), and (c) in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

SECTION 7. SUBCONTRACTORS

- 7.1 Licensure:** The Contractor shall comply with Title 54.1, Chapter 11, of the Code of Virginia, with respect to licensure of itself and all subcontractors employed to work on the project. The Contractor represents that it has verified that all subcontractors hold all required state and local licenses, including State Contractor's license and City business license. The Contractor shall verify that any additional subcontractors employed to work on the project, subsequent to the initial verification, hold all required state and local licenses, including State Contractor's license and City business license. Upon request from the City Engineer, Contractor shall provide documentation of compliance with this Section 7.1. Failure to comply constitutes a material breach of the Contractor's Contract with the City.
- 7.2 Change of Subcontractors:** Subcontractors shall not be changed without the written approval of the City Engineer.
- 7.3 Responsibility for Subcontractors:** The Contractor shall not employ for the project any subcontractor that the City may, within a reasonable time, object to as unsuitable. The Contractor further agrees that it is as fully responsible to the City for the acts and omissions of its subcontractors, suppliers, and invitees on the jobsite and of persons either directly or indirectly employed by them, as the Contractor is for the acts and omissions of persons directly employed by it.

SECTION 8. CONDITIONS AT SITE

- 8.1 Existing Conditions:** The Contractor shall have visited the site prior to bidding and is responsible for having ascertained pertinent local conditions such as location, accessibility, and general character of the site, and the character and extent of existing improvements and work within or adjacent to the site. Claims as a result of failure to have done so will not be considered by the City and will be the sole responsibility of the Contractor.
- 8.2 Hidden Conditions:** If, in the performance of the Contract, hidden physical conditions of a building being modified are exposed revealing unusual or materially different conditions than those ordinarily encountered or inherent in work of this nature, or if subsurface or latent conditions at the site are found which are materially different from those frequently present in the locality, from those indicated in the Contract Documents, or from those inherent in work of the character required by the Contract, the Contractor must report such conditions to the City Engineer before the conditions are disturbed. Upon such notice, or upon his own observation of such conditions, the City Engineer will make such changes in the Contract Documents as he finds necessary to conform to the different conditions. Any change in the cost of the Work or the time needed for completion must be requested pursuant to Section 19 of these General Conditions.
- 8.3 Suspected Hazardous Material:** If the Contractor, during the course of the project, observes the existence of any material which it suspects or knows to be hazardous to human health or the environment, the Contractor shall promptly notify the City Engineer. The City Engineer will provide the Contractor with instructions regarding the situation. The Contractor shall not perform any work involving the material or any work causing the material to be less accessible prior to receipt of special instructions from the City Engineer.

SECTION 9. SURVEYS AND LAYOUT

- 9.1 Surveying Services:** All necessary drawings showing the location of property lines, buildings, and other appropriate information shall be furnished to the Contractor through the drawings and specifications. The Contractor shall provide competent surveying and engineering services to verify the given information and to execute the Work in accordance with the Contract requirements and shall be responsible for the accuracy of Contractor's surveying and engineering services. The Contractor shall immediately notify the City Engineer of any discrepancies and confirm such notice in writing within five (5) calendar days.
- 9.2 Survey Control:** Such general reference points and bench marks on the building site as will enable the Contractor to proceed with the Work will be established in the drawings and specifications. If the Contractor finds that any previously established reference points have been lost or destroyed, Contractor shall promptly notify the City Engineer.
- 9.3 Damage to Survey Control:** The Contractor shall protect and preserve the established bench marks and monuments and shall make no changes in locations without written notice to and approval from the City Engineer. Any of these which may be lost or destroyed or which require shifting because of necessary changes in grades or locations shall, subject to prior approval from the City Engineer, be replaced and accurately located by the Contractor.

SECTION 10. DRAWINGS AND SPECIFICATIONS

- 10.1 Drawings and Specifications:** The general character and scope of the Work are illustrated by the drawings and specifications. Where on any of the drawings a portion of the Work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other like portions of the Work. If the Contractor deems additional detail or information to be needed, Contractor may request the same in writing from the City Engineer. The Contractor shall carry out the Work in accordance with the drawings and specifications and any additional detail drawings and instructions as issued by the City Engineer. However, Contractor shall immediately notify the City Engineer of any discrepancies in such drawings and/or specifications and confirm such notice in writing within five (5) calendar days.
- 10.2 Discrepancies in Drawings:** In case of difference between small and large scale drawings, the large scale drawings shall govern, unless otherwise directed in writing by the City Engineer.
- 10.3 "Similar":** Where the word "similar" appears on the drawings, it shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection with other parts of the Work.
- 10.4 Division of Specifications:** The specifications are divided into several parts for convenience only, since the entire specifications must be considered as a whole. The divisions of the specifications are not intended to control the Contractor in dividing the work among subcontractors or to limit the work performed by any trade. The Contractor shall be responsible for the coordination of the trades, subcontractors, and vendors engaged upon this Work.
- 10.5 Dimension Accuracy:** Measurements or dimensions shown on the drawings for site features, utilities, and structures shall be verified at the site by the Contractor. The location of underground utilities indicated on the plans are diagrammatic and were plotted from available records and field survey information and shall be considered

approximate only, and the City makes no representations with regard to their accuracy. The Contractor shall not scale measurements or dimensions from the drawings. Where there are discrepancies, the City Engineer shall be consulted. Where new work is to connect to, match with, or be provided for existing work, the Contractor shall verify the actual existing conditions and related dimensions prior to ordering or fabrication, so that such new work will properly fit with existing work.

- 10.6 As-Built Drawings:** The Contractor shall maintain at the site for the City one copy of all drawings, specifications, addenda, approved shop or setting drawings, change orders, field deviations, and other documents or modifications (referred to herein as "As-Built Drawings") in good order and marked to record all changes as they occur during construction. These shall be available to the City Engineer, the Project Inspector, and the City's testing personnel. These "As-Built Drawings" shall be neatly and clearly marked in color during construction to record all variations from the drawings made during construction. The representation of such variations shall include such supplemental notes, symbols, legends, documents, and details as may be necessary to clearly show the as-built construction.
- 10.7 Record Drawings:** Upon completion of the Work and prior to Final Acceptance, the Contractor shall deliver to the City Engineer, for preparation of the Record Drawings, one complete set of "As-Built Drawings" and documents referred to in Section 10.6 as well as an electronic copy, if available, or if requested by the City Engineer.

SECTION 11. SCHEDULE OF THE WORK

- 11.1 Scheduling:** The Contractor is responsible for the sequencing, scheduling, and coordinating of the Work, for monitoring the progress of the Work, and for taking appropriate action to keep the Work on schedule. The Contractor is responsible for coordinating Contractor's work on the Project with any other work being carried on by the City or by other City consultants or contractors at the site or for the Project. The Contractor shall prepare and submit to the City Engineer a schedule for accomplishing the Work based upon the completion time stated in the Contract and submit such to the City Engineer at the pre-construction conference. No progress payments will be made to the Contractor until after Contractor has submitted a schedule which is acceptable to the City Engineer. All schedules under Section 11 shall be in both paper and electronic form unless otherwise directed by the City Engineer.
- 11.2 Progress:** The Contractor shall review the progress of the Work not less than each month, but as often as necessary to properly manage the project and stay on schedule. The Contractor shall collect and preserve information on Change Orders, including extensions of time. The Contractor shall evaluate this information and update the schedule monthly to finish within the contractually allowed time. The Contractor shall submit the updated schedule with each progress payment request. The scheduled completion date shall be within the period of time allowed by the Contract for completion of construction, except as amended by any Change Orders.
- 11.3 Delay and Recovery Schedule:** Should there be any delay, the City Engineer may require the Contractor to prepare, at no extra cost to the City, a plan of action and a recovery schedule for completing the Work by the contractual completion date. The plan of action and recovery schedule shall explain and display how the Contractor intends to regain compliance with the original schedule. The plan of action and recovery schedule, when required, shall be submitted and approved by the City Engineer prior to Contractor's submission of the next monthly construction estimate. The City may withhold progress payments until such schedule is submitted and approved.

SECTION 12. CONSTRUCTION SUPERVISION

The Contractor shall be solely responsible to supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract. The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor is solely responsible to the City that the finished Work complies with the Contract Documents. The Contractor shall be solely responsible for health and safety precautions and programs for workers and others in connection with the Work. No inspection by, knowledge on the part of, or acquiescence by the City, or any other entity whatever shall relieve the Contractor from its sole responsibility for compliance with the requirements of the Contract or responsibility for health and safety programs and precautions.

SECTION 13. STANDARDS FOR MATERIAL INSTALLATION AND WORKMANSHIP

- 13.1 Material and Equipment:** Unless otherwise specifically provided in this Contract, all equipment, material, and accessories incorporated in the Work are to be new and in first class condition. The Contractor shall furnish to the City Engineer for approval the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature, and rating of the machinery and mechanical and other equipment which the Contractor contemplates incorporating in the Work. Machinery, equipment, material, and articles installed or used without required approval may be subject to subsequent rejection by the City.
- 13.2 Hazardous Substances:** Unless specifically approved by the City or required by the specifications, the Contractor shall not incorporate any material into the Work containing asbestos or any material known by the Contractor to contain a substance known to be hazardous to human health. If the Contractor becomes aware that a material required by the specifications contains asbestos or other hazardous substances, it shall notify the City and the City Engineer immediately and shall take no further steps to acquire or install any such material without first obtaining City approval. (See also Sections 2.2 and 8.3 of these General Conditions.)
- 13.3 Workmanship:** The workmanship shall be of the highest quality found in the building industry in every respect. All items of Work shall be done by workmen skilled in the particular task to which they are assigned. In the acceptance or rejection of work, no allowance will be made for lack of skill on the part of workmen. Poor or inferior workmanship (as determined by the City Engineer, the City, or other inspecting authorities) shall be removed and replaced to conform to the highest quality standards of the trades concerned, or otherwise corrected to the satisfaction of the City Engineer, the City, or other inspecting authority all at the Contractor's sole expense.
- 13.4 Instructions for Installation:** Under the various sections of the specifications, where specified items are supplied with the manufacturer's printed instructions, recommendations, or directions for installation, or where such instructions, recommendations, or directions are available, installation of the specified items shall be in strict accordance with the manufacturer's printed instructions unless those instructions contradict the drawings or specifications, in which case the City Engineer will be notified by Contractor for an interpretation and decision.
- 13.5 Installation Procedures Without Instructions:** Where neither the manufacturer's printed instructions are available for installation of specific items, nor are specific code or standards given by reference to govern the installation of specific items; and where there

is doubt concerning the installation procedures to be followed or the quality of workmanship to be maintained in the installation of specific items, the Contractor shall consult the City Engineer for approval of the installation procedures Contractor proposes to follow or the specific standards governing the quality of workmanship Contractor proposes to maintain during the installation of the items in question.

- 13.6 Codes and Standards:** Under the various sections of the specifications, where reference is made to specific codes or standards governing the installation of specified items, installation shall in all cases be in strict accordance with the referenced codes and standards. Where no reference is made to specific codes or standards, installation shall conform to the generally recognized applicable standards for first-class installation of the specific item to be installed. Contractors are expected to be proficient and skilled in their respective trades and knowledgeable of the National Fire Protection Association (NFPA), the current edition of the Virginia Uniform Statewide Building Code (USBC) and its referenced technical codes and standards, Occupational Safety and Health Act (OSHA) and other codes and standards applicable to installations and associated work by its trade and/or that are applicable to the Work.

SECTION 14. SUBMITTALS

- 14.1 General:** The Contractor shall submit for the approval of the City Engineer all submittals required by the specifications or requested by the City Engineer. All such submissions shall be made with such promptness as to cause no delay in this or any other part of the project, and to allow reasonable time for checking, correcting, resubmitting, and rechecking. No part of the Work dealt with by a submittal shall be fabricated by the Contractor, save at Contractor's own risk, until such approval has been given. The Contractor shall maintain one (1) set of approved submittals at the jobsite at all times.
- 14.2 Format:** Submittals shall be made in such number of copies that two (2) approved copies may be retained by the City Engineer. Each submission shall be accompanied by a letter of transmittal listing the contents of the submission and identifying each item by reference to specification section or drawings. All submittals shall be clearly labeled with the name of the project and other necessary information. Catalog plates and other similar material that cannot be so labeled conveniently, shall be bound in suitable covers bearing the identifying data.
- 14.3 Supporting Material:** Submittals shall be accompanied by all required certifications and other such supporting material and documents, and shall be submitted in such sequence or in such groups that all related items may be checked together. When submittals cannot be checked because the submission is not complete, or because submittals on related items have not been received, then such submittals will be returned without action or will be held, not checked, until the material which was lacking is received.
- 14.4 Coordination:** Submittals shall have been reviewed by the Contractor and coordinated with all other related or affected work before they are submitted for approval, and shall bear the Contractor's certification that it has checked and approved them as complying with the information given in the Contract Documents. Submittals made without such certification and coordination will be returned to the Contractor without action, and will not be considered a formal submission. The Contractor shall be responsible for checking all dimensions and coordinating all material and trades to ensure that the material proposed will fit in the space available and be compatible with other material provided.

- 14.5 Variations:** If the submittals show variations from the Contract Documents because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in Contractor's letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the Work in accordance with the Contract Documents even though such submittals have been approved.
- 14.6 "Or Equal":** The drawings and/or specifications may indicate that the City Engineer designed or detailed a portion of the plans around a particular product (most commonly a piece of equipment). Should a different product be proposed by the Contractor and accepted, all modifications, rerouting, relocations, and variations required for proper installation and coordination to comply with the design concept and requirements of the Contract Documents shall be the sole responsibility of the Contractor and shall be made at no extra cost to the City. This naming of a particular product, around which the plans were designed or detailed, is not intended to preclude the use of other products or favor the product named when a "brand name or equal" specification has been used. (See also Section 10 of Instructions to Bidders.) Rather it is only intended to acknowledge the reality that in many instances the City Engineer must design around the dimensions and characteristics of a particular product.
- 14.7 Review by City Engineer:** The City Engineer will review and respond to the submittals within fourteen (14) calendar days. Checking and/or approval of submittals will be for general conformance with the design concept of the project and compliance with the information given in the Contract Documents, and will not include verification of quantities, detailed dimensions, nor adjustments of dimensions to actual field conditions. Approval shall not be construed as permitting any departure from Contract requirements, authorizing any increase in price or time for completion or relieving the Contractor of the responsibility for any error in details, dimensions, or otherwise that may exist.
- 14.8** The Work shall be in accordance with approved submittals.

SECTION 15. INSPECTION AND INDEPENDENT TESTING

- 15.1 Inspection and Testing:** All material and workmanship shall be subject to inspection, examination, and testing by the City Engineer at any and all times during manufacture and/or construction. The City Engineer shall have authority to reject defective material and workmanship and require its correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be satisfactorily replaced with proper material without charge therefore, and the Contractor shall promptly segregate and remove the rejected material from the premises. If the Contractor fails to proceed at once with replacement of rejected material and/or the correction of defective workmanship, the City may, by contract or otherwise, replace such material and/or correct such workmanship and charge the cost to the Contractor, and/or may terminate the right of the Contractor to proceed as provided in Sections 26 or 27 of these General Conditions, the Contractor and surety being liable for any damage to the same extent as provided for in those Sections.
- 15.2 Payment for Inspection, Testing, and Certification:**
- a. Jobsite inspections, tests conducted on site, or tests of material gathered on site which the Contract requires to be performed by independent testing entities shall

be contracted and paid for by the City. The Contractor shall promptly furnish, without additional charge, all reasonable facilities, labor, and material necessary for making such tests. Except as provided in Section 15.3 below, whenever such examination and testing finds defective material, equipment, or workmanship, the Contractor shall reimburse the City for the cost of reexamination and retesting.

- b. Although conducted by independent testing entities, the City will not contract and pay for tests or certifications of material, manufactured products or assemblies which the Contract, codes, standards, etc. require to be tested and/or certified for compliance with industry standards such as Underwriters Laboratories, Factory Mutual or ASTM. If there are any fees to be paid for such tests and certifications, they shall be paid by the Contractor.
- c. The Contractor shall also pay for all inspections, tests, and certifications which the Contract specifically requires it to perform or pay, together with any inspections and tests which it chooses to perform for its own quality control purposes.

15.3 Examination of Completed Work: Should it be considered necessary or advisable by City or the City Engineer at any time before final acceptance of the entire Work to make an examination of any part of the Work already completed, by removing or tearing out portions of the Work, the Contractor shall on request promptly furnish all necessary facilities, labor, and material to expose the Work to be tested to the extent required. If such Work is found to be defective in any respect, due to the fault of the Contractor or its Subcontractors, Contractor shall pay for all the expenses of uncovering the Work, of examination and testing, and of satisfactory reconstruction. If, however, such Work is found to meet the requirements of the Contract, the actual cost of the Contractor's labor and material necessarily involved in uncovering the Work, the cost of examination and testing and Contractor's cost of material and labor necessary for replacement shall be paid to the Contractor and it shall, in addition, if completion of the Work has been delayed thereby, be granted a suitable extension of time.

15.4 Suspension of Work: The City may suspend the Work when in its judgment the drawings and specifications are not being followed. Any such suspension shall be issued in writing and continued only until the matter in question is resolved to the satisfaction of the City. The cost of any such Work stoppage shall be borne by the Contractor unless it is later determined that no fault existed in the Contractor's Work.

15.5 Project Inspector: Failure of the Project Inspector to note or require correction of improper or defective work does not relieve the Contractor from its responsibility to correct such improper or defective work. The Project Inspector has no authority to and shall not:

- a. Enter into the area of responsibility of the Contractor's superintendent;
- b. Issue directions relative to any aspect of construction means, methods, techniques, sequences or procedures, or in regard to safety precautions and programs in connection with the Work;
- c. Authorize or suggest that the City occupy the project, in whole or in part; or
- d. Issue a certificate for payment.

SECTION 16. USE OF PREMISES AND REMOVAL OF DEBRIS

- 16.1 Jobsite Coordination:** The Contractor shall perform the Contract in such a manner as not to interrupt or interfere with the operation of any existing activity on the premises or with the work of any other contractor.
- 16.2 Storage of Material:** The Contractor shall store apparatus, material, supplies, and equipment in such orderly fashion at the site of the Work as will not unduly interfere with the progress of its Work or the work of any other contractor.
- 16.3 Jobsite Appearance:** The Contractor expressly undertakes, either directly or through its Subcontractor(s), to clean up frequently all refuse, rubbish, scrap material, and debris caused by his operations, to the end that at all times the jobsite shall present a neat, orderly, and workmanlike appearance. No such refuse, rubbish, scrap material, and debris shall be left within the completed Work nor buried on the building site, but shall be properly protected and removed from the site and properly disposed of in a licensed landfill or otherwise as required by law.
- 16.4 Final Cleaning:** The Contractor expressly undertakes, either directly or through its Subcontractor(s), before final payment, to remove all surplus material, false work, temporary structures, including foundations thereof, and debris of every nature resulting from its operations and to put the site in a neat, orderly condition, to thoroughly clean and leave reasonably dust free all finished surfaces including all equipment, piping, etc., on the interior of all buildings included in the Contract; and to thoroughly clean all glass installed under the Contract including the removal of all paint and mortar splatter and other defacements. If a Contractor fails to clean up at the completion of the Work, the City may do so and charge for costs thereof to the Contractor in accordance with these General Conditions.
- 16.5 Erosion Control:** During and at completion of the Work, the Contractor shall prevent site soil erosion, the runoff of silt and/or debris carried by water from the site, and the blowing of dust or debris off the site in accordance with the applicable requirements and standards of the Virginia Erosion and Sediment Control Handbook, latest edition, and of the Contract Documents and the requirements of the City's Department of Planning, Building and Development.

SECTION 17. PROTECTING PERSONS AND PROPERTY

- 17.1 Protection on Site:** The Contractor expressly undertakes, both directly and through its Subcontractor(s), to take every reasonable precaution at all times for the protection of all persons and property which may come on the jobsite or be affected by the Contractor's operation in connection with the Work.
- 17.2 Safety and Health Precautions:** The Contractor shall be solely responsible for initiating, maintaining, and supervising all safety and health precautions and programs in connection with the Work, including but not limited to provision of appropriate sanitation facilities, if applicable.

- 17.3 Protecting the Public:** The Contractor shall in all cases protect the public and the Work, during its execution, by posting and maintaining, at its expense, appropriate signs, barricades, barriers, lights, flagmen, and other safety devices in accordance with the current edition of the "Virginia Work Area Protection Manual".
- 17.4 Protecting the Work and Adjacent Property:** The Contractor shall continuously maintain adequate protection of all the Work from damage and shall protect the City's property from injury or loss arising in connection with this Contract. The Contractor shall adequately protect adjacent property to prevent any damage to it or loss of use and enjoyment by its owners. The Contractor shall provide and maintain all passageways, guard fences, lights, and other facilities for protection required by public authority, local conditions, any of the Contract Documents or erected for the fulfillment of its obligations for the protection of persons and property.
- 17.5 Emergencies:** In an emergency affecting the safety or life of persons or of the Work, or of the adjoining property, the Contractor, without special instruction or authorization from the City Engineer, shall act, at Contractor's discretion, to prevent such threatened loss or injury. Also, should Contractor, to prevent threatened loss or injury, be instructed or authorized to act by the City Engineer, Contractor shall so act immediately, without appeal.

SECTION 18. DAMAGES TO THE WORK AREA

- 18.1 Damage to the Work:** The Contractor shall have charge of and be solely responsible for the entire Work and be liable for all damages to the Work including, but not limited to any of the damages hereafter mentioned, and to any property in the vicinity of the Work, until its completion and acceptance by the City Engineer.
- a. Where the work involves alterations, renovations, or modifications to any existing building, the Contractor shall familiarize itself with the structural condition of such building before proceeding with any work. It shall be the Contractor's responsibility to take all necessary safeguards to protect and maintain all parts of the building in a safe condition at all times during the process of construction and to protect from damage those portions of the building that are to remain.
 - b. Under no condition shall any load be placed on any part of a building, whether new or existing, in excess of the load the structure will safely support, and no structural member(s) shall be cut or altered without the written consent of the City Engineer.
 - c. The Contractor shall conduct all operations in such a manner as to avoid damage to existing work and surfaces within any existing building that are to remain. Any and all damaged work and surfaces shall be repaired, replaced, or restored to their original condition at the time when this work was started, and the expense of such work shall be borne by the Contractor.
- 18.2 Damage to Utilities:** The respective Utility Company shall be given a minimum of forty-eight (48) hours notice prior to any adjustment of utilities, and the Contractor shall comply with the provisions of the Virginia Underground Utilities Damage Prevention Act, Section 56-265.14 et seq., of the Code of Virginia. Damages that may occur to the utilities during the Work shall be the sole responsibility of the Contractor.

- 18.3 Relocation of Utilities:** Should any utilities require adjustment during the Work, it shall be the Contractor's responsibility to have such utilities relocated as a part of the Work and to contact and cooperate with the respective Utility Company in performance of such operations.
- 18.4 Damage to Other Work and Existing Structures:** The Contractor shall take into account all other work which shall be done by other parties on the jobsite, either now known or which may become necessary during the progress of the Work, and shall be responsible for any damage done to the other work. Damage to concrete curbs, gutters, sidewalks, or any existing facility that may occur during the construction shall be repaired or replaced by the Contractor, at its sole expense, as directed by and to the satisfaction of the City Engineer.
- 18.5 Weather Damage:** Damage with respect to the Work caused by the weather shall be the responsibility of the Contractor.
- 18.6 Blasting:** Any damage that may occur due to blasting shall be the sole responsibility of the Contractor.

SECTION 19. CHANGES IN THE WORK

- 19.1 Changes in Drawings and Specifications:** The City reserves the right to make such changes in the drawings and specifications and in the character of the Work as may be necessary or desirable to ensure completion in the most satisfactory manner, provided such changes do not materially alter the original plans and specifications or change the general nature of the Work as a whole. Such changes shall not be considered as waiving or invalidating any condition or provision of the Contract and Bonds. Such changes shall be issued by the City Engineer to Contractor.
- 19.2 Changes in Quantities:** The City reserves the right to make changes in the quantities of the Work, as may be considered necessary or desirable, and such changes shall not be considered as waiving or invalidating any conditions or provisions of the Contract or Bonds. The Contractor shall perform the Work as altered, whether increased or decreased, and no allowances shall be made for anticipated profits. Payment to the Contractor for the changes in the quantities of work shall be made only for the actual quantities of work performed and material furnished at the unit prices set forth in the Contract, except as provided below.
- a. When the quantity of work to be done or of material to be furnished under any item of the Contract is more than 125 percent of the quantity stated in the Contract, then either party to the Contract, upon demand, shall be entitled to negotiate for revised consideration on the portion of work above 125 percent of the quantity stated in the Contract.
 - b. When the quantity of work to be done or of material to be furnished under any item of the Contract is less than 75 percent of the quantity stated in the Contract, then either party to the Contract, upon demand, shall be entitled to negotiate for revised consideration on the Work performed.
 - c. Any consideration after that as set forth above shall be paid for as is hereinafter provided under Section 19.7. The foregoing notwithstanding, the quantity of work to be done or of material to be furnished under any item of the Contract, or the total original Contract shall not be increased more than 25 percent or reduced by more than 25 percent without the written consent of the Contractor and City.

19.3 Changes in the Work: No change with respect to the Work, except in an emergency situation threatening life or property, shall be made by the Contractor without the prior written approval of the City. The Contractor shall deliver any request for a change in the Work, Contract price, and/or completion time in writing to the City Engineer within ten (10) calendar days of the occurrence requiring the change. The Contractor shall be required to certify the cause of the change order and, if appropriate, length of time involved. Payment for such changes approved by the City Engineer shall be as set forth in Section 19.7. This written request is a condition precedent to the consideration of any such request by the City.

19.4 Delays:

- a.** In the event a delay is caused by the City, the City Engineer, any other separate contractor employed by the City, or any party for whom the Contractor deems the City responsible, or the agents and employees of any of them, the Contractor shall inform the City and the City Engineer immediately at the time of the occurrence by the fastest means available and shall give written notice within a reasonable time, not to exceed ten (10) calendar days. The Contractor's notice to the City Engineer shall specify the nature of the delay claimed by the Contractor, the cause of the delay, and the impact of the delay on the Contractor's work schedule to the fullest extent possible. The City will within a reasonable time, not to exceed ten (10) calendar days, respond to the Contractor's notice with a resolution, remedy, or direction to alleviate the delay or with a notice rejecting the claim for delay alleged to be caused by the City or parties for whom the City is responsible. If the delay is not then resolved, the Contractor may then submit a request for change order in accordance with Sections 19.3 and 19.5. In the event of other delays, the Contractor shall give the City and City Engineer written notice within ten (10) calendar days of the occurrence causing the delay.
- b.** No extension of time or compensation shall be allowed for a delay if the Contractor failed to give notice in the manner and within the time prescribed in Subsection 19.4 (a). Furthermore, no extension of time shall be given or additional compensation allowed for any delay unless a claim therefore is made in writing to the City, with a copy to the City Engineer, within ten (10) calendar days of the occurrence causing the delay. The claim shall state the cause of the delay, the number of days of extension requested, and any compensation requested by the Contractor. The Contractor shall report the termination of the delay to the City and City Engineer not less than ten (10) calendar days after such termination. Failure to give notice of either the inception or the termination of the cause of delay or failure to present a claim for extension of time and/or monetary compensation within the times prescribed are conditions precedent to the assertion of any such claims by Contractor and shall constitute a waiver by Contractor of any such claims for compensation or extension based upon that cause.
- c.** Requests for compensation for delays must be substantiated by itemized data and records clearly showing that the work delayed was progressing according to the approved schedule and that the costs are directly attributable to the delay in the Work claimed. The Contractor shall provide written schedules demonstrating how the Work being delayed affects the approved schedule.
- d.** No extension of time, additional compensation, or change in the Contract price shall be allowed for any delays caused in whole or in part by the Contractor, any

subcontractors, or any supplier. (For unavoidable justified delays, see Section 19.9 of these General Conditions.)

- 19.5 Change Orders:** All change orders shall clearly define changes to the Work, the Contract amount or price, and the Contract time. Incomplete or partial change order requests may not be considered by the City Engineer. All change orders must indicate that the Contract Time for Completion is not changed or is either increased or decreased by a specific number of days. Any change or requested change in the Contract price shall also be included in the change order request. The Contractor must provide written justification for an extension of the Time for Completion to the City Engineer. The written justification must demonstrate an anticipated actual increase in the time required to complete the Work beyond that allowed by the Contract as adjusted by prior change orders or amendments to the Contract, not just an increase or decrease in the time needed to complete some portion of the total Work. City Engineer approved increases or decreases in time required to complete the Work shall be added or deducted, respectively, to the Time for Completion. The change to time or Contract price allowed by each change order shall include all time and monetary impacts of the change, whether the change order is considered alone or with all other changes during the course of the Project. Failure to include a change to time and/or Contract price in a change order shall waive any claims the Contractor may have for any change to the time and/or Contract price unless the parties mutually agree in writing to postpone a determination of the change to time and price resulting from the change order. However, the Contractor shall continue with the Work as may be directed by the City Engineer and shall not stop work on the Project unless directed to do so by the City Engineer.
- 19.6 Extra Work:** The City reserves the right to make alterations or changes in the Work as the Work progresses. When any work is necessary to the proper completion of the project which was not provided for in the Contract, the Contractor shall do such work, but only when and as ordered in writing by the City Engineer. Payment for such extra work shall be made as hereinafter provided in Section 19.7.
- 19.7 Payment Methods for Extra Work:** The extra work done by the Contractor as authorized and approved by the City Engineer shall be paid for in the manner hereinafter described; and the compensation thus provided shall be accepted by the Contractor as payment in full for all labor, material, tools, equipment, incidentals, all superintendents' and timekeepers' services, all insurance, bonds, and all other reasonable overhead expenses incurred in the performance of the extra work. Payment for extra work may be made by one of the following methods, as agreed on in writing by the City Engineer and the Contractor before said extra work is commenced, subject to all other conditions of the Contract:
- a. Unit prices; or
 - b. Lump sum price; or
 - c. The cost of change in work plus ten percent (10%) of allowable costs. Allowable costs for purposes of this paragraph shall only include labor, material, sales tax, the rental of power tools and equipment actually used, or a reasonable price for the use of power tools and equipment owned by the Contractor based upon their life expectancy and purchase price, utilities, pro rata charges for foremen, and all payroll charges such as employer's FICA contribution, Public Liability and Workers' Compensation Insurance, but only if all such costs are incurred as the direct result of the changes in the Work. The change in cost for labor and material bonds and for performance bonds relative to the value of the extra work shall be allowable cost but shall not be marked up.

- 19.8 Disputed Claims for Extra Work:** If one of the payment methods set forth in Section 19.7 is not agreed on by the City Engineer, the City may retain either an independent contractor to perform such extra work or use its own forces to perform such extra work and the Contractor shall cooperate fully with the independent contractor or City in its performance of the extra work. However, the City Engineer may also direct Contractor to perform such extra work and any dispute will be handled as set forth in Section 31 of these General Conditions.
- 19.9 Change in Contract Time or Contract Price:** The Contractor may request an extension of time or change in the Contract price should the Work be obstructed or delayed by any justified unavoidable delays not caused in whole or in part by the Contractor, any subcontractor, or suppliers. However, delays caused by weather conditions will not be considered justified unavoidable delays unless they are caused by unusual weather as set forth in Section 4.2 of the Instructions to Bidders, in which case only an extension of time may be considered by City, but no additional compensation will be allowed for unusual weather. Furthermore, Contractor agrees that for any delays not caused by the City or any delays beyond the control of the City, no additional compensation will be due the Contractor and no change in the Contract price will be allowed by the City, only an extension of the Contract time will be considered by the City. The Contractor shall deliver requests for changes in the Contract price and/or completion time in writing to the City Engineer within ten (10) calendar days of the occurrence requiring the change. Approved changes that alter the time of the Contract shall extend the completion time by a period equivalent to the certified time lost by such occurrence. No change in Contract price and/or completion time shall be allowed if the above notice has not been properly given, such notice being a condition precedent to any such request by the Contractor. However, the Contractor shall continue with the Work as may be directed by the City Engineer and shall not stop work on the Project unless directed to do so by the City Engineer.

SECTION 20. PAYMENT FOR WORK

- 20.1 Monthly Construction Estimates:** Monthly construction estimates shall be submitted to the City Engineer, Noel C. Taylor Municipal Building, 215 Church Avenue, S.W., Room 350, Roanoke, Virginia 24011, no more than once every thirty (30) calendar days.
- 20.2 Preparing Progress Payment Requests:** In preparing construction estimates, the Contractor may request a progress payment based on the actual percentage of work completed during the preceding month. The estimate shall contain a breakdown of the total Contract amount, to include a separate breakdown of all approved change orders, into principal items of construction, showing the estimated quantity, unit price, and total for each item. In preparing progress payment requests, the material delivered on the site and preparatory work done may be taken into consideration, if properly documented, or as may be required by the City Engineer so that quantities can be verified. In addition to material delivered on the site, material such as large pieces of equipment and items purchased specifically for the project, but stored off the site, may be considered for payment, provided prior written approval is given by the City Engineer.
- 20.3 Progress Payments:** The City will make a progress payment to the Contractor on the basis of a duly certified and approved progress payment request for the work performed under the Contract. In the event that the City disagrees with the monthly construction progress payment request submitted by the Contractor, or in the event the As-Built

Drawings are not being kept current, the City may withhold all or a portion of the progress payment until such dispute is resolved to the satisfaction of the City. If there are any objections or problems with the progress payment request, the City will notify the Contractor of such matters. If the progress payment request is approved by the City, payment will be made by the City to the Contractor not more than thirty (30) calendar days after such request has been approved. However, if there is an objection or problem with a progress payment request, the Contractor shall continue with the Work as may be directed by the City Engineer and shall not stop work on the Project unless directed to do so by the City Engineer. Any such disputes shall be handled as set forth in Section 31 of these General Conditions.

20.4 Retainage: To ensure proper performance of the Contract, the City shall retain, unless stipulated otherwise, five percent (5%) of each progress payment until Final Acceptance of all work covered by the Contract. The Contractor may request that such retainage be paid into an escrow account on certain Contracts, pursuant to Section 2.2-4334 of the Code of Virginia. (See also Sections 6.2 and 14.6 of Instructions to Bidders.)

20.5 Ownership of Material and Work: All material and work covered by progress payments shall become the property of the City. This provision shall not relieve the Contractor from the responsibility for all material and to maintain all completed work and to repair all damaged work. The Contractor shall not deem a progress payment as a waiver to complete the terms of the Contract or shift the risk of loss from the Contractor to the City. The Contractor warrants that Contractor has good title to all material, equipment, and supplies which Contractor uses in the Work or for which Contractor accepts payment in whole or in part.

20.6 Payments to Others by Contractor: The Contractor agrees that Contractor will comply with the requirements of Section 2.2-4354 of the Code of Virginia regarding Contractor's payment to other entities and that Contractor will take one of the two actions permitted therein within seven (7) calendar days after receipt of amounts paid to Contractor by the City. The Contractor agrees that Contractor shall indemnify and hold the City harmless for any claims resulting from failure of the Contractor to make prompt payments to all persons supplying him equipment, labor, tools, or material in prosecution and completion of the Work provided for in the Contract.

20.7 Final Payment: After the Final Acceptance of the Work by the City, and after Final Payment is requested in writing by the Contractor, and the City Engineer has received and approved the items listed below, the City shall pay the Contractor the Final Payment, less all prior payments, damages, setoffs, liquidated damages, any amounts withheld from retainage, or any other amounts Contractor may owe the City for any reason whatever. Such final payment is subject to the City Engineer receiving and accepting all documents to finalize the Work or Project, such as, but not limited to:

- a. As-Built drawings, operation and maintenance manuals, written warranties (if applicable).
- b. Affidavit of Payment of Claims.
- c. Certificate of Final Acceptance.
- d. Small Business, Minority-Owned Business, Women-Owned Business, Service Disabled Veteran-Owned Business Usage Status Form
- e. Such other documents or items as the City Engineer may request in writing from the Contractor.

20.8 Payment and Acceptance: No payment, final or otherwise, nor partial or entire use, occupancy, or acceptances of the Work by the City shall be an acceptance of any work or material not in accordance with the Contract, nor shall the same relieve the Contractor of any responsibility for any faulty material or workmanship or operate to release the Contractor or its surety from any obligation under the Contract or the Performance Bond or the Labor and Material Payment Bond.

20.9 Right to Audit and Maintenance of Records: The Contractor agrees that the City, and any approving Federal or State Agency or any of their duly authorized representatives, shall have access to any books, documents, papers, records, schedules and electronic data of the Contractor which are pertinent to this Project for the purpose of making an audit, examinations, excerpts, copies, or transcriptions and that Contractor will provide copies of such items to City upon City's request, at no cost to City. Contractor shall maintain all books, records, electronic data, and other documents relating in any way to this Contract or Project for a period of five (5) years after Final Acceptance.

SECTION 21. LIQUIDATED DAMAGES

If liquidated damages are provided for by the Contract, the following provisions shall apply:

- a. Subject to the provisions of the General Conditions for extension of time allowed for completion of the Work, if the Work is not substantially completed by the date required in the Contract, the Contractor shall owe to the City, not as a penalty but as liquidated damages, the sum stated in the Contract for liquidated damages for each and every calendar day of delay in substantial completion.
- b. Once the Work is substantially complete, the accrual of liquidated damages shall stop and the Contractor shall have thirty (30) calendar days in which to achieve Final Acceptance of the Work.
- c. Provided, however, if Final Acceptance of the Work is not achieved by the thirtieth (30th) calendar day after substantial completion, and if any extension of time is not granted by the City, the Contractor shall owe to the City, not as a penalty, but as additional liquidated damages, the sum stated in the Contract as liquidated damages for each and every calendar day of delay in Final Acceptance. All such liquidated damages set forth in this Section 21 are in addition to any other damages the City may be entitled to recover from the Contractor.

SECTION 22. INSPECTION FOR SUBSTANTIAL COMPLETION AND FINAL ACCEPTANCE

22.1 Substantial Completion: The Contractor shall notify the City, in writing, that the Work will be ready for inspection to determine if it is substantially complete and ready for testing on or after a certain date, which date shall be stated in the notice. The notice shall be given at least ten (10) calendar days in advance of said date and shall be forwarded through the City Engineer. Inspection and testing shall take place at a time mutually agreeable to the Contractor, City, and City Engineer. The inspection shall determine if substantial completion has been accomplished. If so, the City Engineer will issue a Certificate of Substantial Completion and attach a written list of unfinished Work and defective Work, commonly referred to as a "punch list", which must be finished and corrected to obtain Final Acceptance.

22.2 Request for Final Acceptance: The Contractor shall notify the City Engineer, in writing, that the Work will be ready for final inspection and testing on or after a certain

date, which date shall be stated in the notice. That inspection and any necessary testing shall be conducted in the same manner as the inspection for substantial completion. When the Work is finally and totally complete, including the elimination of all known deficiencies, the Work shall be finally accepted by the City and final payment shall be made in accordance with Section 20.7 of these General Conditions.

- 22.3 Final Inspection:** The City Engineer will conduct the final inspection, and may elect to have other persons of his/her choosing also participate in the inspection. If one or more reinspection is required, the Contractor shall reimburse the City for all costs of reinspection or, at the City's option, the costs may be deducted from payments due to the Contractor.
- 22.4 As-Built Drawings:** No Contract retainage will be released prior to receipt of all approved As-Built Drawings.
- 22.5 Final Acceptance:** Upon successful completion of the final inspection and all Work required by the Contract, including, but not limited to, the delivery of the following documents and items; As-Built drawings; operation and maintenance manuals; written warranties; Certificate of Substantial Completion; Affidavit of Payment of Claims; and SB/MB/WB/SDVB Usage Status Form; the City Engineer will furnish a written Certificate of Final Acceptance of the Work to the Contractor. The City Engineer may accept the Work for occupancy or use while asserting claims against the Contractor, disputing the amount of compensation due to the Contractor, disputing the quality of the Work, its completion, or its compliance with the Contract Documents, and the like.
- 22.6 Release By Contractor:** The acceptance by the Contractor of the final payment or a payment designated as such shall be and does operate as a release by the Contractor of all claims by the Contractor against City and of all other liability of the City to the Contractor whatever, including liability for all things done or furnished in connection with the Work or the Contract.

SECTION 23. WARRANTY OF MATERIAL AND WORKMANSHIP

- 23.1** The Contractor warrants that, unless otherwise specified, all material and equipment incorporated in the Work under the Contract shall be new, in first class condition, and in accordance with the Contract Documents. The Contractor further warrants that all workmanship shall be of the highest quality and in accordance with the Contract Documents and shall be performed by persons qualified at their respective trades.
- 23.2** Work not conforming to these warranties shall be considered defective.
- 23.3** These warranties of material and workmanship are separate and independent from and in addition to any of the Contractor's other guarantees or obligations in this Contract, or that may arise by law.

SECTION 24. GUARANTEE OF WORK

- 24.1 One Year Warranty:** The Contractor further guarantees and warrants the Work against defects or deficiencies in the Work and as to all material, equipment, and workmanship for a period of one (1) year from the date of Final Acceptance. However, any

manufacturer's guarantees or warranties or any other guarantees or warranties required by the Contract Documents shall be for the period of time provided for therein.

- 24.2** The Contractor shall obtain and furnish to the City any available guarantees and warranties from manufacturers, installers, subcontractors, or others and any guarantees and warranties called for in the Contract and have such guarantees and warranties issued to the City, or transfer such guarantees and warranties to the City, in a timely manner. All guarantees and warranties shall be subject to the reasonable approval of the City. However, any such approval or disapproval does not relieve the Contractor of any of Contractor's guarantees and warranties. Contractor shall use its best efforts to ensure that all such guarantees and warranties do not contain any indemnity requirements from the City, any limitation of liability, any reduction of the applicable statute of limitations, any venue or forum selection other than the City of Roanoke, Virginia, or any requirement for mediation or arbitration. Any such language in a guaranty or warranty shall be deemed to be void and the Contractor along with the entity providing the guaranty or warranty shall be responsible for such guaranty or warranty with any such items being deemed deleted. All such guaranties or warranties shall be provided to the City before or within ten (10) days after Contractor's completion of the Work and the City may withhold payments to the Contractor until receipt of all such guaranties and warranties.
- 24.3** All guarantees and warranties from the Contractor or others, whether set forth above, in other parts of the Contract or other documents, or that may arise by law, shall be cumulative so as to maximize City's guarantee and warranty protection. The City, by accepting any of the guaranties or warranties provided for in the Contract does not waive, and specifically reserves any legal rights and remedies that the City may have for breach of the Contract and/or breach of any such guarantees or warranties.
- 24.4 Defective Work:** The Contractor agrees it shall repair or replace, at Contractor's sole expense, and to the satisfaction of the City Engineer, any work, material, equipment, or part that is found, by the City Engineer, to be defective.
- 24.5 Repairs:** If, within any guarantee period, defects are noticed by the City Engineer which require repairs or changes in connection with the guaranteed work, those repairs or changes being in the determination of the City Engineer rendered necessary as the result of the use of material, equipment, or workmanship which is defective, inferior, or not in accordance with the terms of the Contract, then the Contractor shall, promptly upon receipt of notice from the City Engineer, such notice being given not more than four weeks after the expiration of any such guarantee period, and without any expense to the City:
- a.** Place in satisfactory condition all guaranteed work and correct all defects therein; and
 - b.** Make good all damage to the structure, site, equipment, or contents thereof, which in the determination of the City Engineer is the result of the use of material, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract; and

- c. Make good any work or material or the equipment and contents of structures or the site disturbed in fulfilling any such guarantee.

24.6 Warranty Extension: In any case, where in fulfilling the requirements of the Contract or any guarantee embraced in or required thereby, the Contractor disturbs, damages or repairs any work guaranteed under the Contract, Contractor shall restore such work to a condition satisfactory to the City Engineer and guarantee such restored work to the same extent and for a like additional period of time as it was originally guaranteed under this Contract.

24.7 Correction of Defects: If the Contractor, after notice, fails to proceed promptly, but in no event longer than thirty (30) calendar days after such notice, unless otherwise agreed to by the City Engineer, to comply with the terms of the guarantee and/or correct the Work, the City may have the defects corrected by its own forces or another contractor and the Contractor and its surety shall be liable to the City for all costs and expenses incurred in doing so.

24.8 Nothing contained in this section shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents or the law of Virginia, including liability for defective work.

SECTION 25. STOP WORK ORDER

In the event that conditions exist such that no work can or should continue, other than the routine closing of the site, the Contractor may submit to the City Engineer a request to stop work or the City Engineer on his/her own may issue a Stop Work Order. The City Engineer will, if he/she approves the request or issues the order himself/herself, deliver a written "Stop Work Order" to the Contractor stipulating the effective date and the Contract time remaining. The Work, other than the routine closing of the site, and Contract time shall not again be started until a written "Resume Work Order" is received by the Contractor from the City Engineer. When the Work is stopped at the request of the Contractor and through no fault of the Contractor, the Contractor may only recover from the City payment for the cost of the Work actually performed, together with reasonable overhead and profit thereon up to that time, but profit shall be recovered only to the extent that the Contractor can demonstrate that it would have had profit on the entire Contract if it had completed the Work. The Contractor may not receive profit or any other type of compensation for parts of the Work not performed, including, but not limited to, home office overhead or any other such costs. The Contractor may also recover the actual cost of physically closing down the jobsite, but no other costs of the Stop Work Order. The City may offset any claims it may have against the Contractor against the amounts due to the Contractor. In no event shall the Stop Work Order to the Contractor relieve in any way the obligations of the Contractor's surety on its payment and performance bonds. When work is stopped by the City Engineer due to any fault of the Contractor, the Contractor may not recover any of the above costs or items or any other costs, profits, expenses, or damages of any type.

SECTION 26. TERMINATION OF CONTRACT FOR CAUSE

26.1 Termination for Cause: If the Contractor should file a petition for relief as a debtor under any applicable bankruptcy law or should be adjudged bankrupt, or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, the City may terminate the Contract. If the Contractor should refuse or should fail, except in cases for which extension of time is

provided, to supply enough properly skilled workmen or proper material, or if it should fail to make prompt payment to subcontractors or suppliers of material or labor, or disregard laws, ordinances, or the written instructions of the City Engineer, or otherwise fails to comply with any of the terms or provisions of this Contract including, but not limited to, poor services, work or material, then the City may terminate this Contract. In no event shall termination for cause terminate the obligations of the Contractor's surety on its payment and performance bonds.

- 26.2 Possession of Work:** Upon termination of the Contract, the City may take possession of the premises and of all material, tools, and appliances thereon and finish the Work by whatever method the City may deem expedient. In such case the Contractor shall not be entitled to receive any further payment of any type. If the expense of finishing the Work, including compensation for additional managerial and administrative services, shall exceed the unpaid balance of the Contract price, the Contractor shall pay the difference to the City, together with any other cost or expenses of terminating the Contract and having it completed by others, together with any and all other damages the City may be entitled to from the Contractor.
- 26.3 Alternative Termination:** If it should be judicially determined that the City improperly terminated this Contract for cause, then the termination shall be deemed to be a termination for the convenience of the City.
- 26.4 Termination Rights:** Termination of this Contract under Section 26 or Section 27 is without prejudice and in addition to any other rights or remedies of the City against the Contractor.

SECTION 27. TERMINATION FOR CONVENIENCE OF CITY

- 27.1 Termination for Convenience:** The City, at its discretion, may terminate this Contract at any time without cause, in whole or in part, upon giving the Contractor written notice of such termination. Upon such termination, the Contractor shall immediately cease work and remove from the jobsite all of its labor forces, equipment, and material as the City elects not to purchase or to assume in the manner hereinafter provided. Upon such termination, the Contractor shall take such steps as City may require to assign to the City the Contractor's interest in all subcontracts and purchase orders designated by the City. After all such steps have been taken to the City's satisfaction, the Contractor shall receive as full compensation for termination and assignment only the following:
- a. All amounts then otherwise due under the terms of this Contract for actual work performed and approved by the City; and
 - b. Reasonable compensation for the actual cost of demobilization incurred by the Contractor as a direct result of such termination. The Contractor shall not be entitled to any compensation for lost profits or for any other type of contractual compensation or damage, other than those provided by the preceding sentence, including any on site or home office overhead. Upon payment of the foregoing, the City shall have no further liabilities or obligations to Contractor of any nature.
- 27.2 Termination Effect on Surety:** In no event shall termination for the convenience of the City terminate the obligation of the Contractor's surety on its payment and performance bonds.

SECTION 28. PRECONSTRUCTION CONFERENCE

The City Engineer shall notify the Contractor as to the location, date, and time of a preconstruction conference to confirm procedures for processing construction estimates for payment and related submissions and to discuss other matters pertaining to scheduling and execution of the Work.

SECTION 29. PROJECT SIGN(S)

The Contractor shall supply, erect, and maintain Project Sign(s) in accordance with the City of Roanoke Standard Detail. The sign(s) shall be located as directed by the City Engineer. The Contractor shall not display any other signs or advertisements.

SECTION 30. ASSIGNMENTS

The Contractor shall not assign or transfer this Contract in whole or in part except with the prior written consent of the City, which consent shall not be unreasonably withheld. If consent to assign is given, no such assignment shall in any way release or relieve the Contractor from any of the covenants or undertakings contained in this Contract and the Contractor shall remain liable for the Contract during the entire term thereof.

SECTION 31. CONTRACTUAL DISPUTES

Contractual claims, whether for money or for other relief, including any disputes as to change orders or extra work, shall be submitted, in writing, no later than sixty (60) calendar days after final payment or payment designated by the City as a final payment; however, written notice of the Contractor's intention to file such claim must be given at the time of the occurrence or beginning of the work upon which the claim is based. Such notice is a condition precedent to the assertion of any such claim by the Contractor. A written decision upon any such claims will be made by the City Manager or his/her designee (hereafter City Manager) within thirty (30) calendar days after submittal of the claim and any practically available additional supporting evidence required by the City Manager. The Contractor may not institute legal action prior to receipt of the City's decision on the claim unless the City Manager fails to render such decision within one hundred twenty (120) calendar days from submittal of its claim. The decision of the City Manager shall be final and conclusive unless the Contractor within six (6) months of the date of the final decision on a claim or from expiration of the 120 day time limit, whichever occurs first, initiates legal action as provided in Section 2.2 - 4364, of the Code of Virginia. Failure of the City to render a decision within said one hundred twenty (120) calendar days shall not result in the Contractor being awarded the relief claimed nor shall it result in any other relief or penalty. The sole result of the City's failure to render a decision within said one hundred twenty (120) calendar days shall be Contractor's right to immediately institute legal action. No administrative appeals procedure pursuant to Section 2.2 - 4365, of the Code of Virginia, has been established for contractual claims under this Contract.

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CITY OF ROANOKE, VIRGINIA

SUPPLEMENTAL GENERAL CONDITIONS

These Supplemental General Conditions modify, change, and/or add to the General Conditions as indicated below:

- A. The Virginia Department of Transportation (VDOT) requires that certain forms and documents be included in the ITB and any resultant contract for this Project. Therefore, these items together with any documents or items provided by the City or referred to in any of the documents are intended to be and should be construed to be consistent with each other whenever possible. If a court or agency of competent jurisdiction determines that a conflict should exist between them, and to the extent of any such conflict, the VDOT documents shall take precedence unless any Federal and/or State rules, regulations, terms, and/or provisions shall require otherwise, in which case they will take precedence. Furthermore, each Bidder, as well as the Successful Bidder, shall notify the City Engineer, in writing, if any such conflict(s) should arise among the ITB and/or resultant contract documents and identify such conflict(s) to the City Engineer. References in any VDOT documents to State, VDOT, Department, and/or Department Engineer or similar terms shall also be deemed to include the City and/or City Engineer where applicable and the Successful Bidder hereby acknowledges and agrees that the City can enforce all such items against the Successful Bidder for this Project. Bidders are advised to refer to the other parts of the ITB, especially the Supplemental General Conditions, for further information on the above items.

- B. Bidders are advised that this ITB and any information or documents provided pursuant to this ITB are subject to the Virginia Freedom of Information Act and the Federal Freedom of Information Act and the Bidder must comply with the provisions of those Acts to protect any documents the Bidder may want protected from disclosure pursuant to the provisions of those Acts.

- C. The Contractor shall be advised that Appendix A contains the construction agreement between the City of Roanoke and Norfolk Southern Railway Company. The Contractor is contractually bound to all terms, provisions, premises, and mutual covenants contained in the construction agreement, including, but not limited to insurance, special provisions, and indemnification requirements.

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Section 01000

Special Conditions

1. General

1.1. **Location of Work** – The Bridge is located in Southwest Roanoke near the intersection of Reserve Avenue / Franklin Road. The South end of the bridge is located in the Virginia Tech/Carilion Biomedical campus. The North end of the bridge is located in 220 Expressway Right of Way and the Old Southwest Neighborhood. The bridge spans approximately 10 Norfolk Southern Railway tracks.

1.2. General Description of Work

1.2.1. Description: Project includes the complete demolition and replacement of the existing bridge. Replacement includes installation of subsurface piles/shafts, two abutments, 4 piers, steel superstructure, concrete deck and associated work. The bridge, which is approximately 560' long by 57' wide. This short description, however, shall not, in any way, be construed to limit the Contractor's obligation for compliance with the contract documents. Unless specified otherwise the Work shall be in accordance with the 2007 Virginia Department of Transportation Road and Bridge Specifications (VDOT RBS).

1.2.2. Unit and Lump-Sum Priced Items: The Bid Form has spaces for bidding several unit and lump-sum priced items. The prices submitted and subsequently paid shall constitute full compensation for all work required by the contract documents. The estimated quantities shown shall be considered as approximate only, and any item may be increased, decreased, or totally deleted should the City determine this to be in his best interest.

1.3. Safety

1.3.1. Citizen and workman safety shall be given top priority at all times.

1.4. Materials Testing

1.4.1. The City shall provide on-site concrete testing and compaction testing on an as-needed basis. The Contractor shall be required to perform all other testing.

1.4.2. If concrete is pumped into place, the City reserves the right to test at the end of the pump hose where the concrete is deposited.

1.5. City and Norfolk Southern Agreement

1.5.1. The Contractor shall be advised that Appendix A contains the construction

agreement between the City of Roanoke and Norfolk Southern Railway Company. The Contractor is contractually bound to all terms, provisions, premises, and mutual covenants contained in the construction agreement.

1.6. Maintenance of Traffic and Work Area Protection

1.6.1. Contractor shall maintain the work site in accordance with Virginia Work Area Protection Manual and current VDOT RBS requirements. All signage shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). The City shall not provide any signs or traffic control devices.

1.7. Property Rights on Parcels Adjacent to the Bridge

1.7.1. On the South end or Reserve Avenue side of the Project, the bridge is bounded by parcels 1032203 and 1040102. See Appendix E for temporary and permanent easements associated with these parcels.

1.7.2. On the North end or 220 Expressway side of the Project, the bridge is bounded by VDOT right of way.

1.7.3. Tax Map Parcel 1032203 (Green Space between the Bridge and Cambria Suites) – This parcel is no longer owned by HTB Properties. It has been acquired by Carilion Clinic. A representative for Carilion, Curtis Mills, can be contacted 540-981-7204.

1.8. **Utilities** – Contractor shall contact Miss Utility (1-800-552-7001) for location of utilities prior to construction.

1.8.1. **Underground Utilities - South Abutment / Retaining Wall** – As shown on Sheet CR-005, there are existing utilities next to and below the abutment. The Western Virginia Water Authority is relocating the water and sanitary lines away from the structure as shown in Appendix. The estimated time of completion for the water and sanitary lines is March 1, 2017. The storm drain and underground telephone shall remain in place and shall be protected during construction. See Appendix F for water and sanitary sewer relocation schematics.

1.9. City of Roanoke Inspectors

1.9.1. The City of Roanoke shall have a Construction Inspector, who reports to the City Project Manager, assigned to this project.

1.9.2. The City Inspector shall be responsible for checking quality control, conformance of work with respect to project documents, and quantities for pay requests.

1.9.3. The Contractor shall give the City Inspector proper notice for overlay and paving operations.

1.9.4. At substantial completion of the project, the City Inspector shall develop a punch list of items to be resolved before final acceptance. City Inspectors shall also be responsible for checking work for acceptance within warranty periods.

1.10. Time Restrictions

1.10.1. Contractor shall perform the Work Monday through Friday, 7:00 AM to 10:00 PM. Contractor shall note that the City does have a noise ordinance with a 10:00 PM deadline. Additional work windows, for concrete pours, etc., may be requested from the City project manager on an as-needed basis.

1.10.2. Contractor shall note that from **November 1 to January 1** represents the Holiday Shopping Season and is the busiest time of the year for Norfolk Southern freight orders involving UPS and FedEx. As such, Norfolk Southern is not willing to break trains under the bridge in order to accommodate the construction/lifting operations during this Holiday Shopping Season.

1.11. Permits

1.11.1. Contractor shall obtain an Erosion & Sediment Control / Land Disturbing permit from the City Planning Department. The Plans have been pre-approved and labeled as CP150045. Contractor is required to have a Responsible Land Disturber (RLD). Please contact City Land Disturbing Administrator, George Nevergold at 540-853-6501, to setup an appointment.

1.11.2. Contractor shall obtain a City of Roanoke Business License before starting the Work.

1.12. Holophane Decorative Lighting

1.12.1. The City has pre-ordered and pre-paid AEP for the decorative lighting on the bridge and the bridge roadway/plaza approaches. This includes the Teardrop Wadsworth products (Sheet E-502) on the bridge and Utility Washington Postlite products (Sheet E-502) on the bridge roadway/plaza approaches. The Contractor shall be responsible for building the light foundations and coordinating the anchor bolt patterns.

1.13. Manner of Conducting the Work

1.13.1. Daily Cleanup: Clean up work regularly. Maintain the project in a neat and orderly manner consistent with normal operation.

1.13.2. The contractor shall provide the City's Project Manager, City's Inspector, or other City Representatives, safe access to all areas of work throughout the course of the

construction project and for final inspection. Safe access includes the use of man-lifts, operated by a contractor's representative, or any other such equipment as needed to reach areas of inspection.

1.14. **Virginia Department of Transportation (VDOT) Specifications and Standards (RBS)** -This project manual references several VDOT specifications. Furthermore, all work and materials on this project shall be in accordance with the latest VDOT specifications and standards. However, there are City provisions that supersede the VDOT provisions. See following list:

1.14.1. General Contract Conditions: This is a City contract and the General Conditions in this Project Manual shall apply.

1.14.2. Measurement and Payment: The VDOT measurement and payment specification shall **not** apply. See City Measurement and Payment Section contained in this project manual.

1.14.3. Note that this manual does contain VDOT Special Provisions that supplement the VDOT Road and Bridge specifications. See Table of Contents for more detail.

2. **Products** - All products incorporated into the work are to be new, unused and first quality. All products shall be in accordance with the latest VDOT RBS.

3. **Execution** - All work is to be performed in a workmanlike manner by properly trained and qualified personnel under supervision of the Contractor's representative.

End of Section

Section 01100

Hierarchy of Construction Documents

1. Part 1 General

1.1. The General Conditions, Supplemental General Conditions, Plans, Technical Specifications, Virginia Department of Transportation Road (VDOT) Road and Bridge Specifications, VDOT Special Provisions/Supplemental Sections are parts of the Contract. A requirement occurring in one shall be as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of a discrepancy, the following order of priority will apply, with the highest governing item appearing first and the least governing item appearing last:

- 1.1.1. City Technical Specifications
- 1.1.2. City General Conditions
- 1.1.3. City Supplemental General Conditions
- 1.1.4. Plans. Calculated dimensions, unless obviously incorrect, will govern over scaled dimensions.
- 1.1.5. VDOT Special Provisions / Supplemental Sections
- 1.1.6. VDOT Road and Bridge Specifications

End of Section

Section 01270

Measurement and Payment

1. General

- 1.1. Payment for all work will be on the basis of the unit or lump sum prices stated in the Bid Form and upon the actual work performed and materials installed, complete-in-place, in accordance with the Contract Documents.
- 1.2. Include the cost for items not listed in the Bid Form, which are mentioned in the specifications, Plans, or normally a part of the work described by the Contract Documents, in the cost of the appropriate items which are listed in the Bid Form.
- 1.3. No separate payments shall be made for work, material, equipment, or other expense which is not part of construction items listed in the Bid Form, subject to conditions described in paragraph 1.2, above.
- 1.4. Bid quantities shown in the Bid Form are estimated and will be adjusted based on the actual provided quantities.
- 1.5. Pay items to be measured on a lump sum basis will be paid on the basis of percentage of completion, unless noted otherwise.
- 1.6. Substantially complete shall be interpreted as all bid form items being 100% complete.
- 1.7. References:
 - 1.7.1. VDOT RBS: 2007dition of the Virginia Department of Transportation Road and Bridge Specifications.
 - 1.7.2. Construction Drawings: Replacement of Franklin Road Bridge over Norfolk Southern Railway by AECOM.

2. **Bid Items** - Each bid item shall include full compensation for performing the work specified in the bid items and furnishing all materials, labor, tools, equipment, profit and incidentals as required. Each bid item shall be paid on a percentage completed for that bid item unless otherwise noted.

- 2.1. **Mobilization** - This bid item shall be paid on a lump sum basis, based on a percentage of completion. This bid item shall include the performance of construction preparatory operations, including the movement of personnel and equipment to the bridge, job site office, payment of performance and payment bond and other insurance premiums, and for the establishment of the Contractor's facilities necessary to begin work on a substantial phase of the contract. This bid item shall include clearing and grubbing and allaying dust.

- 2.2. **Construction Surveying** - This bid item shall be paid on a lump sum basis, which price shall be full compensation for performing the work prescribed herein, and for all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment for construction surveying will be made upon written request by the Contractor. Such request shall be submitted to the Engineer no earlier than five days, and no later than two days prior to the progress estimate date. Payment may be made in increments selected by the Contractor. However, payments will not exceed 60 percent of the contract unit price bid until the Contractor has provided the Engineer with surveying field notes, layouts, computations, certified plats, sketches and drawings in the format approved by the Engineer.
- 2.3. **Erosion and Sediment Control** - This bid item shall be paid on a lump sum basis, which price shall be full compensation for preparing and implementing an erosion and sediment control plan in accordance with the plans and applicable regulations. .
- 2.4. **Maintenance of Traffic** - This bid item shall be paid on a lump sum basis. Pay requests shall be made for this item based on a percentage of completion for the Project. This bid item shall include providing a person to meet the basic work zone traffic control and intermediate work zone traffic control requirements of Section 105.14 of the Specifications; furnishing, placing, maintaining, replacing, relocating, adjusting, aligning, removing, flagger service, warning lights, electronic arrow, channelizing devices, traffic barrier service, traffic barrier service guardrail terminals, impact attenuator service, construction pavement markings, construction pavement message markings, temporary pavement markers, eradication of existing pavement markings, temporary detours, aggregate material, Type III barricades, construction signs, changeable message signs, truck mounted attenuators, and all labor, material and equipment incidental to completing this work in accordance with the Virginia Work Area Protection Manual and City Traffic Engineering guidelines. The City will **not** provide any signs.
- 2.5. **Dismantle And Remove Existing Structure** - This bid item shall be paid on a lump sum basis. The price bid shall include demolishing and removing the entire superstructure and substructure to the extent indicated in the plans and as required to construct the proposed project.
- 2.6. **Material Disposal** - This bid item shall be paid on a lump sum basis. The price bid shall include transporting, storing, and legal disposal of material.
- 2.7. **Environmental And Worker Protection** - This bid item shall be paid on a lump sum basis. The price bid shall include containment operations, regulation compliance, plan approval services, worker protection, and other related costs.
- 2.8. **Bridge Pylons** - This bid item shall be paid on a lump sum basis. The price bid shall include items noted in the drawings on sheet CB-027
- 2.9. **Concrete Surface Color Coating** – This item will be paid for on a lump sum basis wherein no measurement will be made and will be paid for at the contract lump sum price which price shall be full compensation for preparation of surfaces and for applying coating in accordance with the Special Provision and to the limits shown in the plans.

- 2.10. **Electrical Facilities** - This bid item shall be paid on a lump sum basis. The price bid shall include items noted in the drawings on sheet E-001.
- 2.11. **Traffic Signalization** - This bid item shall be paid on a lump sum basis. The price bid shall include items noted in the drawings on sheet CR-205.
- 2.12. **Landscaping** - This bid item shall be paid on a lump sum basis. The price bid shall include items noted in the drawings on sheet L-101.
- 2.13. **Structural Steel, A709 Gr. 50W**- This bid item shall be paid on a lump sum basis. The price bid shall include items noted in the drawings on sheet G-003. Once the structural steel shop drawings are approved, the Contractor is eligible to advance bill for structural steel stored material in accordance with VDOT RBS.
- 2.14. **Earthwork** - This bid item shall be paid on a lump sum basis. The price bid shall include all labor, equipment, and materials necessary to excavate to finished grade or roadbed subgrade, removal and disposal of materials, shoring, benching, and excavation stability.
- 2.15. **Concrete** – This item will be measured within the neat lines of the structure as shown on the plans and will be paid for at the contract unit price per cubic yard for the class indicated, complete-in-place. The volume of reinforcing steel or any other material or internal voids within the concrete will be deducted. The volume of bridge deck slab concrete allowed for payment will be computed using the actual thickness of the slab, not to exceed the plan thickness plus 1/2 inch, for the area between faces of sidewalks. The area beneath sidewalks will be based on the plan thickness. This price shall include waterstops, waterproofing, and trial batches. If corrugated metal bridge deck forms are used in lieu of removable forms, the price for concrete shall include furnishing and placing metal forms, additional concrete required to fill corrugations, work necessary to facilitate inspection of the underside of the deck, repairing deficiencies, and strengthening beams or girders to maintain the design live-load rating of the bridge.
- 2.16. **Reinforcing Steel** – This item will be measured in pounds of steel of the class indicated, as placed in the structure as shown on the plans. Reinforcing steel will be paid for at the contract unit price per pound. This price shall include furnishing, fabricating, and placing reinforcement in the structure.
- 2.17. **Concrete Railing** – This item will be measured in linear feet along the centerline of the rail, based on the quantity shown in the plans. Concrete railing will be paid for at the contract unit price per linear foot. This price shall include furnishing concrete and reinforcing steel as indicated in the plans.
- 2.18. **Deck Expansion Joint** – This item will be measured in linear feet of joint, complete-in-place based on the quantity shown in the plans, and will be paid for at the contract unit price per linear foot. This price shall be full compensation for all labor, materials, and equipment required to install the deck expansion joints, including fabrication, transportation, and installation of expansion dams and sliding cover plates. This price shall also include the cost of shop drawing preparation and approval.

- 2.19. **Bridge Deck Grooving** – This item will be measured in square yards of deck surface area from the faces of sidewalks and will be paid for at the contract unit price per square yard. No deduction will be made for drainage items and joints.
- 2.20. **Structure Excavation** – This item will be measured in cubic yards as determined by the plan quantity and will be paid for at the contract unit price per cubic yard. Structure excavation will include material within the limits shown in the drawings. Structure excavation will be paid for at the contract unit price per cubic yard. This price shall include clearing and grubbing, sheeting, shoring, bracing, placing and compacting regular backfill, dewatering, furnishing and placing aggregate for weep holes, and disposing of unsuitable or surplus material.
- 2.21. **Rock Excavation** - This item shall be measured in cubic yards of rock excavated and paid at the contract price per cubic yard. This price shall include all labor and equipment, shoring, bracing, dewatering, and disposing of unsuitable or surplus material. For purposes of this measurement, rock shall include material which, in the opinion of the City Engineer, requires drilling and blasting or mechanical hammer to remove. Measurement for payment will be made by the City, based on survey elevations provided by the Contractor. The Contractor shall notify the City when such elevations are to be collected.
- 2.22. **Select Material** – This item will be measured in tons of material of the type indicated, placed and compacted within the limits shown in the drawings. Payment will be made at the contract price per ton.
- 2.23. **Drilled Shaft Standard Excavation** – This item will be measured and paid per linear foot for the size of shaft indicated, as noted in the Special Provisions.
- 2.24. **Drilled Shaft Rock Socket** – This item will be measured and paid per linear foot for the size of shaft indicated, as noted in the Special Provisions.
- 2.25. **Permanent Steel Casing** – This item will be measured and paid per linear foot, as noted in the Special Provisions.
- 2.26. **Crosshole Sonic Logging Testing** – This item will be measured and paid per each test completed, as noted in the Special Provisions.
- 2.27. **Steel Piles** – This item will be measured in linear feet for the size indicated, from the tip to the head of the pile remaining in place in the completed structure, and will be paid for at the contract unit price per linear foot. This price shall include furnishing piles with points; driving piles; splices; obtaining required capacity, submittals for approval, performing wave equation analysis, and disposing of piling cutoffs.
- 2.28. **Architectural Treatment** – This item will be measured and paid for at the contract unit price per square yard, complete-in-place, as noted in the Special Provisions.
- 2.29. **Flowable Backfill** – This item will be measured and paid per cubic yard, as noted in the Special Provisions.
- 2.30. **Concrete Pipe** – This bid item shall be measured in linear feet along the centerline of the pipe for the size and type of pipe specified from end of pipe to end of pipe, and paid at

the contract price per linear foot. The unit price shall include the cost of furnishing pipe, fittings, and collars, trenching and excavating, sheeting and shoring, dewatering, disposal of material, installation of the pipe with bedding material and backfill material, and restoration of ground surface.

- 2.31. **Drop Inlet** – This item will be measured as complete units, including the frame and grate or cover, and will be paid for at the contract unit price per each for the type indicated. Where curb or curb and gutter extend along the drop inlet, the contract unit price for drop inlets shall include that part of the curb or gutter within the limits of the structure. The unit price for each structure shall also include bedding and required accessories such as inlet shaping and steps. If Contractor is using precast sections, the Contractor shall perform a field investigation of structure depths before ordering.
- 2.32. **Manholes** - This item will be measured in linear feet, from top of foundation slab to top of masonry on which the casting frame is placed, and will be paid for at the contract unit price per vertical linear foot exclusive of frame and cover. Bedding material shall be included in the unit price per foot for the manhole.
- 2.33. **End Wall** – This item will be measured as complete units and will be paid for at the contract unit price per each for the type indicated. The unit price for each structure shall also include concrete, reinforcing steel, bedding, flapper gates, grading, design and submittals, and other materials and labor to install the completed unit.
- 2.34. **Frame & Cover** – This item will be measured in units of one complete frame and cover and will be paid for at the contract unit price per each.
- 2.35. **Reconstruct Existing Manhole** – This item will be measured as a complete unit and will be paid for at the contract unit price per each.
- 2.36. **Erosion Control Stone** – This item will be measured in tons for the type and class specified and will be paid for at the contract unit price per ton. This price shall include excavating, backfilling, preparing the surface, furnishing and installing geotextile bedding material including overlaps, repair work, excavating and backfilling toe-ins, and placing the required materials.
- 2.37. **Aggregate Base Material** – This item will be measured in tons and will be paid for at the contract unit price per ton for the type indicated, in accordance with the requirements of VDOT RBS Section 109.01. This price shall include furnishing, placing, compacting, and finishing to proper grade.
- 2.38. **Asphalt Concrete** – This item will be measured in tons and paid for at the contract unit price per ton for the type indicated. Net weight information shall be furnished with each load of material delivered in accordance with the requirements of VDOT RBS Section 211. Batch weights will not be permitted as a method of measurement unless the Contractor’s plant is equipped in accordance with the requirements of Section 211, in which case the cumulative weight of the batches will be used for payment.
- 2.39. **Concrete Curbs** – This item will be measured in linear feet along the face of the curb, complete-in-place, and will be paid for at the contract unit price per linear foot for the type indicated, including radial, and combination types. This price shall include modifying

curbs for standard entrance gutters, curb ramps, standard street connection pavement. Where the curb or curb and gutter is adjacent to drop inlets, the contract unit price for the drop inlets shall include that part of the curb or curb and gutter within the limits of the structure.

Where there is no excavation within the limits of the curb, other than that necessary for its construction, the contract unit price shall include excavating, backfilling, bedding, compacting, and disposing of surplus and unsuitable material. Where excavation is necessary for the roadway, the part within the limits of the curb, gutter, combination curb and gutter, or median barrier section will be paid for as regular excavation in accordance with the requirements of Section 303.06.

- 2.40. **CG-12 Detectable Warning Surface** – This item will be measured in square yards and paid for at the contract unit price per square yard, complete-in-place. This price shall be full compensation for furnishing and installing approved truncated dome finished materials and brick pavers, integral visual contrast, dowels and all other labor, tools, equipment, materials and incidentals necessary to fully complete the work.
- 2.41. **Concrete Sidewalk** – This item will be measured in square yards of finished surface, complete-in-place, and will be paid for at the contract unit price per square yard. The contract unit price for sidewalks shall include excavating, removing existing sidewalk, and disposing of surplus and unsuitable material.
- 2.42. **Brick Banding** – This item will be measured in linear feet of banding installed and accepted, as measured along the edge of band nearest the sidewalk. This item will be paid at the contract price per linear foot, which shall include preparing site and subgrade, sand bed, and brick pavers.
- 2.43. **Metal Railing** – This item will be measured in linear feet along the top rail, complete-in-place, and will be paid for at the contract unit price per linear foot. This price shall include coring holes for mounting, grouting, grounding, and attachment to adjacent structures.
- 2.44. **Flexible Pavement Planing** – This item will be measured in square yards of removed to the depth specified and will be paid for at the contract unit price per square yard per inch. This price shall include vehicles, safety equipment, warning devices, and removing and disposing of existing pavement.
- 2.45. **Demolition of Pavement (Flexible)** – This item will be measured as in square yards and paid at the contract price per square yard. This price shall include all demolition, removal and disposal costs of pavement, base, subbase and stabilized subgrade materials.
- 2.46. **Saw Cut Pavement** – This item will be measured in linear feet for the depth specified and will be paid for at the contract unit price per foot, which price shall be full compensation for saw-cutting the asphalt pavement to the depth specified.
- 2.47. **Pavement Marking (Linear Foot, LF; Each, EA)** - This bid item will be measured in linear feet of linear markings or per each non-linear marking, and will be paid at the contract unit price per foot or per each. This price shall include the pavement marking material, surface preparation, quality control tests, daily log, guarding devices,

primer/adhesive, and glass beads. All pavement markings shall be in accordance with VDOT RBS Section 246.

End of Section

Section 01350

Submittals

1. General

1.1. Submittals shall include all anticipated shop drawings, product data, and samples as defined in the Contract Documents and also include certificates, test data, and other submitted data required to demonstrate compliance with the contract documents. See General Conditions Section 14 for more information.

1.2. Submittal Register – Submit by email to luke.pugh@roanokeva.gov

Submittal Number	Description
1	Schedule
2	Submittals as required by VDOT RBS
3	Submittals as required by Norfolk Southern

**** - Must be submitted and approved before notice to proceed date is set.**

1.3. Resubmission -Change or correct submittals as required by the City project manager or City's consultant.

1.4. City Procedures - City's Review: Submittals will be reviewed with reasonable promptness. Submittals will be stamped by the City with one of the five following actions:

1.4.1. "Approved" indicates approval with no exception taken and the plan of work shown may proceed. However, the City's approval of any submittal shall not relieve the Contractor from the responsibility of complying with all requirements of this Contract, including the obligation to provide submittals that are accurate and complete. The City assumes no responsibility for figured dimensions on shop drawings. In addition, the City assumes no responsibility for concrete compression strength tests even after the mix design has been approved.

1.4.2. "Approved as Noted" indicates approval subject to the noted corrections. Ordering or fabrication of work shown may proceed on the basis of corrections indicated.

1.4.3. "Correct and Resubmit" indicates that additional information or changes (as noted) are required prior to taking further action. Corrections shall be made to the submittal and it shall be resubmitted. Ordering or fabrication of work shall not proceed.

Submittals

1.4.4. “Disapproved” indicates information provided reveals that submittal does not conform to the contract requirements. Submittal conforming to the contract requirements shall be submitted for approval.

1.4.5. “No Action Taken” indicates one of the following: Submittal incomplete and a proper review cannot be performed, Insufficient copies submitted, Transmittal form incomplete, Contractor’s certificate approving submittal not signed or missing, Submittal not required and the contract documents do not require the City to take action on this item, and Other causes or reasons as noted.

1.5 Colors – Not Used

1.6 Changes After Approval – Contractor shall not make any changes in submittal marked “Approved” or “Approved as Noted” without obtaining the prior written consent of the City. If such written consent is obtained, revise the submittal to show fully the altered parts of the work and resubmit according to the procedures specified herein. State on resubmitted plans that the work shown supersedes and voids identified parts of the same work previously shown. Give full identification on the drawings previously approved by the City and the date of such action.

1.7 Proceeding without Approval - Proceeding with any construction and ordering or fabricating materials before all relevant drawings have been “Approved” or “Approved as Noted” shall be done at the Contractor’s sole risk.

End of Section

Section 01500

Temporary Facilities

1. General

- 1.1. **Use Charges:** No cost or usage charges for temporary services or facilities shall be chargeable to the City. Cost or use charges for temporary services or facilities or for operation of permanent utilities shall not be accepted as a basis of claims for an increase in the contract sum.
- 1.2. **Temporary Electricity and Lighting** - Contractor shall arrange for power and lighting and pay costs for service and power used.
- 1.3. **Temporary Water** - Contractor shall arrange for water for construction purposes and pay costs for installation, maintenance and removal, and service charges for water used.
- 1.4. **Temporary Sanitary Facilities** - Contractor shall arrange and pay for toilet facilities and maintain those facilities in accordance with the public health authority having jurisdiction.
- 1.5. **Staging and Storage Areas** – Contractor shall arrange and pay for any staging and storage areas.
- 1.6. **Job site office** - The Contractor shall be required to have a job site office or trailer.

2. Products – Not Used

3. Execution – Not Used

End of Section

Appendix A

THIS AGREEMENT, dated as of the 16th day of August, 2016 is made and entered into by and between

NORFOLK SOUTHERN RAILWAY COMPANY, a Virginia corporation, whose mailing address is Three Commercial Place, Norfolk, Virginia 23510 (hereinafter called "RAILWAY" or "NSR"); and

THE CITY OF ROANOKE, VIRGINIA, a Virginia Municipality, whose mailing address is 215 Church Avenue, Room 350, Roanoke, Virginia 24011 (hereinafter called "LICENSEE").

RECITALS

WHEREAS, LICENSEE, at its own cost and expense, has found it necessary to replace the existing Franklin Road Bridge over RAILWAY (the existing and bridge and appurtenances thereto referred to herein as the "Facilities"), in the vicinity of RAILWAY Milepost V-243.55, at or near Roanoke, Virginia (the "Premises"), located substantially as shown upon print of Drawing marked Exhibit A; and

WHEREAS, RAILWAY is willing to permit LICENSEE to enter upon RAILWAY's right of way for installation, construction, replacement, maintenance, operation and removal of the Facilities upon the terms and conditions of this Agreement; and in accordance with the plans and specifications marked Exhibit B; and

WHEREAS, RAILWAY is willing, at LICENSEE's sole expense, to make modifications to RAILWAY's right of way and/or appurtenances rendered necessary by LICENSEE's installation, construction, replacement, maintenance, operation and removal of its Facilities in accordance with the force account estimate marked Exhibit D.

NOW THEREFORE, for and in consideration of the premises and mutual covenants contained in this Agreement, the parties agree as follows:

I. LICENSEE'S FACILITIES

1. Right-of-Entry. RAILWAY, insofar as its rights and title enables it to do so and subject to its rights to operate and maintain its RAILWAY and RAILWAY appurtenances along, in, and over its right-of-way, grants LICENSEE, its agents and/or contractors, without compensation, the right to enter upon the Premises, for the purpose of installation, construction, maintenance, operation and removal of the Facilities, provided that, prior to entry upon lands of RAILWAY, any agent and/or contractor of LICENSEE must execute and deliver to RAILWAY a standard contractor right-of-entry agreement in a form approved by RAILWAY in its sole discretion, together with any certificate(s) of insurance required therein. Furthermore, any crossing of RAILWAY tracks by LICENSEE or any of its agents and/or contractors must be addressed by a standard temporary crossing agreement in a form approved by RAILWAY in its sole discretion.

2. Use and Condition of the Premises. The Premises shall be used by LICENSEE only for the installation, construction, maintenance, operation and removal of the Facilities and for no other purpose without the prior written consent of RAILWAY, which consent may be withheld by RAILWAY in its sole discretion. LICENSEE accepts the Premises in their current "as is" condition, as suited for the installation, construction, replacement maintenance, operation and removal of the Facilities, and without the benefit of any improvements to be constructed by RAILWAY except insofar as contemplated by Section II of this Agreement.

3. Construction and Maintenance of the Facilities. LICENSEE shall cause to be constructed and maintained, the Facilities, at its expense, in such a manner as will not interfere with the operations of RAILWAY or endanger persons or property of RAILWAY, and in accordance with (a) plans and specifications (if any) shown on said print(s) marked as Exhibit B and any other specifications prescribed by RAILWAY, (b) applicable governmental regulations or laws, and (c) applicable specifications adopted by the American RAILWAY

Engineering and Maintenance of Way Association when not in conflict with plans, specifications or regulations mentioned in (a) and (b) above. LICENSEE and any and all of LICENSEE contractors entering the Premises shall fully comply with applicable roadway worker protection regulations.

4. Indemnification. LICENSEE hereby agrees to require its contractor(s) to indemnify and save harmless RAILWAY, its officers, agents and employees, from and against any and all liability, claims, losses, damages, expenses (including attorneys' fees) or costs for personal injuries (including death) and/or property damage to whomsoever or whatsoever occurring that arises or in any manner grows out of (a) the presence of LICENSEE's contractor(s) and its or their employees, agents and/or sub-contractors on or about the Premises, regardless of whether negligence on the part of RAILWAY, its officers, agents or employees caused or contributed to said loss of life, personal injury or property loss or damage in whole or in part; (b) any allegation that RAILWAY is an employer or joint employer of a LICENSEE or LICENSEE's contractor(s) or is liable for related employment benefits or tax withholdings; or (c) any decision by RAILWAY to bar or exclude LICENSEE or LICENSEE's contractor(s) from the Premises pursuant to the terms of this Agreement.

5. Environmental Matters.

LICENSEE, assumes all responsibility for any environmental obligations imposed under applicable laws, regulations or ordinances relating to the installation, operation, maintenance and/or use of the Facilities and/or to any contamination of any property, water, air or groundwater arising or resulting from LICENSEE's permitted operations or uses of RAILWAY's property pursuant to this Agreement, including conducting proper testing and disposal of disturbed media. In addition, LICENSEE shall obtain, or shall require its contractors to obtain, any necessary permits to install, operate, maintain and/or use the Facilities. LICENSEE agrees that it shall require its contractors to be responsible for any and all liability, fines, penalties, claims, demands, costs (including attorneys' fees), losses or lawsuits brought by any person, company or governmental entity relating to contamination of any property, water, air or groundwater due to the installation, maintenance, or presence of the Facilities, including without limitation cleanup costs on RAILWAY's property and/or other property caused by such installation, maintenance or presence of the Facilities.

6. Insurance.

(a) Without limiting in any manner the liabilities and obligations assumed by LICENSEE under any other provision of this Agreement, and as additional protection to RAILWAY, LICENSEE shall, at its expense, procure and maintain with insurance companies satisfactory to RAILWAY, the following insurance policies:

(i) A Commercial General Liability Insurance Policy having a combined single limit of not less than \$2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, shall be endorsed to name RAILWAY as the certificate holder and as an additional insured, and shall include a severability of interests provision; and,

(ii) An original Railroad Protective Liability Insurance Policy naming RAILWAY as a named insured and having a combined single limit of not less than \$2,000,000 each occurrence and \$6,000,000 in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit of \$5,000,000 each occurrence and \$10,000,000 in the aggregate applying separately to each annual period.

(b) All insurance required under the preceding subsection (a) shall be underwritten by insurers and be of such form and content, as may be acceptable to RAILWAY. Prior to the commencement of installation, construction, replacement, maintenance, operation, or removal of the Facilities or any entry on RAILWAY's property, LICENSEE shall furnish to RAILWAY's Director Risk Management, Three Commercial Place, Norfolk, Virginia 23510-2191 (or such other representative and/or address as subsequently given by RAILWAY to LICENSEE in writing), for approval, the original policy described in subsection (a)(ii) and a certificate of insurance evidencing the existence of a policy with the coverage described in subsection (a)(i).

7. Railway Support. RAILWAY shall, at RAILWAY's option, furnish, at the sole expense of LICENSEE, labor and materials necessary, in RAILWAY's sole judgment, to support its tracks and to protect its traffic (including, without limitation, flagging) during the installation, construction, replacement, maintenance, repair, renewal or removal of the Facilities.

8. Special Provisions for Protection of Railway Interests. In connection with the installation, construction, operation, maintenance and removal of the Facilities, it is agreed that the safety of people and the safety and continuity of RAILWAY's rail operations shall be of first importance. LICENSEE shall require its employees, agents, contractors, and invitees to utilize and comply with RAILWAY's directives in this regard and shall require its contractor(s) to comply with all NSR Special Provisions, attached hereto, and herein incorporated by reference, including any future amendments, as Exhibit C. As used in the NSR Special Provisions, LICENSEE is the "contractor" in the event LICENSEE enters onto the Premises to perform any work contemplated by this Agreement other than periodic inspections when LICENSEE's contractor(s) is/are present. LICENSEE hereby agrees that it will not be entering the Premises for any purpose other than the periodic inspections addressed herein. To ensure such compliance, LICENSEE shall assign a project manager to function as a single point-of-contact for LICENSEE. Said project manager is referred to as the "Sponsor's Engineer" in Exhibit C.

9. Safety of Railway Operations. If RAILWAY becomes aware of any safety violations committed by LICENSEE, its employees, agents and/or contractors, RAILWAY shall so notify LICENSEE, and LICENSEE shall promptly correct such violation. In the event of an emergency threatening immediate danger to persons or property, RAILWAY may take corrective actions and shall notify LICENSEE promptly thereafter. LICENSEE shall reimburse RAILWAY for actual costs incurred in taking such emergency measures. RAILWAY assumes no additional responsibility for safety on the Premises for LICENSEE, its agents/or contractors by taking these corrective actions, and LICENSEE, its agents/contractors shall retain full responsibility for such safety violations.

10. Corrective Measures. If LICENSEE fails to take any corrective measures requested by RAILWAY in a timely manner, or if an emergency situation is presented which, in RAILWAY's judgment, requires immediate repairs to the Facilities, RAILWAY, at LICENSEE's expense, may undertake such corrective measures or repairs as it deems necessary or desirable.

11. Railway Changes. If RAILWAY shall make any changes, alterations or additions to the line, grade, tracks, structures, roadbed, installations, right-of-way or works of RAILWAY, or to the character, height or alignment of the RAILWAY's track or other railroad facilities, including without limitation communication and signal systems, at or near the Facilities, LICENSEE shall, upon thirty (30) days prior written notice from RAILWAY and at its sole expense, make such changes in the location and character of the Facilities as, in the opinion of the chief engineering officer of RAILWAY, shall be necessary or appropriate to accommodate any construction, improvements, alterations, changes or additions of RAILWAY.

12. Assumption of Risk. Unless caused solely by the negligence of RAILWAY or caused solely by the willful misconduct of RAILWAY, LICENSEE hereby assumes all risk of damage to the Facilities and LICENSEE's other property relating to its use and occupation of the Premises or business carried on the Premises and any defects to the Premises; and LICENSEE hereby declares and states that RAILWAY, its officers, directors, agents and employees shall not be responsible for any liability for such damage.

13. Liens; Taxes. LICENSEE will not permit any mechanic's liens or other liens to be placed upon the Premises, and nothing in this Agreement shall be construed as constituting the consent or request of RAILWAY.

express or implied, to any person for the performance of any labor or the furnishing of any materials to the Premises, nor as giving LICENSEE any right, power or authority to contract for or permit the rendering of any services or the furnishing of any materials that could give rise to any mechanic's liens or other liens against the Premises. In addition, LICENSEE shall be liable for all taxes levied or assessed against the Facilities and any other equipment or other property placed by LICENSEE within the Premises. In the event that any such lien shall attach to the Premises or LICENSEE shall fail to pay such taxes, then, in addition to any other right or remedy available to RAILWAY, RAILWAY may, but shall not be obligated to, discharge the same. Any amount paid by RAILWAY for any of the aforesaid purposes, together with related court costs, attorneys' fees, fines and penalties, shall be paid by LICENSEE to RAILWAY within ten (10) days after RAILWAY's demand therefor.

14. Default; Remedies.

(a) The following events shall be deemed to be events of default by LICENSEE under this Agreement:

(i) LICENSEE shall fail to pay any sum of money due hereunder and such failure shall continue for a period of ten (10) days after the due date thereof; or

(ii) LICENSEE shall fail to comply with any provision of this Agreement not requiring the payment of money, all of which terms, provisions and covenants shall be deemed material, and such failure shall continue for a period of thirty (30) days after written notice of such default is delivered to LICENSEE.

(b) Upon the occurrence of any event or events of default by LICENSEE, whether enumerated in this paragraph 15 or not, RAILWAY shall have the option to pursue any remedies available to it at law or in equity without any additional notices to LICENSEE. RAILWAY's remedies shall include, but not be limited to, the following: (i) termination of this Agreement, in which event LICENSEE shall immediately surrender the Premises to RAILWAY; (ii) entry into or upon the Premises to do whatever LICENSEE is obligated to do under the terms of this License, in which event LICENSEE shall reimburse RAILWAY on demand for any expenses which RAILWAY may incur in effecting compliance with LICENSEE's obligations under this License, but without rendering RAILWAY liable for any damages resulting to LICENSEE or the Facilities from such action; and (iii) pursuit of all other remedies available to RAILWAY at law or in equity, including, without limitation, injunctive relief of all varieties.

15. Railway Termination Right. Notwithstanding anything to the contrary in this Agreement, RAILWAY shall have the right to terminate this Agreement and the rights granted hereunder, after delivering to LICENSEE written notice of such termination no less than sixty (60) days prior to the effective date thereof, upon the occurrence of any one or more of the following events:

(a) If LICENSEE shall discontinue the use or operations of the Facilities; or

(b) If RAILWAY shall be required by any governmental authority having jurisdiction over the Premises to remove, relocate, reconstruct or discontinue operation of its railroad on or about the Premises; or

(c) If RAILWAY, in the good faith judgment of its Superintendent, shall require a change in the location or elevation of its railroad on or about the location of the Facilities or the Premises that might effectively prohibit the use or operation of the Facilities; or

(d) If RAILWAY, in the good faith judgment of its Superintendent, determines that the maintenance or use of the Facilities unduly interferes with the operation and maintenance of the facilities of RAILWAY, or with the present or future use of such property by RAILWAY, its lessees, affiliates, successors or assigns, for their respective purposes.

16. Condemnation. If the Premises or any portion thereof shall be taken or condemned in whole or in part for public purposes, or sold in lieu of condemnation, then this Agreement and the rights granted to LICENSEE hereunder shall, at the sole option of RAILWAY, forthwith cease and terminate. All compensation awarded for any taking (or sale proceeds in lieu thereof) shall be the property of RAILWAY, and LICENSEE shall have no claim thereto, the same being hereby expressly waived by LICENSEE.

17. Removal of Facilities; Survival. The Facilities are and shall remain the personal property of LICENSEE. Upon the termination of this Agreement, LICENSEE shall remove the Facilities from the Premises within thirty (30) days after the effective date thereof. In performing such removal, unless otherwise directed by RAILWAY, LICENSEE shall restore the Premises to the same condition as existed prior to the installation or placement of Facilities, reasonable wear and tear excepted. In the event LICENSEE shall fail to so remove the Facilities or restore the Premises, the Facilities shall be deemed to have been abandoned by LICENSEE, and the same shall become the property of RAILWAY for RAILWAY to use, remove, destroy or otherwise dispose of at its discretion and without responsibility for accounting to LICENSEE therefor; provided, however, in the event RAILWAY elects to remove the Facilities, RAILWAY, in addition to any other legal remedy it may have, shall have the right to recover from LICENSEE all costs incurred in connection with such removal and the restoration of the Premises. Notwithstanding anything to the contrary contained in this Agreement, the termination of this Agreement shall not relieve LICENSEE from LICENSEE's obligations accruing prior to the termination date, and such obligations shall survive any such termination of this Agreement.

18. Interests in Real Property

RAILWAY, insofar as it has the legal right so to do, shall permit LICENSEE to enter upon lands owned or operated by RAILWAY to construct and occupy its property with sufficient width to permit construction and maintenance of the Facilities. RAILWAY further acknowledges, agrees, and confirms that LICENSEE holds sufficient interests in real property for LICENSEE to maintain and operate the existing bridge and appurtenances on and over the Premises within the areas depicted on Exhibit A attached hereto and made a part hereof; and, pursuant to such rights and interests of LICENSEE, LICENSEE has sufficient property interests in the Premises to construct, repair, replace, maintain, and operate the Facilities on and over the Premises in the locations depicted in the plans and specifications set forth in Exhibit B attached hereto and made a part hereof. Upon completion of construction of the Facilities, LICENSEE and RAILWAY will execute a conveyance of permanent easement rights to construct, maintain, operate, and repair the Facilities that will confirm the rights and interests of LICENSEE in the Premises and confirm the location of these interests. LICENSEE will furnish the plans, descriptions, and instrument for such conveyance and confirmation at LICENSEE'S sole cost and expense. RAILWAY shall not be entitled to, and LICENSEE shall not be obligated to make, any payment in connection with the execution, delivery, and recording of this conveyance, provided that the location of the bridge and appurtenances, as constructed pursuant to this Agreement, remain within the existing piers for the bridge and appurtenances presently located on the property of RAILWAY. In the event that LICENSEE requires additional property rights for (i) the Facilities; or (ii) any future modifications, repairs, or replacement of the Facilities, LICENSEE shall be obligated to pay for such additional easement rights on and over the Premises based upon the fair market value of such additional easement rights and the damage to the residue, if any, as such value RAILWAY and LICENSEE shall mutually agree.

II. SCOPE OF RAILROAD PROJECT, AND MAINTENANCE AND OWNERSHIP OF PROJECT IMPROVEMENTS

1. Scope of Work. The scope of the work by RAILWAY shall include any necessary acquisition of right-of-way, permitting, design, construction, and construction-related activities including, but not limited to, inspection, flagging, and superintendence, within and along RAILWAY property necessary to facilitate LICENSEE's installation, construction, maintenance, operation and removal of the Facilities ("Railroad Project").

2. Construction of the Railroad Project. The RAILWAY shall construct the Railroad Project in accordance with the force account estimate, attached as Exhibit D and herein incorporated by reference, including any future amendments thereto, and all applicable state and federal laws.

(a) All work performed by the RAILWAY related to the Railroad Project and consistent with the force account estimate will be deemed reimbursable project expenses, and shall be at no cost to the RAILWAY.

(b) RAILWAY shall accomplish work on the Railroad Project by the following: (i) railroad force account; (ii) existing continuing contracts at reasonable costs; (iii) contracting with the lowest responsible bidder based on appropriate solicitation; or (iv) contract without competitive bidding for minor work at reasonable costs.

3. Maintenance and Ownership of the Railroad Project. Upon completion of the Railroad Project, the RAILWAY shall own and, at its own cost and expense, maintain the Railroad Project improvements until such time as RAILWAY deems such maintenance to no longer be necessary.

4. Construction of the Railroad Project. Execution of this Agreement constitutes LICENSEE's issuance of a notice to proceed to RAILWAY with the Railroad Project ("Notice to Proceed"). RAILWAY shall make commercially reasonable efforts to commence construction on the Railroad Project as soon as possible, in RAILWAY's sole discretion, after the date of availability for RAILWAY to commence its construction activities on the Railroad Project.

5. Reimbursement by LICENSEE.

(a) RAILWAY shall furnish, or cause to be furnished, at the expense of the LICENSEE all the labor costs, overhead and indirect construction costs, materials and supplies, contracted services, transportation, equipment, and other related costs and items required to perform and complete the Railroad Project. In addition, RAILWAY shall furnish, at the expense of LICENSEE, the protection of rail traffic occasioned by or made necessary by entry by LICENSEE and/or its contractors or any subcontractor(s) pursuant to this Agreement.

(b) Except as otherwise provided in this Agreement, LICENSEE shall reimburse the RAILWAY for the actual cost of the work performed by it, which is estimated to be **One Million Four Thousand One Hundred Fifty-Three Dollars and Zero Cents (\$1,004,153.00)**. It is agreed that progress payments will be made by LICENSEE to the RAILWAY for the total amount of work done as shown on monthly statements. LICENSEE shall pay each RAILWAY statement within forty-five (45) days of receipt. Upon receipt of the final bill, RAILWAY shall be reimbursed in such amounts as are proper and eligible for final payment, and the RAILWAY Project shall be submitted to LICENSEE for final audit.

(c) Incurring Costs. The reimbursement amounts for all costs billed under this Agreement shall be subject to the applicable Federal principles and based on the full actual costs plus Approved Labor Additives. Design costs incurred by RAILWAY prior to issuance of the Notice to Proceed shall be reimbursed by LICENSEE.

III. GENERAL PROVISIONS

1. Assignment and Successors. This Agreement shall be binding upon and shall inure to the benefit of, and shall be enforceable by, the parties hereto and their respective permitted successors and assigns.

2. Limitations Upon Damages. Notwithstanding any other provision of this Agreement, RAILWAY shall not be liable for breach of this Agreement or under this Agreement for any consequential, incidental, exemplary, punitive, special, business damages or lost profits, as well as any claims for death, personal injury, and property loss and damage which occurs by reason of, or arises out of, or is incidental to the interruption in or usage of the Facilities placed upon or about the Premises by LICENSEE, including without limitation any damages under such claims that might be considered consequential, incidental, exemplary, punitive, special, business damages or lost profits.

3. Miscellaneous. All exhibits, attachments, riders and addenda referred to in this Agreement are incorporated into this Agreement and made a part hereof for all intents and purposes. Time is of the essence with regard to each provision of this Agreement. This Agreement shall be construed and interpreted in accordance with and governed by the laws of the State in which the Premises are located. Each covenant of RAILWAY and LICENSEE under this Agreement is independent of each other covenant under this Agreement. No default in performance of any covenant by a party shall excuse the other party from the performance of any other covenant.

4. Notice to Parties. Whenever any notice, statement or other communication is required under this Agreement, it shall be sent to the contact below except as otherwise provided in this Agreement or unless otherwise specifically advised.

As to LICENSEE:
City of Roanoke, Virginia
Noel C. Taylor Municipal Building
215 Church Avenue, S.W.
Roanoke, Virginia 24011
Attention: Roanoke City Engineer

As to RAILWAY:
c/o Norfolk Southern Corporation
1200 Peachtree Street, N.E.
Atlanta, Georgia 30309-3504
Attention: Public Projects Engineer

Either party may, by notice in writing, direct that future notices or demands be sent to a different address. All notices hereunder shall be deemed given upon receipt (or, if rejected, upon rejection).

5. Severability. The invalidity of any section, subsection, clause or provision of this Agreement shall not affect the validity of the remaining sections, subsections, clauses or provisions of this contract.

6. No Third Party Beneficiary. This Agreement shall be for the benefit of the parties only, and no person, firm or corporation shall acquire any rights whatsoever by virtue of this Agreement, except LICENSEE and the RAILWAY and their successors and assigns.

7. Force Majeure. The parties agree to pursue the completion of the Railroad Project in accordance with the requirements of this Agreement. No party shall be held responsible to the other for delays caused by Force Majeure events, and such delays shall not be deemed a breach or default under this Agreement. In no event shall Force Majeure events excuse LICENSEE from its obligation to make payment to RAILWAY in accordance with this Agreement. Further the parties agree that the resolution or settlement of strikes or other labor disputes shall not be deemed to be within the control or reasonable control of the affected party. If any party is unable to complete

work assigned to it due to a condition of Force Majeure or other conditions beyond the reasonable control of said party, then said party will diligently pursue completion of the item that is delayed once said condition or conditions are no longer in effect. For purposes of this Agreement, Force Majeure events are defined as circumstances beyond a party's reasonable control that delay performance and may include, but are not limited to, acts of God, actions or decrees of governmental bodies (beyond control of the parties), acts of the public enemy, labor disputes, fires, insurrections, and floods.

8. Amendment; Entire Agreement. This Agreement may be amended only in writing executed by authorized representatives of the parties hereto. No verbal change, modification, or amendment shall be effective unless in writing and signed by authorized representatives of the parties. The provisions hereof constitute the entire Agreement between the parties and supersede any verbal statement, representations, or warranties, stated or implied.

9. Intentionally Omitted

10. Independent Contractors. The parties agree that LICENSEE and its agents and/or contractors, shall not be deemed either agents or independent contractors of RAILWAY. Except as otherwise provided by this Agreement, RAILWAY shall exercise no control whatsoever over the employment, discharge, compensation of, or services rendered by LICENSEE or its contractors. Notwithstanding the foregoing, this paragraph shall in no way affect the absolute authority of RAILWAY to temporarily prohibit LICENSEE, its agents and/or contractors, or persons not associated with LICENSEE from entering RAILWAY property, or to require the removal of any person from RAILWAY property, if RAILWAY determines, in its sole discretion, that such person is not acting in a safe manner or that actual or potential hazards in, on, or about the Railroad Project Work exist.

11. Meaning of "Railway". The word "RAILWAY" as used herein shall include any other company whose property at the aforesaid location may be leased or operated by RAILWAY. Said term also shall include RAILWAY's officers, directors, agents and employees, and any parent company, subsidiary or affiliate of RAILWAY and their respective officers, directors, agents and employees.

12. Approval of Plans. By its review and approval, if any, of the plans marked as Exhibit B, RAILWAY signifies only that the plans and improvements to be constructed in accordance with the plans satisfy the RAILWAY's requirements. RAILWAY expressly disclaims all other representations and warranties in connection with said plans, including, but not limited to, the integrity, suitability or fitness for the purposes of the LICENSEE or any other person(s) of the plans or improvements constructed in accordance with the plans.

IN WITNESS WHEREOF, the parties have, through duly authorized representatives, entered into this Agreement effective the day and year first written above.

CITY OF ROANOKE, VIRGINIA.

**NORFOLK SOUTHERN RAILWAY
COMPANY, a Virginia corporation**

By: 
Name: Christopher Morrill
Title: City Manager
Date: 8-16-16

By: _____
Name: _____
Title: _____
Date: _____

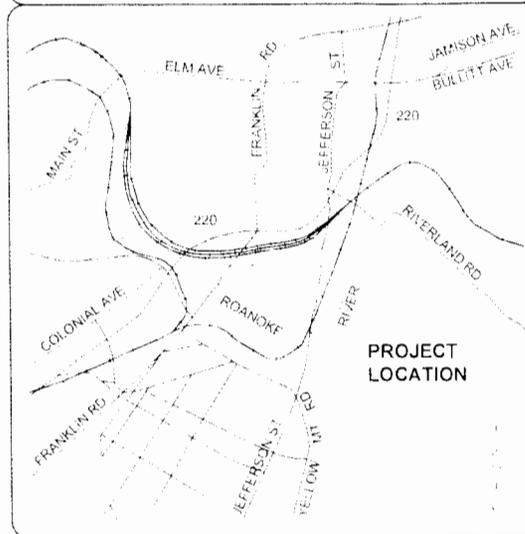
NS File: BR0002281

Approved as to form:

 08.16.2016
Roanoke City Attorney Ordinance No. 46608-081516

EXHIBIT A

PROJECT LOCATION MAP



ROANOKE

OFFICE OF THE CITY ENGINEER
 215 CHURCH AVENUE, SW
 ROOM 350
 ROANOKE, VIRGINIA 24011-1587
 PHONE: (540) 853-2731 FAX: (540) 853-1364
 ENGINEER@ROANOKEVA.GOV

1. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY ENGINEER AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND PUBLIC SAFETY (VDOT) PRIOR TO THE START OF CONSTRUCTION.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY ENGINEER AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND PUBLIC SAFETY (VDOT) PRIOR TO THE START OF CONSTRUCTION.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY ENGINEER AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND PUBLIC SAFETY (VDOT) PRIOR TO THE START OF CONSTRUCTION.

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6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY ENGINEER AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND PUBLIC SAFETY (VDOT) PRIOR TO THE START OF CONSTRUCTION.

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10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY ENGINEER AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND PUBLIC SAFETY (VDOT) PRIOR TO THE START OF CONSTRUCTION.

CONSULTING ENGINEERS

AECOM
 10 SOUTH JEFFERSON STREET
 SUITE 1600
 ROANOKE, VIRGINIA 24011
 PHONE: (540) 857-3100

AECOM PROJECT NO. 60290893

PROJECT NAME

FRANKLIN ROAD BRIDGE REPLACEMENT
 OVER N.S. RAILWAY
 STRUCTURE 1817
 CITY OF ROANOKE, VIRGINIA

CITY PROJECT NUMBER: 6787

VDOT PROJECT NUMBER: 0220-128-R34 / UPC 104248

NCS FILE: 117-19156 (BR0002281) R.R.M.P. V-243.55 (VIRGINIA)

REVISION BY	DESCRIPTION	DATE

FINAL PLANS FOR
 NORFOLK SOUTHERN
 RAILWAY REVIEW
 14 AUG. 2015

APPROVED FOR CONSTRUCTION

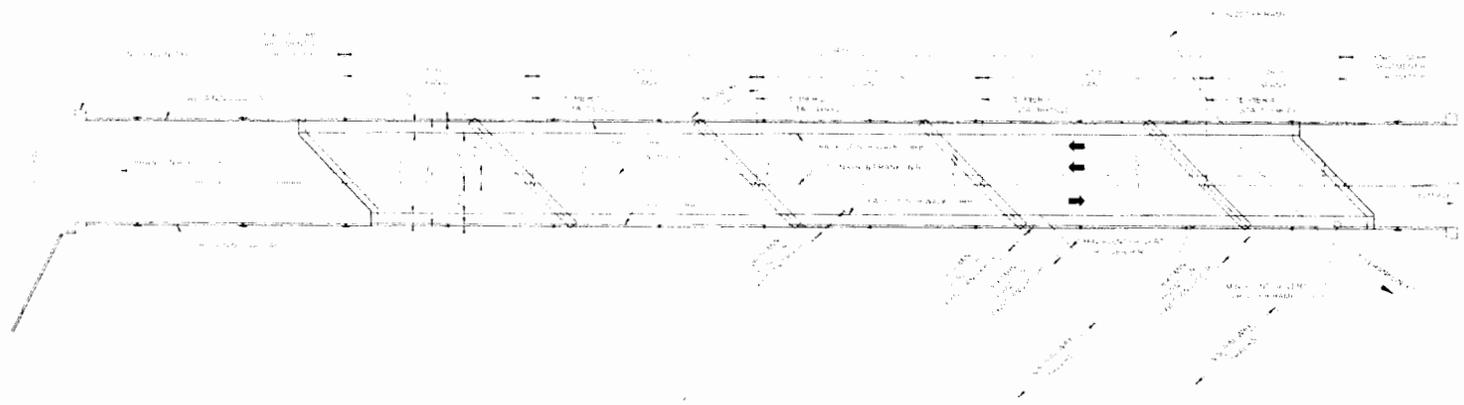
ROANOKE CITY ENGINEER	DATE
DIRECTOR OF PUBLIC WORKS	DATE

ADVERTISED DATE:

SET NUMBER:

SHEET NUMBER G-001

EXHIBIT B



PLAN



ABUTMENT A PIER 1 PIER 2 PIER 3 PIER 4 ABUTMENT B

DEVELOPED SECTION ALONG CONSTR. B

GRAPHIC SCALES



PROJECT
FRANKLIN ROAD
BRIDGE REPLACEMENT
OVER N.S. RAILWAY

CLIENT
CITY OF ROANOKE

CONSULTANT

REGISTRATION

**FINAL PLANS FOR
NORFOLK SOUTHERN
RAILWAY REVIEW
14 AUG. 2015**

ISSUE/REVISION

NO.	DESCRIPTION

KEY PLAN

PROJECT NUMBER

BOUNDARY

SHEET TITLE
BRIDGE PLAN AND ELEVATION

SHEET NUMBER
CR-002

EXHIBIT B

1. This drawing shows the proposed bridge structure and approach roads over the N.S. Railway. The bridge is to be constructed on the existing railway embankment. The approach roads are to be constructed on the existing railway embankment and the existing road surface.

2. The bridge structure is to be constructed on the existing railway embankment. The approach roads are to be constructed on the existing railway embankment and the existing road surface.

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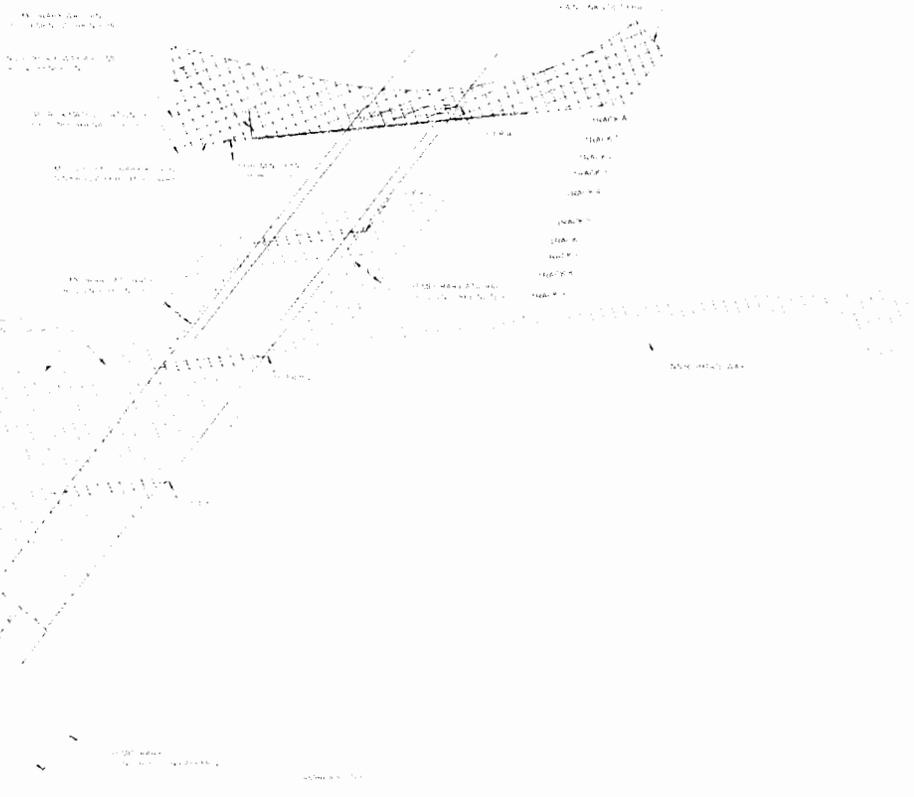
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LEGEND

- 1. PROPOSED BRIDGE STRUCTURE
- 2. PROPOSED APPROACH ROADS
- 3. EXISTING ROAD SURFACE
- 4. EXISTING RAILWAY
- 5. EXISTING EMBANKMENT

PLAN

Scale: 1:1000



PROJECT
FRANKLIN ROAD
BRIDGE REPLACEMENT
OVER N.S. RAILWAY

CLIENT
CITY OF ROANOKE
1000 North Avenue
Roanoke, VA 24011

CONSULTANT
AECOM
1000 North Avenue
Roanoke, VA 24011

REGISTRATION

**PRELIMINARY PLANS
NOT FOR
CONSTRUCTION
15 OCT. 2015**

ISSUE	REVISION

KEY PLAN

PROJECT NUMBER
6020093

SHEET TITLE
SITE ACCESS AND RAILROAD
COORDINATION

SHEET NUMBER
CB-001



E. Norfolk Southern – Special Provisions for Protection of Railway Interests

1. AUTHORITY OF RAILROAD ENGINEER AND SPONSOR ENGINEER:

Norfolk Southern Railway Company, hereinafter referred to as “Railroad”, and their authorized representative shall have final authority in all matters affecting the safe maintenance of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks. For Public Projects impacting the Railroad, the Railroad’s Public Projects Engineer, hereinafter referred to as “Railroad Engineer”, will serve as the authorized representative of the Railroad.

The authorized representative of the Project Sponsor (“Sponsor”), hereinafter referred to as the “Sponsor’s Engineer”, shall have authority over all other matters as prescribed herein and in the Project Specifications.

The Sponsor’s Prime Contractor, hereinafter referred to as “Contractor” shall be responsible for completing any and all work in accordance with the terms prescribed herein and in the Project Specifications. These terms and conditions are subject to change without notice, from time to time in the sole discretion of the Railroad. Contractor must request from Railroad and follow the latest version of these provisions prior to commencing work.

2. NOTICE OF STARTING WORK:

A. The Contractor shall not commence any work on railroad rights-of-way until he has complied with the following conditions:

1. Signed and received a fully executed copy of the required Norfolk Southern Contractor Right of Entry Agreement.
2. Given the Railroad written notice in electronic format to the Railroad Engineer, with copy to the Sponsor’s Engineer who has been designated to be in charge of the work, at least ten days in advance of the date he proposes to begin work on Railroad rights-of-way.
3. Obtained written approval from the Railroad of Railroad Protective Liability Insurance coverage as required by paragraph 14 herein. It should be noted that the Railroad does not accept notation of Railroad Protective insurance on a certificate of liability insurance form or Binders as Railroad must have the full original countersigned policy. Further, please note that mere receipt of the policy is not the only issue but review for compliance. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for the Railroad to review.
4. Obtained Railroad’s Flagging Services as required by paragraph 7 herein.
5. Obtained written authorization from the Railroad to begin work on Railroad’s rights-of-way, such authorization to include an outline of specific conditions with which he must comply.
6. Furnished a schedule for all work within the Railroad’s rights-of-way as required by paragraph 7.B.1.



- B. The Railroad's written authorization to proceed with the work shall include the names, addresses, and telephone numbers of the Railroad's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

3. INTERFERENCE WITH RAILROAD OPERATIONS.

- A. The Contractor shall so arrange and conduct his work that there will be no interference with Railroad's operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad or to poles, wires, and other facilities of tenants on the rights-of-way of the Railroad. Whenever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor which requires flagging service or inspection service shall be deferred by the Contractor until the flagging service or inspection service required by the Railroad is available at the job site.
- B. Whenever work within Railroad's rights-of-way is of such a nature that impediment to Railroad's operations such as use of runaround tracks or necessity for reduced speed is unavoidable, the Contractor shall schedule and conduct his operations so that such impediment is reduced to the absolute minimum.
- C. Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of the Railroad, the Contractor shall make such provisions. If in the judgment of the Railroad Engineer, or in his absence, the Railroad's Division Engineer, such provisions is insufficient, either may require or provide such provisions as he deems necessary. In any event, such unusual provisions shall be at the Contractor's expense and without cost to the Railroad or the Sponsor.
- D. "One Call" Services do not locate buried Railroad utilities. The contractor shall contact the Railroad's representative 2 days in advance of work at those places where excavation, pile driving, or heavy loads may damage the Railroad's underground facilities. Upon request from the Contractor or Sponsor, Railroad forces will locate and paint mark or flag the Railroad's underground facilities. The Contractor shall avoid excavation or other disturbances of these facilities. If disturbance or excavation is required near a buried Railroad facility, the contractor shall coordinate with the Railroad to have the facility potholed manually with careful hand excavation. The facility shall be protected by the Contractor during the course of the disturbance under the supervision and direction of the Railroad's representative.

4. TRACK CLEARANCES:

- A. The minimum track clearances to be maintained by the Contractor during construction are shown on the Project Plans. If temporary clearances are not shown on the project plans, the following criteria shall govern the use of falsework and formwork above or adjacent to operated tracks.
 - 1. A minimum vertical clearance of 22'-0" above top of highest rail shall be maintained at all times.
 - 2. A minimum horizontal clearance of 13'-0" from centerline of tangent track or 14'-0" from centerline of curved track shall be maintained at all times. Additional horizontal



clearance may be required in special cases to be safe for operating conditions. This additional clearance will be as determined by the Railroad Engineer.

3. All proposed temporary clearances which are less than those listed above must be submitted to Railroad Engineer for approval prior to construction and must also be authorized by the regulatory body of the State if less than the legally prescribed clearances.
 4. The temporary clearance requirements noted above shall also apply to all other physical obstructions including, but not limited to: stockpiled materials, parked equipment, placement or driving of piles, and bracing or other construction supports.
- B. Before undertaking any work within Railroad right-of-way, and before placing any obstruction over any track, the Contractor shall:
1. Notify the Railroad's representative at least 72 hours in advance of the work.
 2. Receive assurance from the Railroad's representative that arrangements have been made for flagging service as may be necessary.
 3. Receive permission from the Railroad's representative to proceed with the work.
 4. Ascertain that the Sponsor's Engineer has received copies of notice to the Railroad and of the Railroad's response thereto.

5. CONSTRUCTION PROCEDURES:

A. General:

1. Construction work and operations by the Contractor on Railroad property shall be:
 - a. Subject to the inspection and approval of the Railroad Engineer or their designated Construction Engineering Representative.
 - b. In accordance with the Railroad's written outline of specific conditions.
 - c. In accordance with the Railroad's general rules, regulations and requirements including those relating to safety, fall protection and personal protective equipment.
 - d. In accordance with these Special Provisions.
2. Submittal Requirements
 - a. The Contractor shall submit all construction related correspondence and submittals electronically to the Railroad Engineer.
 - b. The Contractor shall allow for 30 days for the Railroad's review and response.
 - c. All work in the vicinity of the Railroad's property that has the potential to affect the Railroad's train operations or disturb the Railroad's Property must be submitted and approved by the Railroad prior to work being performed.



- d. All submittals and calculations must be signed and sealed by a registered engineer licensed in the state of the project work.
- e. All submittals shall first be approved by the Sponsor's Engineer and the Railroad Engineer, but such approval shall not relieve the Contractor from liability.
- f. For all construction projects, the following submittals, but not limited to those listed below, shall be provided for review and approval when applicable:
 - (1) General Means and Methods
 - (2) Ballast Protection
 - (3) Construction Excavation & Shoring
 - (4) Pipe, Culvert, & Tunnel Installations
 - (5) Demolition Procedure
 - (6) Erection & Hoisting Procedure
 - (7) Debris Shielding or Containment
 - (8) Blasting
 - (9) Formwork for the bridge deck, diaphragms, overhang brackets, and protective platforms
 - (10) Bent Cap Falsework. A lift plan will be required if the contractor want to move the falsework over the tracks.
- g. For Undergrade Bridges (Bridges carrying the Railroad) the following submittals in addition to those listed above shall be provided for review and approval:
 - (1) Shop Drawings
 - (2) Bearing Shop Drawings and Material Certifications
 - (3) Concrete Mix Design
 - (4) Structural Steel, Rebar, and/or Strand Certifications
 - (5) 28 day Cylinder Test for Concrete Strength
 - (6) Waterproofing Material Certification
 - (7) Test Reports for Fracture Critical Members
 - (8) Foundation Construction Reports

Fabrication may not begin until the Railroad has approved the required shop drawings.

- h. The Contractor shall include in all submissions a detailed narrative indicating the progression of work with the anticipated timeframe to complete each task. Work will not be permitted to commence until the Contractor has provided the Railroad with a satisfactory plan that the project will be undertaken without scheduling, performance or safety related issues. Submission shall also provide a listing of the anticipated equipment to be used, the location of all equipment to be used and insure a contingency plan of action is in place should a primary piece of equipment malfunction.

B. Ballast Protection

- 1. The Contractor shall submit the proposed ballast protection system detailing the specific filter fabric and anchorage system to be used during all construction activities.



2. The ballast protection is to extend 25' beyond the proposed limit of work, be installed at the start of the project and be continuously maintained to prevent all contaminants from entering the ballast section of all tracks for the entire duration of the project.

C. Excavation:

1. The subgrade of an operated track shall be maintained with edge of berm at least 10'-0" from centerline of track and not more than 24-inches below top of rail. Contractor will not be required to make existing section meet this specification if substandard, in which case existing section will be maintained.
2. Additionally, the Railroad will require the installation of an OSHA approved handrail and orange construction safety fencing for all excavations of the Railroad right-of-way.

D. Excavation for Structures and Shoring Protection:

1. The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles or sheeting for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material.
2. All plans and calculations for shoring shall be prepared, signed, and sealed by a Registered Professional Engineer licensed in the state of the proposed project, in accordance with Norfolk Southern's Overhead Grade Separation Design Criteria, subsection H.1.6.E-Construction Excavation (Refer to Norfolk Southern Public Projects Manual Appendix H). The Registered Professional Engineer will be responsible for the accuracy for all controlling dimensions as well as the selection of soil design values which will accurately reflect the actual field conditions.
3. The Contractor shall provide a detailed installation and removal plan of the shoring components. Any component that will be installed via the use of a crane or any other lifting device shall be subject to the guidelines outlined in section 5.G of these provisions.
4. The Contractor shall be required to survey the track(s) and Railroad embankment and provide a cross section of the proposed excavation in relation to the tracks.
5. Calculations for the proposed shoring should include deflection calculations. The maximum deflection for excavations within 18'-0" of the centerline of the nearest track shall be 3/8". For all other cases, the max deflection shall not exceed 1/2".
6. Additionally, the Railroad will require the installation of an OSHA approved handrail and orange construction safety fencing for all excavations of the Railroad right-of-way.
7. The front face of shoring located to the closest NS track for all shoring set-ups located in Zone 2 as shown on NS Typical Drawing No. 4 – Shoring Requirements (Appendix I) shall remain in place and be cut off 2'-0" below the final ground elevation. The remaining shoring in Zone 2 and all shoring in Zone 1 may be removed and all voids must be backfilled with flowable fill.



E. Pipe, Culvert, & Tunnel Installations

1. Pipe, Culvert, & Tunnel Installations shall be in accordance with the appropriate Norfolk Southern Design Specification as noted below:
 - a. For Open Cut Method refer to Norfolk Southern Public Projects Manual Appendix H.4.6.
 - b. For Jack and Bore Method refer to Norfolk Southern Public Projects Manual Appendix H.4.7.
 - c. For Tunneling Method refer to Norfolk Southern Public Projects Manual Appendix H.4.8.
2. The installation methods provided are for pipes carrying storm water or open flow run-off. All other closed pipeline systems shall be installed in accordance Norfolk Southern's Pipe and Wire Program and the NSCE-8

F. Demolition Procedures

1. General

- a. Demolition plans are required for all spans over the track(s), for all spans adjacent to the track(s), if located on (or partially on) Railroad right-of-way; and in all situations where cranes will be situated on, over, or adjacent to Railroad right-of-way and within a distance of the boom length plus 15'-0" from the centerline of track.
- b. Railroad tracks and other Railroad property must be protected from damage during the procedure.
- c. A pre-demolition meeting shall be conducted with the Sponsor, the Railroad Engineer or their representative, and the key Contractor's personnel prior to the start of the demolition procedure.
- d. The Railroad Engineer or his designated representative must be present at the site during the entire demolition procedure period.
- e. Existing, obsolete, bridge piers shall be removed to a sufficient depth below grade to enable restoration of the existing/proposed track ditch, but in no case less than 2'-0" below final grade.

2. Submittal Requirements

- a. In addition to the submittal requirements outlined in Section 5.A.2 of these provisions, the Contractor shall submit the following for approval by the Railroad Engineer:
 - (1) A plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other Railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.

- (2) Rating sheets showing cranes or lifting devices to be adequate for 150% of the actual weight of the pick, including all rigging components. A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted. Safety factors that may have been "built-in" to the crane charts are not to be considered when determining the 150% factor of safety.
- (3) Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the existing structure showing complete and sufficient details with supporting data for the demolition the structure. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements are to be made under the supervision of the Registered Professional Engineer submitting the procedure and calculations.
- (4) The Contractor shall provide a sketch of all rigging components from the crane's hook block to the beam. Catalog cuts or information sheets of all rigging components with their lifting capacities shall be provided. All rigging must be adequate for 150% of the actual weight of the pick. Safety factors that may have been "built-in" to the rating charts are not to be considered when determining the 150% factor of safety. All rigging components shall be clearly identified and tagged with their rated lifting capacities. The position of the rigging in the field shall not differ from what is shown on the final plan without prior review from the Sponsor and the Railroad.
- (5) A complete demolition procedure, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.
- (6) Design and supporting calculations for the temporary support of components, including but not limited to the stability of the superstructure during the temporary condition, temporary girder tie-downs and falsework.

3. Overhead Demolition Debris Shield

- a. The demolition debris shield shall be installed prior to the demolition of the bridge deck or other relevant portions of the superstructure over the track area to catch all falling debris.
- b. The demolition debris shield shall provide a minimum vertical clearance as specified in Section 4 A.1 of these provisions or maintain the existing vertical clearance if the existing clearance is less than that specified in Section 4.A.1.
- c. The Contractor shall include the demolition debris shield installation/removal means and methods as part of the proposed Demolition procedure submission.
- d. The Contractor shall submit the demolition debris shield design and supporting calculations for approval by the Railroad Engineer.



- e. The demolition debris shield shall have a minimum design load of 50 pounds per square foot plus the weight of the equipment, debris, personnel, and other loads to be carried.
 - f. The Contractor shall include the proposed bridge deck removal procedure in its demolition means and methods and shall verify that the size and quantity of the demolition debris generated by the procedure does not exceed the shield design loads.
 - g. The Contractor shall clean the demolition debris shield daily or more frequently as dictated either by the approved design parameters or as directed by the Railroad Engineer.
4. Vertical Demolition Debris Shield
- a. A vertical demolition debris shield may be required for substructure removals in close proximity to the Railroad's track and other facilities, as determined by the Railroad Engineer.

G. Erection & Hoisting Procedures

1. General

- a. Erection plans are required for all spans over the track(s), for all spans adjacent to the track(s), if located on (or partially on) Railroad right-of-way; and in all situations where cranes will be situated on, over, or adjacent to Railroad right-of-way and within a distance of the boom length plus 15'-0" from the centerline of track.
- b. Railroad tracks and other Railroad property must be protected from damage during the erection procedure.
- c. A pre-erection meeting shall be conducted with the Sponsor, the Railroad Engineer or their representative, and the key Contractor's personnel prior to the start of the erection procedure.
- d. The Railroad Engineer or his designated representative must be present at the site during the entire erection procedure period.
- e. For field splices located over Railroad property, a minimum of 50% of the holes for each connection shall be filled with bolts or pins prior to releasing the crane. A minimum of 50% of the holes filled shall be filled with bolts. All bolts must be appropriately tightened. Any changes to previously approved field splice locations must be submitted to the Railroad for review and approval. Refer to Norfolk Southern's Overhead Grade Separation Design Criteria for additional splice details (Norfolk Southern Public Projects Manual Appendix H.1, Section 4.A.3.).

2. Submittal Requirements

- a. In addition the submittal requirements outlined in Section 5.A.2 of these provisions, the Contractor shall submit the following for approval by the Railroad Engineer:
- (1) As-built beam seat elevations - All as-built bridge seats and top of rail elevations shall be furnished to the Railroad Engineer for review and verification at least 30 days in advance of the erection, to ensure that minimum vertical clearances as approved in the plans will be achieved.
 - (2) A plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or staging locations shown. The location of all tracks and other Railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.
 - (3) Rating sheets showing cranes or lifting devices to be adequate for 150% of the actual weight of the pick, including all rigging components. A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted. Safety factors that may have been "built-in" to the crane charts are not to be considered when determining the 150% factor of safety.
 - (4) Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the proposed structure showing complete and sufficient details with supporting data for the erection of the structure. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements are to be made under the supervision of the Registered Professional Engineer submitting the procedure and calculations.
 - (5) The Contractor shall provide a sketch of all rigging components from the crane's hook block to the beam. Catalog cuts or information sheets of all rigging components with their lifting capacities shall be provided. All rigging must be adequate for 150% of the actual weight of the pick. Safety factors that may have been "built-in" to the rating charts are not to be considered when determining the 150% factor of safety. All rigging components shall be clearly identified and tagged with their rated lifting capacities. The position of the rigging in the field shall not differ from what is shown on the final plan without prior review from the Sponsor and the Railroad.
 - (6) A complete erection procedure, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.
 - (7) Design and supporting calculations for the temporary support of components, including but not limited to temporary girder tie-downs and falsework.

H. Blasting:

1. The Contractor shall obtain advance approval of the Railroad Engineer and the Sponsor Engineer for use of explosives on or adjacent to Railroad property. The request for permission to use explosives shall include a detailed blasting plan. If permission for use of explosives is granted, the Contractor will be required to comply with the following:
 - a. Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Contractor and a licensed blaster.
 - b. Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way radios.
 - c. No blasting shall be done without the presence of the Railroad Engineer or his authorized representative. At least 72 hours advance notice to the person designated in the Railroad's notice of authorization to proceed (see paragraph 2.B) will be required to arrange for the presence of an authorized Railroad representative and such flagging as the Railroad may require.
 - d. Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at his expense any track misalignment or other damage to Railroad property resulting from the blasting as directed by the Railway's authorized representative. If his actions result in delay of trains, the Contractor shall bear the entire cost thereof.
 - e. The blasting Contractor shall have a copy of the approved blasting plan on hand while on the site.
 - f. Explosive materials or loaded holes shall not be left unattended at the blast site.
 - g. A seismograph shall be placed on the track shoulder adjacent to each blast which will govern the peak particle velocity of two inches per second. Measurement shall also be taken on the ground adjacent to structures as designated by a qualified and independent blasting consultant. The Railroad reserves the option to direct the placement of additional seismographs at structures or other locations of concern, without regard to scaled distance.
 - h. After each blast, the blasting Contractor shall provide a copy of their drill log and blast report, which includes number of holes, depth of holes, number of decks, type and pounds of explosives used per deck.
 - i. The Railroad may require top of rail elevations and track centers taken before, during and after the blasting and excavation operation to check for any track misalignment resulting from the Contractor's activities.



2. The Railroad representative will:
 - a. Determine approximate location of trains and advise the Contractor the appropriate amount of time available for the blasting operation and clean up.
 - b. Have the authority to order discontinuance of blasting if, in his opinion, blasting is too hazardous or is not in accord with these special provisions.
3. The Contractor must hire, at no expense to the Railroad, a qualified and independent blasting consultant to oversee the use of explosives. The blasting consultant will:
 - a. Review the Contractor's proposed drilling and loading patterns, and with the blasting consultant's personnel and instruments, monitor the blasting operations.
 - b. Confirm that the minimum amounts of explosives are used to remove the rock.
 - c. Be empowered to intercede if he concludes that the Contractor's blasting operations are endangering the Railway.
 - d. Submit a letter acknowledging that he has been engaged to oversee the entire blasting operation and that he approves of the blasting plan.
 - e. Furnish copies of all vibration readings to the Railroad representative immediately after each blast. The representative will sign and date the seismograph tapes after each shot to verify the readings are for that specific shot.
 - f. Advise the Railroad representative as to the safety of the operation and notify him of any modifications to the blasting operation as the work progresses.
4. The request for permission to use explosives on the Railroad's Right-of-Way shall include a blasting proposal providing the following details:
 - a. A drawing which shows the proposed blasting area, location of nearest hole and distance to Railway structures, all with reference to the centerline of track.
 - b. Hole diameter.
 - c. Hole spacing and pattern.
 - d. Maximum depth of hole.
 - e. Maximum number of decks per hole.
 - f. Maximum pounds of explosives per hole.
 - g. Maximum pounds of explosives per delay.
 - h. Maximum number of holes per detonation.



- i. Type of detonator and explosives to be used. (Electronic detonating devices will not be permitted). Diameter of explosives if different from hole diameter.
- j. Approximate dates and time of day when the explosives are to be detonated.
- k. Type of flyrock protection.
- l. Type and patterns of audible warning and all clear signals to be used before and after each blast.
- m. A copy of the blasting license and qualifications of the person directly in charge of the blasting operation, including their name, address and telephone number.
- n. A copy of the Authority's permit granting permission to blast on the site.
- o. A letter from the blasting consultant acknowledging that he has been engaged to oversee the entire blasting operation and that he approves of the blasting plan.
- p. In addition to the insurance requirements outlined in Paragraph 14 of these Provisions, A certificate of insurance from the Contractor's insurer stating the amount of coverage for XCU (Explosive Collapse and Underground Hazard) insurance and that XCU Insurance is in force for this project.
- q. A copy of the borings and Geotechnical information or report.

I. Track Monitoring

- 1. At the direction of the Railroad Engineer, any activity that has the potential to disturb the Railroad track structure may require the Contractor to submit a detailed track monitoring program for approval by the Railroad Engineer.
- 2. The program shall specify the survey locations, the distance between the location points, and frequency of monitoring before, during, and after construction. Railroad reserves the right to modify the survey locations and monitoring frequency as necessary during the project.
- 3. The survey data shall be collected in accordance with the approved frequency and immediately furnished to the Railroad Engineer for analysis.
- 4. If any movement has occurred as determined by the Railroad Engineer, the Railroad will be immediately notified. Railroad, at its sole discretion, shall have the right to immediately require all Contractor operations to be ceased and determine what corrective action is required. Any corrective action required by the Railroad or performed by the Railroad including the monitoring of corrective action of the Contractor will be at project expense.

J. Maintenance of Railroad Facilities:

- 1. The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his operations and provide and maintain any erosion control measures as required. The Contractor will promptly



repair eroded areas within Railroad rights-of-way and repair any other damage to the property of the Railroad or its tenants.

2. If, in the course of construction, it may be necessary to block a ditch, pipe or other drainage facility, temporary pipes, ditches or other drainage facilities shall be installed to maintain adequate drainage, as approved by the Railroad Engineer. Upon completion of the work, the temporary facilities shall be removed and the permanent facilities restored.
3. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

K. Storage of Materials and Equipment:

1. Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the rights-of-way of the Railroad without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.
2. All grading or construction machinery that is left parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to immobilize grading or construction machinery.

L. Cleanup:

1. Upon completion of the work, the Contractor shall remove from within the limits of the Railroad rights-of-way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said rights-of-way in a neat condition satisfactory to the Railroad Engineer or his authorized representative.

6. DAMAGES:

- A. The Contractor shall assume all liability for any and all damages to his work, employees, servants, equipment and materials caused by Railroad traffic.
- B. Any cost incurred by the Railroad for repairing damages to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid directly to the Railroad by the Contractor.

7. FLAGGING SERVICES:

A. Requirements:

1. Flagging services will not be provided until the Contractor's insurance has been reviewed & approved by the Railroad.



2. Under the terms of the agreement between the Sponsor and the Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's personnel or equipment are or are likely to be, working on the Railroad's right-of-way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a Railroad structure or the Railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging.
3. Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three (3) flagmen may be required. However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required full time until the project has been completed.
4. For Projects exceeding 30 days of construction, Contractor shall provide the flagmen a small work area with a desk/counter and chair within the field/site trailer, including the use of bathroom facilities, where the flagman can check in/out with the Project, as well as to the flagman's home terminal. The work area should provide access to two (2) electrical outlets for recharging radio(s), and a laptop computer; and have the ability to print off needed documentation and orders as needed at the field/site trailer. This should aid in maximizing the flagman's time and efficiency on the Project.

B. Scheduling and Notification:

1. The Contractor's work requiring Railroad flagging should be scheduled to limit the presence of a flagman at the site to a maximum of 50 hours per week. The Contractor shall receive Railroad approval of work schedules requiring a flagman's presence in excess of 40 hours per week.
2. Not later than the time that approval is initially requested to begin work on Railroad right-of-way, Contractor shall furnish to the Railroad and the Sponsor a schedule for all work required to complete the portion of the project within Railroad right-of-way and arrange for a job site meeting between the Contractor, the Sponsor, and the Railroad's authorized representative. Flagman or Flagmen may not be provided until the job site meeting has been conducted and the Contractor's work scheduled.
3. The Contractor will be required to give the Railroad representative at least 10 working days of advance written notice of intent to begin work within Railroad right-of-way in accordance with this special provision. Once begun, when such work is then suspended at any time, or for any reason, the Contractor will be required to give the Railroad representative at least 3 working days of advance notice before resuming work on Railroad right-of-way. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Engineer a copy; if notice is given verbally, it shall be confirmed in writing with copy to the Engineer. If flagging is required, no work shall be undertaken until the flagman, or flagmen are present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer



needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain from the Railroad. Due to Railroad labor agreements, it is necessary to give 5 working days notice before flagging service may be discontinued and responsibility for payment stopped.

4. If, after the flagman is assigned to the project site, an emergency arises that requires the flagman's presence elsewhere, then the Contractor shall delay work on Railroad right-of-way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the Sponsor or Railroad.

C. Payment:

1. The Sponsor will be responsible for paying the Railroad directly for any and all costs of flagging which may be required to accomplish the construction.
2. The estimated cost of flagging is the current rate per day based on a 10-hour work day. This cost includes the base pay for the flagman, overhead, and includes a per diem charge for travel expenses, meals and lodging. The charge to the Sponsor by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.
3. Work by a flagman in excess of 8 hours per day or 40 hours per week, but not more than 12 hours a day will result in overtime pay at 1 and 1/2 times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2 and 1/2 times the normal rate.
4. Railroad work involved in preparing and handling bills will also be charged to the Sponsor. Charges to the Sponsor by the Railroad shall be in accordance with applicable provisions of Subchapter B, Part 140, Subpart I and Subchapter G, Part 646, Subpart B of the Federal-Aid Policy Guide issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change. The above estimates of flagging costs are provided for information only and are not binding in any way.

D. Verification:

1. Railroad's flagman will electronically enter flagging time via Railroad's electronic billing system. Any complaints concerning flagging must be resolved in a timely manner. If the need for flagging is questioned, please contact the Railroad Engineer. All verbal complaints will be confirmed in writing by the Contractor within 5 working days with a copy to the Sponsor's Engineer. Address all written correspondence electronically to Railroad Engineer.
2. The Railroad flagman assigned to the project will be responsible for notifying the Sponsor Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he performs such services for each separate period that services are provided. The Sponsor's Engineer will document such notification in the project records. When requested, the Sponsor's Engineer will also sign the flagman's diary showing daily time spent and activity at the project site.



8. HAUL ACROSS RAILROAD TRACK:

- A. Where the plans show or imply that materials of any nature must be hauled across Railroad's track, unless the plans clearly show that the Sponsor has included arrangements for such haul in its agreement with the Railroad, the Contractor will be required to make all necessary arrangements with the Railroad regarding means of transporting such materials across the Railroad's track. The Contractor or Sponsor will be required to bear all costs incidental to such crossings whether services are performed by his own forces or by Railroad personnel.
- B. No crossing may be established for use of the Contractor for transporting materials or equipment across the tracks of the Railroad unless specific authority for its installation, maintenance, necessary watching and flagging thereof and removal, until a temporary private crossing agreement has been executed between the Contractor and Railroad. The approval process for an agreement normally takes 90 days.

9. WORK FOR THE BENEFIT OF THE CONTRACTOR:

- A. All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans; included in the force account agreement between the Sponsor and the Railroad or will be covered by appropriate revisions to same which will be initiated and approved by the Sponsor and/or the Railroad.
- B. Should the Contractor desire any changes in addition to the above, then he shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.

10. COOPERATION AND DELAYS:

- A. It shall be the Contractor's responsibility to arrange a schedule with the Railroad for accomplishing stage construction involving work by the Railroad or tenants of the Railroad. In arranging his schedule he shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefore.
- B. No charge or claim of the Contractor against either the Sponsor or the Railroad will be allowed for hindrance or delay on account of railroad traffic; any work done by the Railroad or other delay incident to or necessary for safe maintenance of railroad traffic or for any delays due to compliance with these special provisions.

11. TRAINMAN'S WALKWAYS:

- A. Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 10 feet from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railroad's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with 10'-0" minimum clearance from centerline of track, shall be placed and must conform to AREMA and/or FRA standards.

12. GUIDELINES FOR PERSONNEL ON RAILROAD RIGHT-OF-WAY:



- A. The Contractor and/or the Sponsor's personnel authorized to perform work on Railroad's property as specified in Section 2 above are not required to complete Norfolk Southern Roadway Worker Protection Training; However the Contractor and the Sponsor's personnel must be familiar with Norfolk Southern's standard operating rules and guidelines, should conduct themselves accordingly, and may be removed from the property for failure to follow these guidelines.
- B. All persons shall wear hard hats. Appropriate eye and hearing protection must be used. Working in shorts is prohibited. Shirts must cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots is prohibited. Hard-sole, lace-up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle are adequate. Wearing of safety boots is strongly recommended. In the vicinity of at-grade crossings, it is strongly recommended that reflective vests be worn.
- C. No one is allowed within 25' of the centerline of track without specific authorization from the flagman.
- D. All persons working near track while train is passing are to lookout for dragging bands, chains and protruding or shifted cargo.
- E. No one is allowed to cross tracks without specific authorization from the flagman.
- F. All welders and cutting torches working within 25' of track must stop when train is passing.
- G. No steel tape or chain will be allowed to cross or touch rails without permission from the Railroad.

13. GUIDELINES FOR EQUIPMENT ON RAILROAD RIGHT-OF-WAY:

- A. No crane or boom equipment will be allowed to set up to work or park within boom distance plus 15' of centerline of track without specific permission from Railroad official and flagman.
- B. No crane or boom equipment will be allowed to foul track or lift a load over the track without flag protection and track time.
- C. All employees will stay with their machines when crane or boom equipment is pointed toward track.
- D. All cranes and boom equipment under load will stop work while train is passing (including pile driving).
- E. Swinging loads must be secured to prevent movement while train is passing.
- F. No loads will be suspended above a moving train.
- G. No equipment will be allowed within 25' of centerline of track without specific authorization of the flagman.
- H. Trucks, tractors or any equipment will not touch ballast line without specific permission from Railroad official and flagman. Orange construction fencing may be required as directed.

- I. No equipment or load movement within 25' or above a standing train or Railroad equipment without specific authorization of the flagman.
- J. All operating equipment within 25' of track must halt operations when a train is passing. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.
- K. All equipment, loads and cables are prohibited from touching rails.
- L. While clearing and grubbing, no vegetation will be removed from Railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.
- M. No equipment or materials will be parked or stored on Railroad's property unless specific authorization is granted from the Railroad Engineer.
- N. All unattended equipment that is left parked on Railroad property shall be effectively immobilized so that it cannot be moved by unauthorized persons.
- O. All cranes and boom equipment will be turned away from track after each work day or whenever unattended by an operator.
- P. Prior to performing any crane operations, the Contractor shall establish a single point of contact for the Railroad flagman to remain in communication with at all times. Person must also be in direct contact with the individual(s) directing the crane operation(s).

14. INSURANCE:

- A. In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Prime Contractor will be required to carry insurance of the following kinds and amounts:
 - 1. a. Commercial General Liability Insurance having a combined single limit of not less than \$2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, shall be endorsed to name Railroad specified in item A.2.c. below both as the certificate holder and as an additional insured, and shall include a severability of interests provision.
 - b. Automobile Liability Insurance with a combined single limit of not less than \$1,000,000 each occurrence for injury to or death of persons and damage to or loss or destruction of property. Said policy or policies shall be endorsed to name Railroad specified in item A.2.c. below both as the certificate holder and as an additional insured and shall include a severability of interests provision.
- 2. Railroad Protective Liability Insurance having a combined single limit of not less than \$2,000,000 each occurrence and \$6,000,000 in the aggregate applying separately to each annual period. If the project involves track over which passenger trains operate, the insurance limits required are not less than a combined single limit of \$5,000,000 each occurrence and \$10,000,000 in the aggregate applying separately to each annual period. Said policy shall provide coverage for all loss, damage or expense arising from



bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.

The standards for the Railroad Protective Liability Insurance are as follows:

a. The insurer must be rated A- or better by A.M. Best Railroad, Inc.
NOTE: NS does not accept from insurers Chartis (AIG or Affiliated Company including Lexington Insurance Company), Hudson Group or Liberty or Affiliated Company.

b. The policy must be written using one of the following combinations of Insurance Services Office ("ISO") Railroad Protective Liability Insurance Form Numbers:

- (1) CG 00 35 01 96 and CG 28 31 10 93; or
- (2) CG 00 35 07 98 and CG 28 31 07 98; or
- (3) CG 00 35 10 01; or
- (4) CG 00 35 12 04; or
- (5) CG 00 35 12 07; or
- (6) CG 00 35 04 13.

c. The named insured shall read:

(As named in the Project Agreement with Project Sponsor)
Three Commercial Place
Norfolk, Virginia 23510-2191
Attn: S. W. Dickerson Risk Management

(NOTE: Railroad does not share coverage on RRPL with any other entity on this policy)

d. The description of operations must appear on the Declarations, must match the project description in this agreement, and must include the appropriate Sponsor project and contract identification numbers.

e. The job location must appear on the Declarations and must include the city, state, and appropriate highway name/number. **NOTE: Do not include any references to milepost, valuation station, or mile marker on the insurance policy.**

f. The name and address of the prime Contractor must appear on the Declarations.

g. The name and address of the Sponsor must be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party."

h. Endorsements/forms that are **required** are:

- (1) Physical Damage to Property Amendment
- (2) Terrorism Risk Insurance Act (TRIA) coverage must be included



- i. Other endorsements/forms that will be accepted are:
 - (1) Broad Form Nuclear Exclusion – Form IL 00 21
 - (2) 30-day Advance Notice of Non-renewal or cancellation
 - (3) Required State Cancellation Endorsement
 - (4) Quick Reference or Index Form CL/IL 240

- j. Endorsements/forms that are NOT acceptable are:
 - (1) Any Pollution Exclusion Endorsement except CG 28 31
 - (2) Any Punitive or Exemplary Damages Exclusion
 - (3) Known injury or Damage Exclusion form CG 00 59
 - (4) Any Common Policy Conditions form
 - (5) An Endorsement that limits or excludes Professional Liability coverage
 - (6) A Non-Cumulation of Liability or Pyramiding of Limits Endorsement
 - (7) An Endorsement that excludes TRIA coverage
 - (8) A Sole Agent Endorsement
 - (9) Any type of deductible endorsement or amendment
 - (10) Any other endorsement/form not specifically authorized in item no. 2.h above.

- B. If any part of the work is sublet, similar insurance, and evidence thereof as specified in A.1 above, shall be provided by or on behalf of the subcontractor to cover its operations on Railroad's right of way.

- C. All insurance required under the preceding subsection A shall be underwritten by insurers and be of such form and content, as may be acceptable to the Company. Prior to entry on Railroad right-of-way, the original Railroad Protective Liability Insurance Policy shall be submitted by the Prime Contractor to the Department at the address below for its review and transmittal to the Railroad. In addition, certificates of insurance evidencing the Prime Contractor's and any subcontractors' Commercial General Liability Insurance shall be issued to the Railroad and the Department at the addresses below, and forwarded to the Department for its review and transmittal to the Railroad. The certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to Railroad and the Department. No work will be permitted by Railroad on its right-of-way until it has reviewed and approved the evidence of insurance required herein.

<u>SPONSOR:</u>	<u>RAILROAD:</u> Risk Management Norfolk Southern Railway Company Three Commercial Place Norfolk, Virginia 23510-2191
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- D. The insurance required herein shall in no way serve to limit the liability of Sponsor or its Contractors under the terms of this agreement.

- E. Insurance Submission Procedures



1. Railroad will only accept initial insurance submissions via US Mail or Overnight carrier to the address noted in C above. Railroad will NOT accept initial insurance submissions via email or faxes. **Please provide point of contact information with the submission including a phone number and email address.**
2. Railroad requires the following two (2) forms of insurance in the initial insurance submission to be submitted under a cover letter providing details of the project and contact information:
 - a. The full original or certified true countersigned copy of the railroad protective liability insurance policy in its entirety inclusive of all declarations, schedule of forms and endorsements along with the policy forms and endorsements.
 - b. The Contractor's commercial general, automobile, and workers' compensation liability insurance certificate of liability insurance evidencing a combined single limit of a minimum of \$2M per occurrence of general and \$1M per occurrence of automobile liability insurance naming Norfolk Southern Railway Company, Three Commercial Place, Norfolk, VA 23510 as the certificate holder and as an additional insured on both the general and automobile liability insurance policy.
3. It should be noted that the Railroad does not accept notation of Railroad Protective insurance on a certificate of liability insurance form or Binders as Railroad must have the full original countersigned policy. Further, please note that mere receipt of the policy is not the only issue but review for compliance. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for the Railroad to review.

15. FAILURE TO COMPLY:

- A. In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:
 1. The Railroad Engineer may require that the Contractor vacate Railroad property.
 2. The Sponsor's Engineer may withhold all monies due the Contractor on monthly statements.
- B. Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Sponsor's Engineer.

16. PAYMENT FOR COST OF COMPLIANCE:

- A. No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such costs shall be included in prices bid for other items of the work as specified in the payment items.

17. PROJECT INFORMATION

- | | |
|---------------------------|-----------------------|
| A. Date: | <u>August 8, 2016</u> |
| B. NS File No.: | <u>BR0002281</u> |
| C. NS Milepost: | <u>V-243.55</u> |
| D. Sponsor's Project No.: | _____ |

EXHIBIT C

CONTRACTOR WORKING ON BEHALF OF PROJECT SPONSOR
COSTS REIMBURSED BY PROJECT SPONSOR
NS FILE: BR0002281

NORFOLK SOUTHERN CONTRACTOR RIGHT OF ENTRY AGREEMENT

WHEREAS, _____ (“Principal”) has requested that Norfolk Southern Railway Company (“Company”) permit Principal to be on or about Company’s premises and/or facilities at or in the vicinity of Company Milepost V-243.55, at or near Roanoke, Virginia (the “Premises”) for the sole purpose of replacing the existing Franklin Road Overhead Bridge, on behalf of the City of Roanoke (the “Project Sponsor”) during the period _____, 20____, to _____, 20____ (the “Right of Entry”).

WHEREAS, Company is willing to grant the Right of Entry subject to the terms and conditions set forth herein.

NOW THEREFORE, in consideration of the foregoing and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and intending to be legally bound hereby, the parties hereby agree as follows.

Company hereby grants Principal the Right of Entry. The Right of Entry shall extend to Principal and to subcontractors and other entities affiliated with Principal who are specifically approved for entry by authorized representatives of Company in writing, as well as to the officers and employees of the foregoing (collectively “Licensees”). The Right of Entry shall apply to those portions of the Premises, and to such equipment, machinery, rolling stock and other personal property and fixtures belonging to Company or otherwise located on the Premises, only to the extent specifically designated and approved in writing by authorized representatives of Company (collectively, “Designated Property”).

Principal agrees:

- (i) that Licensees’ access to the Premises shall be limited to the Designated Property and that Principal shall be liable and fully responsible for all actions of Licensees while on the Premises pursuant to the Right of Entry;
- (ii) that Licensees shall (a) be subject to Company’s direction when upon the Premises, and (b) be subject to Company’s removal from the Premises, in Company’s sole discretion, due to negligence, misconduct, unsafe actions, breach of this agreement or the failure to act respectfully, responsibly, professionally, and/or in a manner consistent with Company’s desire to minimize risk and maintain its property with maximum security and minimum distractions or disruptions or for any other lawful reason;
- (iii) that Licensees shall perform all work with such care, diligence and cooperation with Company personnel as to reasonably avoid accidents, damage or harm to persons or property and delays or interference with the operations of any Company’s facilities and in accordance with Company’s “Special Provisions for Protection of Railway Interest”, attached and incorporated herein.
- (iv) to give Company’s officer signing this agreement, or his or her authorized representative, advance notification of the presence of Licensees on Designated Property in accordance with Company’s “Special Provisions for Protection of Railway Interest”;
- (v) to indemnify and save harmless Company, its officers, agents and employees from and against any and all claims, demands, losses, suits, judgments, costs, expenses (including without limitation reasonable attorney’s fees) and liability resulting from (a) injury to or death of any person, including without limitation the Licensees, and damage to or loss of any property, including without limitation that belonging to or in the custody of Licensees (the “Licensee Property”), arising or in any manner growing out of the presence of either the Licensees or the Licensee Property, or both, on or about the Premises, regardless of

EXHIBIT C

whether negligence on the part of Company, its officers, agents or employees caused or contributed to said loss of life, personal injury or property loss or damage in whole or in part; (b) any alleged violation of any law, statute, code, ordinance or regulation of the United States or of any state, county or municipal government (including, without limitation, those relating to air, water, noise, solid waste and other forms of environmental protection, contamination or pollution or to discrimination on any basis) that results in whole or in part, directly or indirectly, from the activities of Licensees related in any way to their presence on the Premises or from any other act or omission of Licensees contributing to such violation, regardless of whether such activities, acts or omissions are intentional or negligent, and regardless of any specification by Company without actual knowledge that it might violate any such law, statute, code, ordinance or regulation; (c) any allegation that Company is an employer or joint employer of a Licensee or is liable for related employment benefits or tax withholdings; or (d) any decision by Company to bar or exclude a Licensee from the Premises pursuant to subsection (ii)(b) above;

- (vi) to have and keep in effect the appropriate kinds of insurance as listed in the Company's "Special Provisions for Protection of Railway Interest, with insurance companies satisfactory to Company, during the entire time Licensees or Licensee Property, or both, is on the Premises; and to provide certificates of insurance showing the foregoing coverage, as well as any endorsements or other proper documentation showing and any change or cancellations in the coverage to the Company officer signing this agreement or to his or her authorized representative;
- (vii) to reimburse Company for any costs not covered under the existing project agreement between the Company and the Project Sponsor, including any material, labor, supervisory and protective costs (including flagging) and related taxes and overhead expenses required or deemed necessary by Company because of the presence of either Licensees or Licensee Property on the Premises;
- (viii) to exercise special care and precautions to protect the Premises and equipment, machinery, rolling stock and other personal property and fixtures belonging to Company or otherwise located on the Premises (whether or not constituting Designated Property) and to avoid interference with Company's operations;
- (ix) to not create and not allow drainage conditions which would be adverse to the Premises or any surrounding areas;
- (x) to refrain from the disposal or release of any trash, waste, and hazardous, dangerous or toxic waste, materials or substances on or adjacent to the Premises and to clean up or to pay Company for the cleanup of any such released trash, waste, materials or substances; and
- (xi) to restore the Premises and surrounding areas to its original condition or to a condition satisfactory to the Company officer signing this agreement or to his or her authorized representative (ordinary wear and tear to rolling stock and equipment excepted) upon termination of Licensees' presence on the Premises.

As a part of the consideration hereof, Principal further hereby agrees that Company shall mean not only Norfolk Southern Railway Company but also Norfolk Southern Corporation and any and all subsidiaries and affiliates of Norfolk Southern Railway Company or Norfolk Southern Corporation, and that all of Principal's indemnity commitments in this agreement in favor of Company also shall extend to and indemnify Norfolk Southern Corporation and any subsidiaries and affiliated companies of Norfolk Southern Railway Company or Norfolk Southern Corporation and its and/or their directors, officers, agents and employees.

EXHIBIT C

It is expressly understood that the indemnification obligations set forth herein cover claims by Principal's employees, agents, independent contractors and other representatives, and Principal expressly waives any defense to or immunity from such indemnification obligations and/or any subrogation rights available under any applicable state constitutional provision, laws, rules or regulations, including, without limitation, the workers' compensation laws of any state. Specifically, (i) in the event that all or a portion of the Premises is located in the State of Ohio, the following provision shall be applicable: "Principal, with respect to the indemnification provisions contained herein, hereby expressly waives any defense or immunity granted or afforded it pursuant to Section 35, Article II of the Ohio Constitution and Section 4123.74 of the Ohio Revised Code"; and (ii) in the event that all or a portion of the Premises is located in the Commonwealth of Pennsylvania, the following provision shall be applicable: "Principal, with respect to the indemnification provisions contained herein, hereby expressly waives any defense or immunity granted or afforded it pursuant to the Pennsylvania Workers' Compensation Act, 77 P.S. 481".

This agreement shall be governed by the internal laws of the Commonwealth of Virginia, without regard to otherwise applicable principles of conflicts of laws. If any of the foregoing provisions is held for any reason to be unlawful or unenforceable, the parties intend that only the specific words found to be unlawful or unenforceable be severed and deleted from this agreement and that the balance of this agreement remain a binding enforceable agreement to the fullest extent permitted by law.

This agreement may be amended only in a writing signed by authorized representatives of the parties.

Name of Principal

NORFOLK SOUTHERN RAILWAY COMPANY

By _____

By _____

Title _____

Title _____

Date _____, 20____

Date _____, 20____

EXHIBIT D

FORCE ACCOUNT ESTIMATE

Work to be Performed By: Norfolk Southern Railway Company
For the Account of: City of Roanoke, VA
Project Description: Franklin Rd Overhead Bridge Replacement
Location: Roanoke, VA
Project No.: 0
Milepost: V-243.55 (Virginia)
File: 117-19156 / BR0002281 SAO
Date: November 16, 2015

SUMMARY

ITEM A - Preliminary Engineering	0
ITEM B - Construction Engineering	139,029
ITEM C - Accounting	3,194
ITEM D - Flagging Services	607,330
ITEM E - Communications Changes	11,800
ITEM F - Signal & Electrical Changes	194,400
ITEM G - Track Work	48,400
ITEM H - T-Cubed	0
GRAND TOTAL	\$ 1,004,153

ITEM A - Preliminary Engineering

(Review plans and special provisions,
prepare estimates, etc.)

Labor: 0 Hours @ \$60 / hour 0
Labor Additives: 0
Travel Expenses: 0
Services by Contract Engineer: 0

NET TOTAL - ITEM A \$ -

EXHIBIT D

ITEM B - Construction Engineering

(Coordinate Railway construction activities,
review contractor submittals, etc.)

Labor:	60 Hours @ \$60 / hour	3,600
Labor Additives:		2,829
Travel Expenses:		2,500
Services by Contract Engineer:		130,100
		<hr/>
	NET TOTAL - ITEM B	\$ 139,029

ITEM C - Administration

Agreement Construction, Review and/or Handling:		1,000
Accounting Hours (Labor):	40 Hours @ \$30 / hour	1,200
Accounting Additives:		994
		<hr/>
	NET TOTAL - ITEM C	\$ 3,194

ITEM D - Flagging Services

(During construction on, over,
under, or adjacent to the track.)

Labor:	Flagging Foreman	
	500 days @ 390.00 per day	195,000
	(based on working 12 hours/day)	
Labor Additive:		362,330
Travel Expenses, Meals & Lodging:	500 days @ \$100/day	50,000
Rental Vehicle	0 months @ \$950/month	0
		<hr/>
	NET TOTAL - ITEM D	\$ 607,330

ITEM E - Communications Changes

Material:		2,000
Labor:		1,900
Purchase Services:		3,000
Subsistence:		0
Additive:		4,900
		<hr/>
	NET TOTAL - ITEM E	\$ 11,800

EXHIBIT D

ITEM F - Signal & Electrical Changes

Material:	152,000
Labor:	42,400
Purchase Services:	0
Other:	0
	<hr/>
NET TOTAL - ITEM F	\$ 194,400

ITEM G - Track Work

Material:	(see attached summary)	32,681
Labor:	(see attached summary)	7,993
Additive:	(see attached summary)	5,880
Purchase Services:	(see attached summary)	1,846
		<hr/>
NET TOTAL - ITEM G		\$ 48,400

ITEM H - T-CUBED

Lump Sum	\$ -
----------	------

NOTES

1. For all groups of CONTRACT employees, the composite labor surcharge rate used in this estimate (including insurance) is **185.81%**. Self Insurance - Public Liability Property Damage is estimated at 16.00%. Work will be billed at actual current audited rate in effect at the time the services are performed.
2. For all groups of NON-CONTRACT employees, the composite labor surcharge rate used in this estimate (including insurance) is **78.59%**. Self Insurance - Public Liability Property Damage is estimated at 16.00%. Work will be billed at actual current audited rate in effect at the time the services are performed.
3. All applicable salvage items due the Department will be made available to it at the jobsite for its disposal.
4. The Force Account Estimate is valid for one (1) year after the date of the estimate (11/16 2015). If the work is not performed within this time frame the Railway may revise the estimate to (1) include work not previously indicated as necessary and (2) reflect changes in cost to perform the force account work.



July 13, 2015

Mr. J. N. Carter, Jr. (Attn: S. A. Overbey)
Chief Engineer - Bridges & Structures
Norfolk Southern Corporation
1200 Peachtree Street, NE
Atlanta, GA 30309

Description: Roanoke, Virginia
Replacement Overhead Bridge on Franklin Road Bridge near Milepost
V-243.55 (Virginia)

NSC File: 117-19156 / BR0002281 SAO

Re: Construction Engineering Estimate

Dear Mr. Carter:

As requested by your office, we have made a review of the preliminary plans available for the above captioned project and are submitting an estimate for the Preliminary Engineering.

The charges for our engineering services will be as per our approved rates noted in our 2013-2015 Service Contract Number SC101591 and as shown in Attachment I-A (copy attached). The charges will be based on the actual hours needed to complete these services. We will not incur cost beyond our proposed budget of \$130,100.00 without prior approval and authorization by Norfolk Southern Corporation and the City of Roanoke. Billing for these services will occur on a monthly basis at the employee's classification plus any direct costs.

We appreciate the opportunity to work with Norfolk Southern Corporation on this project. Please let me know if further information is required.

Best Regards,

A handwritten signature in black ink, appearing to read 'JWB', with a horizontal line extending to the right.

Jeffrey W. Brittain, P.E.
Corporate Vice President

Enclosures

ATTACHMENT I

**Construction Engineering Cost Estimate
For
Franklin Road Overhead Bridge, Roanoke, VA
M.P. V-243.55 (Virginia)**

Activity 1: Pre-Construction Meeting

Scope of Activity: Field Work involving: Meeting

Classification	Hours	Classification Rate	Labor
Principal	12	\$134.77	\$1,617.24
Senior Field Inspector	12	\$88.27	\$1,059.24
Administrative Assistant	2	\$64.02	\$128.04
			\$2,804.52

Activity 2: Review of Demolition Plan

Scope of Activity: Primarily Office Work involving: Plan Review

Classification	Hours	Classification Rate	Labor
Principal	16	\$134.77	\$2,156.32
Design Engineer	32	\$78.17	\$2,501.44
Administrative Assistant	4	\$64.02	\$256.08
			\$4,913.84

Activity 3: Inspection of Access Crossing

Scope of Activity: Primarily Field Work involving: Site Inspection

Classification	Hours	Classification Rate	Labor
Principal	8	\$134.77	\$1,078.16
Senior Field Inspector	80	\$88.27	\$7,061.60
Administrative Assistant	4	\$64.02	\$256.08
			\$8,395.84

EXHIBIT D

Activity 4: Inspection of Demolition of Railing, Deck and Substructure Unit

Scope of Activity: Primarily Field Work involving: Site Inspection

Classification	Hours	Classification Rate	Labor
Principal	16	\$134.77	\$2,156.32
Senior Field Inspector	120	\$88.27	\$10,592.40
Administrative Assistant	4	\$64.02	\$256.08
			\$13,004.80

Activity 5: Installation of Temporary Shoring for Substructure Construction

Scope of Activity: Primarily Office Work involving: Site Inspection

Classification	Hours	Classification Rate	Labor
Principal	12	\$134.77	\$1,617.24
Senior Field Inspector	120	\$88.27	\$10,592.40
Administrative Assistant	4	\$64.02	\$256.08
			\$12,465.72

Activity 6: Review of Temporary Shoring for Substructure Construction

Scope of Activity: Primarily Office Work involving: Plan Review

Classification	Hours	Classification Rate	Labor
Principal	8	\$134.77	\$1,078.16
Senior Field Inspector	60	\$88.27	\$5,296.20
Administrative Assistant	4	\$64.02	\$256.08
			\$6,630.44

Activity 7: Inspection of Substructure Construction

Scope of Activity: Primarily Office Work involving: Plan Review

Classification	Hours	Classification Rate	Labor
Principal	24	\$134.77	\$3,234.48
Senior Field Inspector	200	\$88.27	\$17,654.00
Administrative Assistant	4	\$64.02	\$256.08
			\$21,144.56

Activity 8: Review of Girder Setting Plan

Scope of Activity: Primarily Field Work involving: On-site Inspection

Classification	Hours	Classification Rate	Labor
Principal	16	\$134.77	\$2,156.32
Design Engineer	40	\$78.17	\$3,126.80
Administrative Assistant	4	\$64.02	\$256.08
			\$5,539.20

Activity 9: Review of Overhang Falsework Plan

Scope of Activity: Primarily Office Work involving: Plan Review

Classification	Hours	Classification Rate	Labor
Principal	8	\$134.77	\$1,078.16
Design Engineer	16	\$78.17	\$1,250.72
Administrative Assistant	2	\$64.02	\$128.04
			\$2,456.92

Activity 10: Inspection of Superstructure Construction

Scope of Activity: Primarily Field Work involving: Site Inspection

Classification	Hours	Classification Rate	Labor
Principal	32	\$134.77	\$4,312.64
Senior Field Inspector	160	\$88.27	\$14,123.20
Administrative Assistant	4	\$64.02	\$256.08
			\$18,691.92

Activity 11: Daily Reports

Scope of Activity: Primarily Field Work involving: Site Inspection

Classification	Hours	Classification Rate	Labor
Principal	24	\$134.77	\$3,234.48
Senior Field Inspector	160	\$88.27	\$14,123.20
Administrative Assistant	4	\$64.02	\$256.08
			\$17,613.76

EXHIBIT D

Activity 12: Final Inspection & Documentation			
Scope of Activity: Primarily Field Work involving: On-site Inspection & Final Documentation			
Classification	Hours	Classification Rate	Labor
Principal	12	\$134.77	\$1,617.24
Senior Field Inspector	12	\$88.27	\$1,059.24
Administrative Assistant	2	\$64.02	\$128.04
			\$2,804.52

Direct Costs:		
Transportation	40 trips x 400 miles = 16000 @ \$0.575/mile	\$9,200.00
Subsistence	40 days @ \$110.00/day	\$4,400.00
Photo Copies	50 copies @ \$0.20/copy	\$10.00
Blue Prints	0 prints @ \$2.00/print	\$0.00
Telephone and Fax		\$30.00
Film and Photos		\$20.00
UPS and Postage		\$20.00
		\$13,680.00

Summary:	Totals
Labor	\$116,466.04
Direct Costs	\$13,680.00
Total Construction Engineering Cost =	
	\$130,146.04
Say	\$130,100.00

EXHIBIT D

Subject: Roanoke, VA - Franklin Road OHB

Atlanta 6/15/2015
File No. 384-R
AFE No.
Mgr Code
RIN 15760
Dept Code 50
Function Code 5126

Jeffrey W. Brittain : File

Reference your request of 6/15/2015 concerning the above subject. The estimated cost for Communications Department involvement is as follows.

Contract	\$3,000.00
Contract Additive	\$0.00
Material	\$2,000.00
Material Additive	\$200.00
Preliminary Engineering	\$0.00
Construction Engineering	\$700.00
Engineering Additive	\$600.00
Labor (include overhead)	\$1,200.00
Labor Additive	\$1,000.00
Equipment Rental	\$0.00
Accounting Overhead	\$3,100.00
Total	\$11,800.00

The above estimate is based on existing applicable wage rates and material prices. A delay of twelve (12) months or more in the approval of this project could result in overrun. In the event of such delay, an engineering and estimate review will be necessary.

Remarks: Cost to relocate Access point at Franklin Road OHB, Roanoke, VA

Charles A. Wilson Tel (404) 529-1008
Office of Chief Engineer
Communications Engineering

Copies:



NORFOLK SOUTHERN RAILWAY COMPANY N&WRY V-17/94-A
 EASTERN REGION - VIRGINIA DIVISION
 ROANOKE, VA - FRANKLIN ROAD OHB REPLACEMENT - MILEPOST V-243.55
 ESTIMATE FOR PROPOSED TEMPORARY CROSSING SURFACE INSTALLATION

6 TRACK; VARIABLE ' CROSSING LENGTH

MATERIAL	QUANTITY	UNIT	UNIT COST	AMOUNT
SURFACE MTL. (RUB. RAIL SEAL)	0	TRK. FT.	50.00	0
ASPHALT	0	TONS	150.00	0
RAIL, 132 lb. BW	0	LIN FT.	19.95	0
RAIL ANCHORS	0	EA.	1.18	0
SPIKES	0.0	KEG	100.95	0
TIE PLATES	0	EA.	6.30	0
CROSSTIES (GRADE 5)	0	EA.	38.00	0
BALLAST AND GRAVEL	1200	TONS	20.00	24,000
FILTER FABRIC	750	SQ. YARDS	3.00	2,250
THERMITE WELDS	0	EA.	500.00	0
TWO SECURITY GATES (INSTALLED)	0	EA.	1000.00	0
DRAINAGE PIPE	300	LIN FT.	16.25	4,875
TOTAL (INCLUDES 5% INVENTORY OR TAX ADDITIVES)				32,681
LABOR				
INSTALL NEW CROSSING	72	MAN HOURS	22.00	1,584
REMOVE NEW CROSSING	72	MAN HOURS	22.00	1,584
TOTAL				3,168
OTHER				
COMPOSITE LABOR ADDITIVE (185.62%)				5,880
USE OF EQUIPMENT				1,346
DISPOSAL FEE FOR REMOVED CROSSING MATERIAL				500
Preliminary Engineering, Construction Supervision, Bill Preparation				4,825
GRAND TOTAL				\$48,400

OFFICE OF CHIEF ENGINEER, BRIDGES AND STRUCTURES - ATLANTA, GEORGIA
 DATE: SEPTEMBER 21, 2015

Appendix B

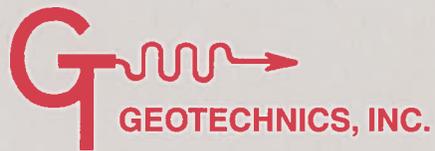
Report of Subsurface Investigation

Replacement of Franklin Road Bridge over NS Railway

City of Roanoke, Virginia

The Report of Subsurface Investigation was prepared by Geotechnics, Inc. to establish guidelines for design only, and is not considered part of the Contract Documents or a warranty of subsurface conditions. The opinions and engineering analyses expressed in this report represent interpretations of subsurface conditions, including both field and laboratory test data. Therefore, the information in this report is not intended as a substitute for the Contractor's personal investigation, interpretation, and good judgment.

Boring logs included in the report are intended to provide an overview of the stratification considered by the designer. Data on subsurface conditions are not intended as representations or warranties of continuity of such conditions. The data are made available for the convenience of the Contractor, and it is expressly understood that the City will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. The Contractor or prospective bidders may obtain, prior to bidding, right-of-entry and complete whatever investigations, research, tests, or analyses required for bid purposes.



Telephone (540) 966-4795
Fax (540) 992-4234

686 Lee Highway South
Roanoke, Virginia 24019

SUBSURFACE INVESTIGATION

REPLACEMENT FRANKLIN ROAD BRIDGE

OVER NORFOLK SOUTHERN RAILROAD

ROANOKE, VIRGINIA

Geotechnics, Inc.

Commission No. 4670

15 October 2015

SUBSURFACE INVESTIGATION

REPLACEMENT FRANKLIN ROAD BRIDGE

OVER NORFOLK SOUTHERN RAILROAD

ROANOKE, VIRGINIA

General -

Eleven (11) test borings have been made for Franklin Road Bridge Replacement over the Norfolk Southern Railroad. Borings No. 1, 2, 3, 6, 7, 8, 9, 10 and 11 were made with a CME-45 trailer-mounted power auger using six (6) inch diameter hollow-stem continuous flight augers. Borings No. 4C, 5C and 6C were drilled by Connelly Associates with a track-mounted Dietrich rig.

Standard Penetration tests were made at five (5) foot intervals, or less with an automatic SPT Hammer.

Borings No. 4C, 5C, 6C, 7 and 9 were advanced into bedrock beneath auger refusal with an N-Series wire-line double-tube core barrel with diamond bit.

Two (2) horizontal core borings were also made into the existing concrete piers with an N-Series wire-line double-tube core barrel with diamond bit.

Detailed descriptions of the materials encountered and recorded groundwater measurements are shown on the attached boring logs.

All soil samples were retained by Geotechnics and may be examined at this office, upon request, for a period of sixty (60) days from the date of this report, by the Owner, his Architect or Engineer, Contractors or other authorized persons.

The test borings were selected in the field by Geotechnics, and the approximate elevation of the ground surface at each boring location was provided by the Engineer (AECOM).

Location -

The existing Franklin Road Bridge over the Norfolk Southern Railroad begins just north of Reserve Avenue and ends between the 220 Expressway off-ramp to Franklin Road and the

220 Expressway north bound lanes. The replacement bridge will be about a five (5) span structure about 570 feet long.

General Geology -

Bedrock at the site is capped by alluvium (material transported and deposited by moving water) and/or older terrace deposits. The Roanoke 7.5 Minute U.S.G.S Geologic Map indicates the alluvium is underlain by the Rome Formation of Cambrian age.

The Rome Formation is extremely heterogeneous, consisting of shale, limestone and dolomite. The shales, which predominate the formation, are vari-colored, including maroon, reddish-brown, gray-green, green, dark gray and tan to yellow. They are fine-grained, close-jointed and break with a splintery or hackly fracture. The limestones and dolomites are generally thin to medium bedded, highly fractured (usually calcite-healed) and range in color from light gray to dark blue-gray.

Laboratory Testing -

Four (4) concrete core specimens were selected for Unconfined Compression Testing. The test results are tabulated below:

Location	Compressive Strength (PSI)
Pier N: S. Side, West End	5,540
Pier N: S. Side, West End	4,920
Pier M: S. Side, East End	4,560
Pier M: S. Side, East End	5,400

Average 5,110

Four (4) rock core specimens were also selected for Unconfined Compression Testing. The test results are tabulated below:

Location	Compressive Strength (PSI)
B-8, 10.2'-10.7' Limestone	14,360
B-5C 69.0'-70.0' Shale	10,490
B-6C, 77.6'-78.4' Shale	7,290
B-7, 2.2'-2.9' Limestone	16,080

Discussion -

The Plans for the existing Bridge state the footings for the existing abutments should extend to 'firm material', which is shown a few feet below the present ground surface. The Pier footings were to extend to solid rock, which is shown within about twenty (20) feet of the present ground surface.

The Abutments and Piers are oriented parallel to the railroad tracks, which are skewed about 45° to the Construction Baseline. Abutment A will be located at approximate Baseline Station 12+68.95, Pier 1 will be at Baseline Station 13+72.2, Pier 2 will Baseline Station 14+93.70, Pier 3 will Baseline Station 16+15.2, Pier 4 will Baseline Station 17+36.70, and Abutment B will be located at Baseline Station 18+16.95.

The south approach begins near Baseline Station 10+50 and slopes upward to Abutment A. Four (4) test borings (Nos. 1, 2, 3 and 4-C) were made for the south approach and Abutment A.

Boring No. 1 was terminated at auger refusal, presumably on boulders, at a depth of 24.0 feet. Boring No. 2 was terminated when the augers deflected in the shale residuum at a depth of 25.6 feet. Boring No. 3 was terminated after the sampling tools dropped from 34.0 feet to 41.8 feet depth in a mud seam.

Boring No. 4C refused on weathered shale at a depth of 21.5 feet. The boring drilled alternately hard and soft from 21.5 feet to about 65.7 feet, and drilled hard from 65.7 feet to the bottom of the hole at a depth of 75.5 feet. The shale was described as weathered to highly weathered, and the Core Recovery ranged from 0% to 62%. The Rock Quality Designation (RQD) was 0%.

Boring No. 5C was drilled near Pier 1. The power auger refused at a depth of 54.6 feet. Partially weathered tan and gray-green shale was penetrated from 54.6 feet to 61.4 feet. A highly weathered zone or mud seam was encountered from 61.4 feet to 63.6 feet. From 63.6 feet to 65.0 feet, the boring encountered highly weathered to decomposed tan and maroon shale. Partially weathered maroon, tan or gray shale was encountered from 65.0 feet to the bottom of the hole at 70.0 feet.

From 54.6 feet to 58.1 feet, the Core Recovery was 91% with an RQD of 57%. From 58.1 feet to 65.0 feet, the Core Recovery was 36% with an RQD of 16%. From 65.0 feet to 70.0 feet, the Core Recovery was 99+% with an RQD of 99+%.

Boring No. 6 was drilled near Pier 2, and was terminated with the augers binding and deflecting at a depth of 42.5 feet. At Boring No. 6C, the power auger refused at a depth of 77.6 feet. Partially weathered tan, gray or maroon shale was penetrated from 77.6 feet to 86.4 feet. Weathered maroon shale was encountered from 86.4 feet to the bottom of the hole at 87.6 feet.

From 77.6 feet to 82.6 feet, the Core Recovery was 96% with an RQD of 92%. From 82.6 feet to 87.6 feet, the Core Recovery was 86% with an RQD of 56%.

At Borings No. 1, 2, 3, 4C, 5C, 6 and 6C; groundwater was encountered about fifteen (15) to twenty (20) feet below the present ground surface. Since the boreholes collapsed when the augers were removed, we were unable to obtain 24 hour water level measurements.

Boring No. 7 was drilled near Pier 4. The power auger refused at a depth of 2.2 feet, and partially weathered gray limestone was penetrated from 2.2 feet to the bottom of the hole at 11.4 feet.

From 2.2 feet to 7.2 feet, the Core Recovery was 94% with an RQD of 84%. From 7.2 feet to 11.4 feet, the Core Recovery was 99+% with an RQD of 99+%.

Four (4) test borings (Nos. 8, 9, 10 and 11) were made for the north approach and Abutment B.

Boring No. 8 was drilled near Abutment B. The power auger refused at a depth of 5.2 feet. Partially weathered gray limestone was penetrated from 5.2 feet to 11.7 feet. A mud seam was encountered from 11.7 feet to 16.7 feet. From 16.7

feet to the bottom of the hole at 21.9 feet, the boring encountered partially weathered gray limestone.

From 5.2 feet to 10.2 feet, the Core Recovery was 98% with an RQD of 94%. From 10.2 feet to 15.2 feet, the Core Recovery was 30% with an RQD of 30%. From 15.2 feet to 16.9 feet, the Core Recovery was 12% with an RQD of 0%. From 16.9 feet to 21.9 feet, the Core Recovery was 98% with an RQD of 98%.

Boring No. 9, which was also drilled near Abutment B refused on highly weathered to decomposed shale at a depth of 19.5 feet.

Borings No. 10 and 11, which were drilled for the north approach, refused on highly weathered to decomposed shale at depths of 12.9 feet and 8.3 feet, respectively.

The test borings indicate the subsurface conditions at the proposed bridge site are highly variable. The depth to the top of bedrock ranged from only 2.2 feet at Boring No. 7 to 77.6 feet at Boring No. 6C; and the RQD varied from 0% to more than 90%.



Geotechnics, Inc.
686 Lee Highway
Roanoke, VA 24019

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT A

Sheet 1 of 1

Geologist _____

Boring No. 1

Contractor Geotechnics, Inc.

Engineer JRC

Date 9 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 24.0'
931	0						Rock ----
							Wt. of hammer 140#
							Avg. fall of hammer 30"
							El of ground water ----
							REMARKS
930.7	0.3		TOPSOIL				
			FILL Reddish-Tan and Brown Silty CLAY with Cinders, Rock Fragments and Boulders	3 3 3	0.5' 0.5' 0.5'	1	SAMPLE 2.0'-3.5'
				2 2 3	0.5' 0.5' 0.5'	2	SAMPLE 5.0'-6.5'
924.0	7.0		ALLUVIUM Brown Silty SAND	2 3 4	0.5' 0.5' 0.5'	3	SAMPLE 7.0'-8.5'
921.5	9.5		Brown SAND	2 2 3	0.5' 0.5' 0.5'	4	SAMPLE 10.0'-11.5'
				2 2 2	0.5' 0.5' 0.5'	5	SAMPLE 15.0'-16.5' Tools Wet
912.0	19.0		Brown Sand with Some Pebble and Cobbles	5 5 6	0.5' 0.5' 0.5'	6	SAMPLE 20.0'-21.5'
907.0	24.0		AUGERS REFUSAL BOTTOM OF HOLE Completed 12:40 PM 9 JUL 15				Augers Scraping Hard on Boulder - Augers Deflecting

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT A

Sheet 1 of 1

Geologist _____

Boring No. 2

Contractor Geotechnics, Inc.

Engineer JRC

Date 9 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 25.6'
932	0						Rock ----
							Wt. of hammer 140#
							Avg. fall of hammer 30"
							El of ground water ----
							REMARKS
931.0	1.0		TOPSOIL				
			ALLUVIUM Brown Silty SAND	2 3 4	0.5' 0.5' 0.5'	1	SAMPLE 2.0'-3.5'
				2 3 3	0.5' 0.5' 0.5'	2	SAMPLE 5.0'-6.5'
925.0	7.0		Brown SAND	2 2 3	0.5' 0.5' 0.5'	3	SAMPLE 7.0'-8.5'
				1 2 2	0.5' 0.5' 0.5'	4	SAMPLE 10.0'-11.5'
917.5	14.5		Brown Sand with Some Pebble and Cobbles	7 12 10	0.5' 0.5' 0.5'	5	SAMPLE 15.0'-16.5' Tools Wet
				12 30	0.5' 0.1'	6	SAMPLE 20.0'-21.5'
909.0	23.0		RESIDUUM Orange-Tan Silty SAND with Shale Fragments				
906.4	25.6		AUGERS DEFLECTING BOTTOM OF HOLE Completed 10:45 PM 9 JUL 15	1 30	0.5' 0.1'	7	SAMPLE 25.0'-25.6' Could Not Reseat Tools to Bottom of Hole

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT A

Sheet 1 of 2

Geologist _____

Boring No. 3

Contractor Geotechnics, Inc.

Engineer JRC

Date 21 APR 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole <u>41.8'</u>
929	0						Rock ---
928.8	0.2		Crushed Stone				Wt. of hammer <u>140#</u>
927.5	1.5		FILL				Avg. fall of hammer <u>30"</u>
			Reddish-Tan Silty CLAY with Rock Fragments	6	0.5'		El of ground water ---
			ALLUVIUM Brown Silty SAND	6	0.5'		REMARKS
				9	0.5'		
				5	0.5'		SAMPLE 2.0'-3.5'
				5	0.5'		SAMPLE 4.0'-5.5'
				6	0.5'		
				4	0.5'		SAMPLE 7.0'-8.5'
				3	0.5'		
920.5	8.5		Brown SAND	3	0.5'		SAMPLE 9.0'-10.5'
				2	0.5'		
				2	0.5'		
				2	0.5'		
915.5	13.5		Brown Sand with Some Pebbles and Cobbles	3	0.5'		SAMPLE 14.0'-15.5'
				6	0.5'		Tools Wet
				6	0.5'		
				8	0.5'		SAMPLE 19.0'-20.5'
				13	0.5'		Drilled hard 20'-23'
909.1	19.9		RESIDUUM Highly Weathered to Decomposed Tan and Maroon Shale with Mud Seams	15	0.5'		Softer at 23'
				1	0.5'		SAMPLE 24.0'-25.5'
				1	1'		No Recovery
							Alternating Hard and Soft Drilling
				12	0.5'		SAMPLE 29.0'-30.5'
				15	0.5'		
				5	0.5'		

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT A

Sheet 1 of 3

Geologist _____

Boring No. 4C

Contractor Geotechnics, Inc.

Engineer JRC

Date 29 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 75.5'
928	0						Rock 54.0'
927.8	0.2		Crushed Stone				Wt. of hammer 140#
			FILL Brown Silty SAND with Cinders and Rock Fragments				Avg. fall of hammer 30"
925.0	3.0		ALLUVIUM Brown Silty SAND	3 3 4	0.5' 0.5' 0.5'	1	El of ground water ----
							REMARKS
918.0	10.0		Brown Sand	1 2 3	0.5' 0.5' 0.5'	2	
913.0	15.0		Brown SAND with Pebbles and Cobbles	WH 1 5	0.5' 0.5' 0.5'	3	
906.5	21.5		AUGER REFUSAL TOP OF ROCK Weathered to Highly Weathered Tan, Gray and Maroon Shale	4 8 21	0.5' 0.5' 0.5'	5	
				30	0.1'	5	
			Highly Weathered Zone or Mud Seam				SAMPLE 4.0'-5.5'
899.0	29.0						SAMPLE 9.0'-10.5'
897.7	30.3		Weathered to Highly Weathered Tan, Gray and Maroon Shale				SAMPLE 14.0'-15.5' Tools Wet
							SAMPLE 19.0'-20.5' Tools Wet
							SAMPLE 21.5'-21.6'
							Core Barrel Took-up at 21.5'
							CORE REC. 21.5'-25.5': 58% RQD: 0%
							CORE REC. 25.5'-30.5': 44% RQD: 0%
							Drilled Alternatingly Hard and Soft 21.5'-65.7'

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT A

Sheet 2 of 3

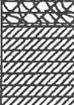
Geologist _____

Boring No. 4C

Contractor Geotechnics, Inc.

Engineer JRC

Date 29 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 75.5'
896	32						Rock 54.0'
							Wt. of hammer 140#
							Avg. fall of hammer 30"
							El of ground water ---
							REMARKS
893.2	34.8		Highly Weathered Zone or Mud Seam				CORE REC 30.5'-35.5': 36% RQD: 0%
891.5	36.5		Weathered to Highly Weathered Tan, Gray and Maroon Shale				CORE REC. 35.5'-38.0': 18% RQD: 0%
							CORE REC. 38.0'-40.5': 40% RQD: 0%
884.0	44.0		Highly Weathered Zone or Mud Seam				CORE REC 40.5'-45.5': 0% RQD: 0%
880.4	47.6		Weathered to Highly Weathered Tan, Gray and Maroon Shale				CORE REC 45.5'-50.5': 38% RQD: 0%
							CORE REC 50.5'-55.5': 62% RQD: 0%
							CORE REC 55.5'-60.5': 28% RQD: 0%
864.5	63.5						

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure PIER 1

Sheet 2 of 3

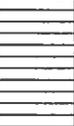
Geologist _____

Boring No. 5C

Contractor Geotechnics, Inc.

Engineer JRC

Date 28 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 70.0'
894	32						Rock 15.4'
							Wt. of hammer 140#
							Avg. fall of hammer 30"
							El of ground water ----
							REMARKS
891.5	34.5		Highly Weathered to Decomposed Tan, Gray and Maroon Shale	2 50	0.5' 0.5'	7	SAMPLE 34.0'-35.5'
889.0	37.0		Orange-Tan Clayey SAND with Shale Fragments				
886.0	40.0		Highly Weathered to Decomposed Maroon and Tan Shale	1 1 21	0.5' 0.5' 0.5'	8	SAMPLE 39.0'-40.5'
							Drilled Alternatingly Hard and Soft 40'-54'
				13 18 23	0.5' 0.5' 0.5'	9	SAMPLE 44.0'-45.5'
				11 15 17	0.5' 0.5' 0.5'	10	SAMPLE 49.0'-50.5'
871.4	54.6		AUGER REFUSAL TOP OF ROCK Partially Weathered Tan and Gray-Green SHALE.	34 30	0.5' 0.1'	11	SAMPLE 54.0'-54.6' Tools Bouncing
							Core Barrel Took-up at 54.6' No Drill Water Return
864.6	61.4		Highly Weathered Zone or Mud Seam				Blocked at 58.1' CORE REC. 54.6'-58.1' 91% RQD: 57%
862.4	63.6						

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure PIER 2

Sheet 1 of 2

Geologist _____

Boring No. 6

Contractor Geotechnics, Inc.

Engineer JRC

Date 7 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole <u>42.5'</u>
930	0						Rock --- Wt. of hammer <u>140#</u> Avg. fall of hammer <u>30"</u> El of ground water ----
			Crushed Stone and Cinders				REMARKS
928.5	1.5		FILL Reddish-Tan Silty CLAY with Rock Fragments and Brown Clayey SILT	1 1 5	0.5' 0.5' 0.5'	1	
				2 3 3	0.5' 0.5' 0.5'	2	SAMPLE 5.0'-6.5'
923.3	6.7		ALLUVIUM Brown Silty SAND	2 3 4	0.5' 0.5' 0.5'	3	SAMPLE 7.0'-8.5'
				2 3 3	0.5' 0.5' 0.5'	4	SAMPLE 10.0'-11.5'
916.5	13.5		Brown SAND	2 2 3	0.5' 0.5' 0.5'	5	SAMPLE 15.0'-16.5' Tools Wet
911.5	18.5		Brown Sand with Some Pebble and Cobbles	8 10 14	0.5' 0.5' 0.5'	6	SAMPLE 20.0'-21.5'
907.5	22.5		RESIDUUM Orange-Tan Clayey SILT with Shale Fragments	3 5 9	0.5' 0.5' 0.5'	7	SAMPLE 25.0'-26.5' No Recovery
							Alternating Hard and Soft Drilling
				2 10 6	0.5' 0.5' 0.5'	8	SAMPLE 30.0'-31.5'

GEOTECHNICS Form 10

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure PIER 2

Sheet 1 of 3

Geologist _____

Boring No. 6C

Contractor Geotechnics, Inc.

Engineer JRC

Date 27 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 87.6'
930	0		Crushed Stone	15	0.5'	1	Rock 10.0'
928.5	1.5		FILL Brown Silty SAND with Cinders and Rock Fragments	14	0.5'		Wt. of hammer 140#
				10	0.5'		Avg. fall of hammer 30"
				1	0.5'	2	El of ground water ----
				2	0.5'		REMARKS
				3	0.5'		
922.5	7.5		ALLUVIUM Brown Sandy SILT			3	
				2	0.5'		
				3	0.5'		
				4	0.5'		
916.5	13.5		Brown Sand			4	
				1	0.5'		SAMPLE 14.0'-15.5'
				3	0.5'		Sample Moist
				3	0.5'		
911.5	18.5		Brown SAND with Pebbles and Cobbles			5	
				9	0.5'		SAMPLE 19.0'-20.5'
				15	0.5'		Tools Wet
				23	0.5'		
907.5	22.5		RESIDUUM Yellow-Tan and Gray Silty SAND with Shale Fragments			6	
				4	0.5'		SAMPLE 24.0'-25.5'
				7	0.5'		
				13	0.5'		
900.0	30.0		Highly Weathered to Decomposed Tan, Gray and Maroon Shale			7	
				11	0.5'		SAMPLE 29.0'-30.5'
				23	0.5'		
				34	0.5'		

GEOTECHNICS Form 10

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure PIER 2

Sheet 2 of 3

Geologist _____

Boring No. 6C

Contractor Geotechnics, Inc.

Engineer JRC

Date 27 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 87.6'
898	32						Rock 10.0'
							Wt. of hammer 140#
							Avg. fall of hammer 30"
							El of ground water ----
							REMARKS
896.5	33.5		Orange-Tan SILT with Some Shale Fragments	2 2 3	0.5' 0.5' 0.5'	8	SAMPLE 34.0'-35.5'
890.5	39.5		Highly Weathered to Decomposed Tan and Brown Shale	8 47 27	0.5' 0.5' 0.5'	9	SAMPLE 39.0'-40.5'
				26 36 42	0.5' 0.5' 0.5'	10	SAMPLE 44.0'-45.5'
				21 32 29	0.5' 0.5' 0.5'	11	SAMPLE 49.0'-50.5'
876.0	54.0		Orange-Tan SILT	3 2 1	0.5' 0.5' 0.5'	12	SAMPLE 54.0'-55.5'
872.5	57.5		Tan and Brown Silty SAND with Shale Fragments	7 14 9	0.5' 0.5' 0.5'	13	SAMPLE 59.0'-60.5'

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure PIER 2

Sheet 3 of 3

Geologist _____

Boring No. 6C

Contractor Geotechnics, Inc.

Engineer JRC

Date 27 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 87.6'
865.947	64.0	5332		7	0.5'		Rock 10.0'
				9	0.5'	14	Wt. of hammer 140#
				20	0.5'		Avg. fall of hammer 30"
863.0	67.0		Highly Weathered to Decomposed Tan and Gray Shale				El of ground water ----
				22	0.5'	15	REMARKS
				39	0.5'		SAMPLE 64.0'-65.5'
				44	0.5'		
857.0	73.0		Maroon Silty SAND with Shale Fragments				SAMPLE 69.0'-70.5'
				9	0.5'	16	SAMPLE 74.0'-75.5'
				7	0.5'		
				2	0.5'		
853.0	77.0		Highly Weathered to Decomposed Tan and Gray Shale				Core Barrel Took-up at 77.6'
852.4	77.6		AUGER REFUSAL TOP OF ROCK				No Drill Water Return
			Partially Weathered Tan Gray and Maroon SHALE. Some Iron Stained Fractures.				CORE REC. 77.6'-82.6': 96 % RQD: 92%
							Qu: 77.6'-78.4' 7,390 PSI
843.6	86.4		Weathered Maroon Shale				CORE REC. 82.6'-87.6': 86% RQD: 56%
842.4	87.6		BOTTOM OF HOLE Completed: 7:30 AM 28 JUL 15				

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure PIER 4

Sheet 1 of 1

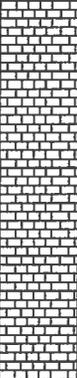
Geologist _____

Boring No. 7

Contractor Geotechnics, Inc.

Engineer JRC

Date 16 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 11.4'
939	0						Rock 9.2'
938.0	1.0		Crushed Stone				Wt. of hammer 140#
936.8	2.2		FILL				Avg. fall of hammer 30"
			Brown Silty SAND with Rock Fragments	30	0.2'		El of ground water ---
			TOP OF ROCK				REMARKS
			Partially Weathered Gray LIMESTONE with Calcite Healed Fractures				SAMPLE 2.0'-2.2' Auger Refusal Core Barrel Took-up at 2.2' Drill Water Gray
927.6	11.4		BOTTOM OF HOLE Completed 11:30 AM 16 JUL 15				CORE REC: 2.2'-7.2': 94% RQD: 84%
							Qu: 2.2'-2.9' 16,080 PSI
							Core Barrel Full at 11.4' Picked-up 0.8' from Run 1
							CORE REC: 7.2'-11.4': 99+% RQD: 99+%

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT B

Sheet 1 of 1

Geologist _____

Boring No. 8

Contractor Geotechnics, Inc.

Engineer JRC

Date 15 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 21.9'
939	0						Rock 16.7'
938.8	0.2		TOPSOIL				Wt. of hammer 140#
			FILL				Avg. fall of hammer 30"
937.0	2.0		Tan Clayey SILT with Rock Fragments	2	0.5'	1	El of ground water ---
			RESIDUUM	3	0.5'		REMARKS
			Tan and Orange-Tan Silty CLAY	3	0.5'		
933.8	5.2		TOP OF ROCK	2	0.5'	2	SAMPLE 2.0'-3.5'
			Partially Weathered Gray LIMESTONE with Calcite Healed Fractures	30	0.2'		SAMPLE 4.5'-5.2'
							Auger Refusal
							Core Barrel Took-up at 5.2'
							Drill Water Gray
							CORE REC: 5.2'-10.2': 98%
							RQD: 94%
927.3	11.7		Mud Seam				Qu: 10.2'-10.7' 10,490 PSI
							Lost Drill Water Return at 11.7'
							CORE REC: 10.2'-15.2': 30%
							RQD: 30%
922.3	16.7		Partially Weathered Gray LIMESTONE with Calcite Healed Fractures				Core Barrel Blocked at 16.9'
							CORE REC: 15.2'-16.9': 12%
							RQD: 0%
							CORE REC: 16.9'-21.9': 98%
							RQD: 98%
917.1	21.9		BOTTOM OF HOLE Completed 1:15 PM 15 JUL 15				W.L. 16 JUL: 17.5' (Drill Water)

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT B

Sheet 1 of 1

Geologist _____

Boring No. 9

Contractor Geotechnics, Inc.

Engineer JRC

Date 15 JUL 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 19.5'
936.5	0						Rock ---
936.2	0.3		TOPSOIL				Wt. of hammer 140#
			FILL				Avg. fall of hammer 30"
			Brown Sandy CLAY with Rock Fragments	2	0.5'	1	El of ground water ----
				3	0.5'		REMARKS
				3	0.5'		
			Some Brick and Concrete Fragments	3	0.5'	2	
				7	0.5'		
				12	0.5'		
				11	0.5'	3	
				11	0.5'		SAMPLE 7.0'-8.5'
				2	0.5'		Sampler Deflecting - No Recovery
				2	0.5'	4	
925.7	10.8		RESIDUUM	2	0.5'		SAMPLE 9.5'-11.0'
			Tan to Reddish-Tan Silty CLAY	2	0.5'		
				2	0.5'		
				2	0.5'	5	
				3	0.5'		SAMPLE 14.5'-16.0'
918.5	18.0		Highly Weathered to Decomposed Shale				Auger Scraping 18.0'-19.5'
917.0	19.5		AUGERS DEFLECTING BOTTOM OF HOLE Completed 2:30 PM 15 JUL 15				Could Not Reseat Tools to Bottom of Hole W.L. @ Completion: Dry W.L. 16 JUL: Dry at 18.2'

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT B

Sheet 1 of 1

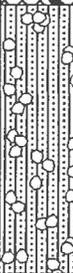
Geologist _____

Boring No. 10

Contractor Geotechnics, Inc.

Engineer JRC

Date 5 AUG 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 12.9'
954	0						Rock ---
953.5	0.5		TOPSOIL FILL Brown and Tan Silty CLAY with Rock Fragments	3 9 6	0.5' 0.5' 0.5'	1	Wt. of hammer 140# Avg. fall of hammer 30" El of ground water ----
949.0	5.0		RESIDUUM Tan and Orange-Tan Silty SAND with Shale Fragments	5 7 8	0.5' 0.5' 0.5'	2	
				5 7 9	0.5' 0.5' 0.5'	3	
943.5	10.5		Highly Weathered to Decomposed Tan and Gray Shale	7 13 17	0.5' 0.5' 0.5'	4	
941.1	12.9		AUGERS REFUSAL BOTTOM OF HOLE Completed 2:45 PM 5 AUG 15				REMARKS W.L. @ Completion: Dry Hole Backfilled

**FRANKLIN ROAD BRIDGE
OVER NS RAILROAD**

BORING LOG

Comm. No. 4670

Location ROANOKE, VA

Structure ABUTMENT B

Sheet 1 of 1

Geologist _____

Boring No. 11

Contractor Geotechnics, Inc.

Engineer JRC

Date 5 AUG 15

Stratification			Description of Materials (Type, color & Consistency)	Sampler or Spoon		Sample No.	Misc. Data
Elevation	Depth	Legend		Blows	Penetration		Length of hole 8.3'
949	0						Rock ---
948.7	0.3		TOPSOIL FILL Brown and Tan Silty CLAY with Rock Fragments	7	0.5'	1	Wt. of hammer 140#
				7	0.5'		Avg. fall of hammer 30"
				6	0.5'		El of ground water ---
943.0	6.0		RESIDUUM Maroon and Tan Silty SAND with Shale Fragments	1	0.5'	2	REMARKS
941.5	7.5			3	0.5'		
940.7	8.3		Highly Weathered to Decomposed Tan and Gray Shale	3	0.5'	3	
				19	0.5'		
			AUGERS REFUSAL BOTTOM OF HOLE Completed 2:00 PM 5 AUG 15	30	0.3'		W.L. @ Completion: Dry
							Hole Backfilled

Appendix C



Roanoke, Virginia

**ASBESTOS INSPECTION REPORT
Franklin Road Bridge over Norfolk Southern
Railway**

**Prepared For:
City of Roanoke
215 Church Avenue, S.W. – Room 350
Roanoke, Virginia 24011**

**Prepared By:
EnviroCheck of Virginia, Inc.
375 Mountain Lane
Tazewell, Virginia 24651**

Project #EC-458

EnviroCheck of Virginia, Inc.
120 Lovelane Street
Bluefield, VA 24605

January 21, 2016

Mr. Luke Pugh, P.E.
City of Roanoke – Engineering Department
215 Church Avenue, S.W. – Room 350
Roanoke, Virginia 24011

Re: *Asbestos Inspection Report*
Franklin Road Bridge over Norfolk Southern Railway
Roanoke, Virginia

Dear Mr. Pugh,

EnviroCheck of Virginia, Inc. (EC) is pleased to submit the above referenced report for your review. Positive asbestos containing material (ACM) **was not** identified on the bridge structure.

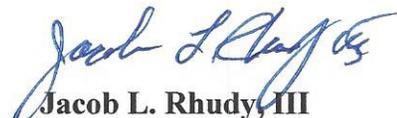
EnviroCheck of Virginia appreciates the opportunity to provide our asbestos inspection services. If you have any questions or need any additional information, please feel free to contact me at 276-322-1323.

Sincerely,

EnviroCheck of Virginia, Inc.



Jody Hawks
Project Manager
Virginia Licensed Asbestos
Inspector # 3303003791



Jacob L. Rhudy, III
Operations Manager
Virginia Licensed Asbestos
Inspector #3303-001729

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2.0 ASBESTOS-CONTAINING MATERIAL DEFINED	2
3.0 ASBESTOS INSPECTION	3
4.0 ANALYTICAL METHODS	4
5.0 CONFIRMED ASBESTOS CONTAINING MATERIAL	5
6.0 CONCLUSIONS/RECOMMENDATIONS	5

APPENDICES

APPENDIX I

Laboratory Analyses/Chain of Custody Forms

APPENDIX III

Laboratory Accreditation

APPENDIX III

Inspectors License

1.0 INTRODUCTION

EnviroCheck of Virginia, Inc. (EC) was retained by **The City of Roanoke** to conduct an asbestos inspection of the **Franklin Road Bridge** located near 301 Reserve Avenue, Roanoke, Virginia. The inspection performed was with the best available industry standard sampling protocols for the material types observed.

The scope of services for the project included the following:

- The identification and representative sampling (as necessary) of suspected asbestos-containing materials (ACM);
- The classification of any ACM including its condition and estimated volume;
- The preparation of a report outlining the inspection procedures and laboratory analyses, amount of ACM found; and
- The presentation of information necessary to comply with the Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) asbestos regulations and for building renovation or demolition.

1.1 Inspection Limitations

While every reasonable effort was made to sample all suspect material within the structure, not all areas may have been accessible for sampling. In virtually all structures, there are concealed, interstitial spaces between walls, between a ceiling and the floor above it, and possibly even beneath slab or built-up flooring. Additionally, the possibility exists for the suspect or asbestos-containing materials (ACMs) to be contained within doors and other pre-fabricated building components, or hidden beneath, behind, or above other finish materials. Moreover, there is the possibility that some ACMs may go undetected due to either inhomogeneity of the materials, or limitations in the current industry-standard sampling protocols.

EC recommends that the property owner, and or the building's occupants, exercise caution so that in the event that any as-yet-unknown, currently inaccessible, suspect material(s) become exposed, the appropriate sampling, analysis, and response activities are planned and performed in a timely manner. Subsequently, EC can provide no guarantees, either written or implied, that all ACMs in or on the structure were located or identified.

2.0 ASBESTOS-CONTAINING MATERIAL DEFINED

According to NESHAP (40 CFR subpart M, part 61) asbestos regulations, materials found to contain asbestos fibers may be categorized as follows:

Category I Non-friable – Category I ACM includes asbestos-containing gaskets, packings, resilient floor coverings, resilient floor covering mastic, and asphalt roofing products containing more than one percent asbestos. Asphalt roofing products, which may contain asbestos, include built-up roofing; asphalt containing single ply membrane systems; asphalt shingles; asphalt containing underlayment felts; asphalt containing roof coatings and mastics; and asphalt containing base flashings. ACM roofing products that use other bituminous or resinous binders (such as coal tars or pitches) are also considered Category I ACM.

Category II Non-friable – Category II ACM includes all other non-friable ACM, for example, asbestos-cement (A/C) shingles, A/C tiles, and transite boards or panels containing more than one percent asbestos. Generally speaking, Category II ACM is more likely to become friable when damaged than is Category I ACM. The applicability of the NESHAP to Category I and II ACM depends on: (1) the condition of the material at the time of demolition or renovation, (2) the nature of the operation to which the material will be subjected, and (3) the amount of ACM involved.

Friable ACM – Friable ACM is ACM that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure.

Regulated Asbestos-Containing Material (RACM) ACM regulated under the NESHAP is referred to as "regulated asbestos-containing material" (RACM). RACM is defined in § 61.141 of the NESHAP and includes: (1) friable ACM; (2) Category I non-friable ACM that has become friable; (3) Category I non-friable ACM that has been or will be sanded, ground, cut, or abraded; or (4) Category II non-friable ACM that has already been or is likely to become crumbled, pulverized, or reduced to powder. If the coverage threshold for RACM is met or exceeded in a renovation or demolition operation, then all friable ACM in the operation, and in certain situations, non-friable ACM in the operation, are subject to the NESHAP (A) Threshold Amounts of Asbestos-Containing Roofing Material.

The NESHAP asbestos regulations specify that Category I materials that are not in poor condition and are not friable prior to demolition do not have to be removed, except where demolition will be by intentional burning. However, RACM, and Category II materials that have a high probability of being crumbled, pulverized, or reduced to powder, as part of demolition must be removed before demolition begins.

3.0 ASBESTOS INSPECTION

A Virginia-licensed asbestos inspector from EC conducted an asbestos inspection of the structure on January 14, 2016. Suspected ACMs were evaluated according to whether the materials were damaged (poor) or non-damaged (good) condition at the time of inspection. **Table 1 – Microscopy Results**, presents the condition and NESHAP category of all materials confirmed to contain asbestos. Areas containing homogenous materials were identified and sampled accordingly. Homogeneous materials are defined as being uniform in texture and color and appearing identical in every other aspect. Additionally, as part of the scope of services for this project, the area or length of the sampled material was estimated and should not be relied upon by an abatement contractor. The following, is a table (**Table 1**) of homogeneous materials sampled and their asbestos content expressed as positive or negative.

Table 1
Franklin Road Bridge
Summary of Homogeneous Material
Sampled on January 14, 2016

Sample #	Homogeneous Material	ACM
1, 2, 3	Light pole caulk	<1%
4, 5, 6	Green Paint	Negative
7, 8, 9	Fiber Conduit	Negative
10, 11, 12	Electrical wire wrap	Negative
13, 14, 15	Sidewalk caulk	Negative
16, 17, 18	Expansion joint caulk	Negative
19, 20, 21	Expansion joint gasket	Negative
22, 23, 24	Gutter caulk	Negative

4.0 ANALYTICAL METHODS

EC submitted eight samples (24 materials) for the structure to Ameri Sci Laboratory of Richmond, Virginia for analysis. The analytical method used by the laboratory for sample identification was EPA Method 600/R-93/116 and EPA/600/M4-82/020 – Polarized Light

Microscopy (PLM) coupled with Dispersion Staining. Ameri Sci Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP No. 101904). Certificates of analyses are located in **Appendix I**, proof of laboratory accreditation is provided in **Appendix II** and a copy of the Inspector's License is provided in **Appendix III**.

5.0 CONFIRMED ASBESTOS-CONTAINING MATERIAL

The laboratory confirmed that **none** of the materials collected from of the Franklin Road Bridge are comprised of greater than 1% asbestos.

6.0 CONCLUSIONS/RECOMMENDATIONS

Results of the asbestos inspection on the Franklin Road Bridge confirmed positive ACM greater than 1% **was not** identified on the structure. Therefore, demolition of the structure may be conducted without any special provisions for asbestos abatement.

APPENDIX I
*Laboratory Analyses with
Chain-of-Custody Forms*



Please Reply To:

AmeriSci Richmond
13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

FACSIMILE TELECOPY TRANSMISSION

To: J.L. Rhudy III
Envirocheck, LLC
Fax #:
Email: jody@e2cofvirginia.com

From: William M. Dunstan
AmeriSci Job #: 116011482
Subject: PLM 5 day Results
Client Project: City Of Roanoke

Date: Thursday, January 21, 2016
Time: 10:43:29
Comments:

Number of Pages: 7
(including cover sheet)

CONFIDENTIALITY NOTICE: Unless otherwise indicated, the information contained in this communication is confidential information intended for use of the individual named above. If the reader of this communication is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is prohibited. If you have received this communication in error, please immediately notify the sender by telephone and return the original message to the above address via the US Postal Service at our expense. Samples are disposed of in 60 days or unless otherwise instructed by the protocol or special instructions in writing. Thank you.

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AmeriSci Richmond

13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos Report

Envirocheck, LLC
Attn: J.L. Rhudy III
375 Mountain Road

Date Received 01/18/16
Date Examined 01/21/16

AmeriSci Job # 116011482
P.O. #
Page 1 of 5

RE: City Of Roanoke

Tazewell, VA 24651

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
1 1 Location: Light Pole Caulk	116011482-01	Yes	Trace (<1 %) (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <1. % Other Material: Non-fibrous 100 %			
2 1 Location: Light Pole Caulk	116011482-02	Yes	Trace (<1 %) (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <1. % Other Material: Non-fibrous 100 %			
3 1 Location: Light Pole Caulk	116011482-03	Yes	Trace (<1 %) (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <1. % Other Material: Non-fibrous 100 %			
4 2 Location: Green Paint	116011482-04	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Green/Orange, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
5 2 Location: Green Paint	116011482-05	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Green/Orange, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

City Of Roanoke

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
6 2 Location: Green Paint	116011482-06	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Green/Orange, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
7 3 Location: Fiber Conduit	116011482-07	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 60 %, Non-fibrous 40 %			
8 3 Location: Fiber Conduit	116011482-08	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 60 %, Non-fibrous 40 %			
9 3 Location: Fiber Conduit	116011482-09	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 60 %, Non-fibrous 40 %			
10 4 Location: Wire Wrap	116011482-10	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 80 %, Non-fibrous 20 %			
11 4 Location: Wire Wrap	116011482-11	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 80 %, Non-fibrous 20 %			

PLM Bulk Asbestos Report

City Of Roanoke

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
12 4 Location: Wire Wrap	116011482-12	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 80 %, Non-fibrous 20 %			
13 5 Location: Sidewalk Caulk	116011482-13	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
14 5 Location: Sidewalk Caulk	116011482-14	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
15 5 Location: Sidewalk Caulk	116011482-15	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
16 6 Location: Expansion Joint Caulk	116011482-16	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
17 6 Location: Expansion Joint Caulk	116011482-17	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			

PLM Bulk Asbestos Report

City Of Roanoke

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
18 6	116011482-18 Location: Expansion Joint Caulk	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
19 7	116011482-19 Location: Expansion Joint Gasket	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
20 7	116011482-20 Location: Expansion Joint Gasket	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
21 7	116011482-21 Location: Expansion Joint Gasket	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
22 8	116011482-22 Location: Rain Gutter Caulk - (On Top)	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			
23 8	116011482-23 Location: Rain Gutter Caulk - (On Top)	No	NAD (by CVES) by William M. Dunstan on 01/21/16
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100 %			

PLM Bulk Asbestos Report

City Of Roanoke

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
24 8	116011482-24 Location: Rain Gutter Caulk - (On Top)	No	NAD (by CVES) by William M. Dunstan on 01/21/16

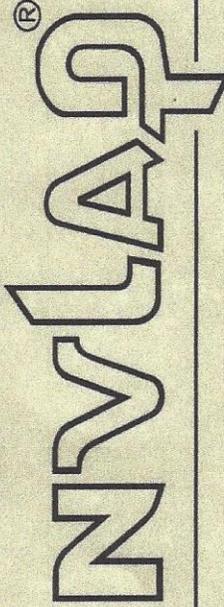
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material
Asbestos Types:
Other Material: Non-fibrous 100 %

Reporting Notes:

Analyzed by: William M. Dunstan William M. Dunstan Date 1/21/16
*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/R-93/116 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples which includes quantitation of any vermiculite observed (198.6 for NOB samples) or EPA 400 pt ct by EPA 600/M4-82-020 (NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.
Reviewed By: William M. Dunstan

APPENDIX II
Laboratory Accreditation

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101904-0

AmeriSci Richmond
Midlothian, VA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).

2015-06-16 through 2016-06-30

Effective Dates



A handwritten signature in black ink, which appears to read "William R. Murphy".

For the National Voluntary Laboratory Accreditation Program

APPENDIX V
Inspectors License

COMMONWEALTH of VIRGINIA

Department of Professional and Occupational Regulation
9960 Mayland Drive, Suite 400, Richmond, VA 23233
Telephone: (804) 367-8500

EXPIRES ON
01-31-2017

NUMBER
3303001729

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
ASBESTOS INSPECTOR LICENSE



JACOB LEACH RHUDY III
375 MOUNTAIN LANE
TAZEWELL, VA 24651-0000



Jay W. DeBoer
Jay W. DeBoer, Director

Status can be verified at <http://www.dpor.virginia.gov>

COMMONWEALTH of VIRGINIA

Department of Professional and Occupational Regulation
9960 Mayland Drive, Suite 400, Richmond, VA 23233
Telephone: (804) 367-8500

EXPIRES ON
10-31-2016

NUMBER
3303003792

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
ASBESTOS INSPECTOR LICENSE



JOHN ROBERT MORETTO
RT 4 BOX 157A
BLUEFIELD, WV 24701-0000



Jay W. DeBoer
Jay W. DeBoer, Director

Status can be verified at <http://www.dpor.virginia.gov>

DEPARTMENT OF PROFESSIONAL AND OCCUPATIONAL REGULATION
COMMONWEALTH OF VIRGINIA

9960 Mayland Dr., Suite 400, Richmond, VA 23233
Telephone: (804) 367-8500

EXPIRES ON
08-31-2016

NUMBER
3303003219

BOARD FOR ASBESTOS, LEAD, AND HOME INSPECTORS
ASBESTOS INSPECTOR LICENSE

FRANK WAYNE LAMPERT
310 EAST VIEW ST
BLUEFIELD, VA 24605-0000



Jay W. DeBoer
Jay W. DeBoer, Director

ALTERATION OF THIS DOCUMENT, USE AFTER EXPIRATION, OR USE BY PERSONS OR FIRMS OTHER THAN THOSE NAMED MAY RESULT IN CRIMINAL PROSECUTION UNDER THE CODE OF VIRGINIA.

License Details



Name	HAWKS, JODY SCOTT
License Number	3303003791
License Description	Asbestos Inspector License
Rank	Asbestos Inspector
Address	PRINCETON, WV 24739-0000
Initial Certification Date	2012-11-08
Expiration Date	2016-11-30

The license information in this application was last updated at Sat Jan 23 02:50:18 EST.

License Lookup legal disclaimer

Appendix D

Replacement of Franklin Road Bridge over NS Railway

City of Roanoke, Virginia

Special Provisions

Flowable Backfill

Drilled Shafts Using Self-Consolidating Concrete

Architectural Treatment

Concrete Surface Color Coating

Precast Architectural Concrete

Decorative Metal Panels

Wave Equation Analysis

Detectable Warning Surface

Planing or Milling of Pavement

Special Modifications to the VDOT Road and Bridge Specifications

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
FLOWABLE BACKFILL

March 11, 2010

I. DESCRIPTION

This work shall consist of furnishing and placing flowable backfill for use as backfill material in pipe installations or in other uses at locations as designated on the plans, and as backfill material for plugging designated abandoned pipes and culverts.

II. MATERIALS

Hydraulic Cement shall conform to the requirements of Section 214 of the Specifications.

Fly Ash shall conform to the requirements of Section 241.02(a) of the Specifications.

Water shall conform to the requirements of Section 216 of the Specifications with the exception that wash water as described in Section 216.02 may comprise the total mix water.

Aggregates shall conform to the requirements of Sections 202 and 203 of the Specifications with a combined gradation as determined by the Contractor.

Admixtures shall conform to the requirements of Section 215 of the Specifications.

Granulated Iron Blast Furnace Slag shall conform to the requirements of Section 215 of the Specifications.

III. MIX DESIGN

Mix design for flowable backfill shall be provided by the Contractor. When used as backfill material in pipe installations or in other uses at locations as designated on the plans flowable backfill shall have a design compressive strength of 30 to 200 pounds per square inch. When used as backfill material for plugging designated abandoned pipes and culverts flowable backfill shall have a design compressive strength of 30 to 1200 pounds per square inch. The design compressive strength requirement shall be at 28 days when tested in accordance with ASTM D 4832. Mix design shall result in a fluid product having no less than an 8-inch slump at time of placement. The Contractor shall submit a mix design for approval supported by laboratory test data verifying compliance with 28 day compressive strength requirements. Mix design shall be approved by the Engineer prior to placement.

IV. PROCEDURES

Mixing and transporting shall be in accordance with Section 217 of the Specifications or by other methods approved by the Engineer.

Temperature of flowable backfill shall be at least 50 degrees F at time of placement. Material shall be protected from freezing for 24 hours after placement.

When used as backfill for pipe installation and floatation or misalignment occurs, correct alignment of the pipe shall be assured by means of straps, soil anchors or other approved means of restraint.

When used to fill the voids in abandoned pipes and culverts, they shall be plugged and backfilled in accordance with the plan details or as directed by the Engineer. The plugs shall be in accordance with the plan details. The backfill material shall be flowable backfill placed into the abandoned pipe or culvert without voids. When deemed necessary by the Engineer, the Contractor shall submit a plan of operations for acceptance showing how the flowable backfill will be placed without voids. The opening for culvert backfill installation shall be sealed with masonry or Class A-3 concrete at completion of backfilling.

V. MEASUREMENT AND PAYMENT

Flowable Backfill will be measured and paid for in cubic yards complete-in-place. When used as backfill material in pipe installations or in other uses at locations as designated on the plans this price shall be full compensation for furnishing and placing flowable backfill, securing the pipe alignment, and for all materials, labor, tools, equipment and incidentals necessary to complete the work. When used as backfill material for plugging designated abandoned pipes and culverts the price bid shall include furnishing and placing of backfill material and furnishing and installing plugs.

Payment will be made under:

Pay Item	Pay Unit
Flowable Backfill	Cubic yard

**SPECIAL PROVISION FOR
DRILLED SHAFTS USING SELF-CONSOLIDATING CONCRETE**

I. DESCRIPTION:

This work shall consist of all labor, materials, equipment and services necessary to perform all operations to complete the drilled shaft installation in accordance with the specifications, this special provision and with the details and dimensions shown on the plans. Drilled shafts are a reinforced concrete section, cast-in-place against in-situ, undisturbed material. Drilled shafts are a straight shaft type and are vertical.

II. SITE INFORMATION

The Report of Subsurface Investigation and as-built plans are available for use by the Contractor. Data on subsurface conditions are not intended as representations or warranties of continuity of such conditions. The data are made available for the convenience of the Contractor, and it is expressly understood that the City will not be responsible for interpretations or conclusions drawn there from by the Contractor.

The Contractor or prospective bidders may obtain, prior to bidding, right-of-entry and complete whatever investigations, research, tests, or analyses required for bid purposes.

III. QUALIFICATIONS OF DRILLED SHAFT CONTRACTOR

The Contractor performing the work described in this specification shall have experience consisting of successful installation of at least 10 drilled shaft projects installed within the past 5 years, 2 of which shall be similar or greater size and in similar geotechnical conditions. The drilled shaft work shall be performed under the supervision of the Contractor's superintendent, who shall have at least 5 years of experience installing drilled shafts within the last 8 years and shall be fully knowledgeable and experienced in construction of drilled shaft foundations of similar size and geotechnical conditions as those shown in the Report of Subsurface Investigation. See Section IV for submittal requirements.

The City may accept or reject the Contractor's Drilled Shaft Subcontractor based on his qualifications and previous field performance.

IV. SUBMITTALS:

A. Drilled Shaft Installation Plan

No later than two months prior to constructing drilled shafts, the Contractor shall submit an installation plan for approval and attend a drilled shaft pre-construction conference as detailed herein. This plan shall provide information of the following:

- (a) A list of the 10 projects performed in the last 5 years by the Contractor performing the work specified as required experience in Section III. QUALIFICATIONS OF DRILLED SHAFT CONTRACTOR. The documentation shall reference, for each project the names and phone numbers of owner's representatives who can verify the Contractors' participation on those projects, detail the size and number of the shafts, methods used during installation, methods used for wall stabilization, local soil conditions, actual construction time, and contract time. Name and experience record of the drilled shaft superintendent who will be in charge of drilled shaft operations for this project. The Contractor shall provide documentation of his

- superintendent's qualifications, record experience, and prior project references demonstrating that he can handle unusual site conditions and equipment breakdowns. The mentioned documentation shall reference, for each project the names and phone numbers of owner's representatives who can verify the Contractors' participation on those projects, detail the size and number of the shafts, methods used during installation, methods used for wall stabilization, local soil conditions, actual construction time, and contract time.
- (b) A list of proposed equipment to be used, including cranes, drills, augers, bailing buckets, final cleaning equipment, de-sanding equipment, slurry pumps, core sampling equipment, tremies or concrete pumps, etc.
 - (c) Details of overall construction operation sequence and the sequence of shaft construction in groups including the time for driving casing, sealing casing, excavation and/or drilling time, drilled shaft cleaning, rock coring, drilled shaft inspection and concrete placement.
 - (d) Details of shaft excavation methods. Methods for monitoring verticality of the drilled shaft walls during excavation and details of proposed corrective measures to be implemented for shafts out of tolerance.
 - (e) When the use of slurry is anticipated, details of the mix design and its suitability for the subsurface conditions at the construction site, mixing and storage methods, maintenance methods, and disposal procedures.
 - (f) Details of methods to clean the excavated shaft to include details of disposal of the excavated material and/or sediment laden water. Details shall include consideration for the protection of the adjacent railroad property from runoff associated with temporary spoil stockpiles.
 - (g) Details of steel reinforcement and means of placement during construction. Include methods to ensure cage centering and cover; cage integrity while lifted during placement (number of cranes, lift points, and spreader bars); number and location of bottom and side spacers; cage support; mechanical bar splice details, and tie downs during concrete placement. Detailing of reinforcing steel shall be based on the results of the exploratory borings and shall include means to adjust steel details based on actual shaft length constructed.
 - (h) Details of concrete placement, including proposed operational procedures for free fall, tremie or pumping methods.
 - (i) Details of casing installation and removal methods for both temporary and permanent casing.
 - (j) Plan to Protect Existing Structures. The Contractor shall outline the steps he will take during drilled shaft installation to protect adjacent tracks and nearby structures.
 - (k) Details of Environmental Control Procedures. Indicate plan to prevent loss of soil, slurry or concrete into protected areas and to comply with all State and Federal environmental regulations and project permitting requirements.
 - (l) Method to install and secure the Crosshole Sonic Logging (CSL) tubes to the reinforcing cage.
 - (m) Concrete Mix Design. Include the details of the concrete mix design to be used. Mix design shall include a Slump Loss Graph. The Slump Loss Graph for a proposed drilled shaft mix design shall illustrate the slump reducing slowly and still maintaining a minimum 4 inch slump throughout the drilled shaft concrete elapsed time as defined in Section VI.A.
 - (n) Concrete Placement Plan. The proposed Concrete Placement Plan shall ensure that sufficient concrete is at the job site or in transit to the job site so that the entire pour can be done without delay. Include location of the concrete plant, number of trucks, estimated delivery times, estimated time between trucks, and number of trucks at the site before placement begins. Indicate the use of tremie or concrete pump, de-airing lines, details of the seal to be used at the bottom end of the tremie or concrete pump line. Breakdowns of concrete plants, trucks, or traffic problems shall be considered under this Concrete

Placement Plan. Include an estimate of the concrete placement and overpouring time per drilled shaft.

- (o) Methods of Disposal of Spoil Excavation, Waste Slurry, Waste Concrete, and Drilled Shaft Cutoffs. Sufficient details shall be presented to the City to evaluate the adequacy and compliance of the Contractor's methods of disposal with all related environmental permits and local regulations.

The City will evaluate the drilled shaft installation plan for conformance with the plans, specifications and special provisions. Within 14 days after receipt of the installation plan, the City will notify the Contractor of any additional information required and/or changes necessary to meet the contract requirements. All procedural approvals given by the City shall be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work as detailed in the plans and specifications.

B. Preconstruction Conference

A drilled shaft preconstruction conference will be held with the Contractor and Sub-Contractor (if applicable) prior to the start of shaft construction to discuss construction and inspection procedures. This conference will be scheduled by the City after the Contractor's submittals are approved by the City.

V. FIELD DEMONSTRATION OF THE TRIAL SHAFT:

After the Drilled Shaft Installation Plan has been approved, the first production drilled shaft shall be constructed at Piers 1 or 2, and will be constructed as a trial shaft. The trial drilled shaft must be constructed in identical manner as that proposed in the Drilled Shaft Installation Plan, including the method of installation, CSL tube installation and testing, steel reinforcement, and concreting. Construction of the trial drilled shaft will be used to determine if the Contractor's methods, equipment, and proposed procedures are effective to produce a drilled shaft excavation and concreting that meet the requirements of the plans and specifications.

Failure by the Contractor to demonstrate to the City the adequacy of methods and equipment shall be reason for the City to require alterations in equipment and/or method by the Contractor to eliminate unsatisfactory results. The City may require that an additional trial shaft be constructed at a non-production location. Any additional trial shafts required to demonstrate the adequacy of altered methods or construction equipment shall be at the Contractor's expense. Once approval has been given to construct production shafts, no changes will be permitted in the methods or equipment used to construct the satisfactory trial shaft without written approval of the City.

VI. MATERIALS:

A. Hydraulic Cement Concrete for Drilled Shafts

1. Hydraulic cement concrete shall conform to the requirements of Section 217 of the Road and Bridge specifications, except as noted herein.
2. Specifications for Concrete Mixture

(a) Requirements for Hydraulic Cement Concrete

Design Min. Laboratory Compressive Strength at 28 Days (f'c) (psi)	Design Max. Laboratory Permeability at 28 Days (Coulombs)	Agg Size No.	Min. Cementitious Content (lbs/cu yd)	Max. Water /Cementitious lb. water lb. cement	Consistency (slump flow) (in)	Air Content (%)
5,000 or as specified on the plans	2500	8	635	0.40	20-26	4 ½ ± 1 ½

(b) Requirements for Low Permeability

1. Class F Fly Ash, granulated iron blast-furnace slag (slag cement) and silica fume shall conform to the requirements of Section 215.

One of the following shall be used as a percent mass of the cementitious material.

- 20 percent minimum Class F Fly Ash
- 40 percent minimum slag cement
- 7 percent minimum silica fume
- Silica fume with a range of 2.5 – 5 percent combined with a minimum 15 percent Class F Fly Ash
- Silica fume with a range of 2.5 – 5 percent combined with a minimum of 30 percent slag cement

2. Not used.

(c) Consistency of Concrete

Self-consolidating concrete (SCC) shall meet the requirements of regular concrete except that the slump requirement shall be waived. Instead the slump flow (ASTM C 1611) shall be measured, which is the diameter of the concrete spread. The slump flow shall be 23 ± 3 in. and there shall be no visible segregation in the spread. A visual stability index (VSI) value of 0 or 1 shall be acceptable; a value of 2 or 3 shall be rejected (ASTM C 1611). The City's representative shall be the sole authority in this determination. The slump flow shall be compared to slump flow with the J-Ring (ASTM C 1621) and the difference shall be 2 inches or less. Combined aggregate grading, workability retaining admixture, and viscosity modifying admixture (VMA) can be used. The Contractor shall perform all tests under the supervision of the City's representative.

The Contractor shall demonstrate by documents indicating successful experience or by trial batching that satisfactory SCC can be produced that meets the specification requirements. A concrete technologist (such as the admixture supplier), experienced in the production of SCC and representing the contractor or the producer shall be present during placement. Concrete shall stay plastic and within the slump flow

specified during the placement. Concrete placement will be conducted such that air is not encapsulated and segregation is not occurring.

Ensure that drilled shaft concrete maintains a slump of 4 inches or more throughout the drilled shaft concrete elapsed time. Ensure that the slump loss is gradual as evidenced by slump loss tests described below. The concrete elapsed time is the sum of the mixing and transit time, the placement time and the time required for removal of any temporary casing that could cause the concrete to flow into the space previously occupied by the temporary casing.

Provide slump loss tests before drilled shaft concrete operations begin, demonstrating that the drilled shaft concrete maintains a slump of at least 4 inches throughout the drilled shaft concrete elapsed time. Perform slump loss testing of the drilled shaft mix using a laboratory acceptable to the City.

(d) Slump Loss Test

Conduct the slump loss test as follows:

- 1) Batch the actual mix design at a slump flow of 20 to 23 inches and at the highest concrete temperature expected on the job, but no less than 60°F.
- 2) Batch at least 4 cu. yd. in a mixer truck. Begin timing the test when the mixing water is introduced into the mix.
- 3) After initial mixing, measure and record the slump, ambient and, concrete temperature and percent air. Ensure all concrete properties are within specifications.
- 4) Mix the concrete intermittently at agitation speed for 30 seconds every 15 minutes.
- 5) Measure and record the slump, ambient and concrete temperatures, and percent air after every second 15 minute interval until the slump is 3 ½ inches.

After batching, ensure that the concrete maintains a minimum slump of 4 inches throughout the drilled shaft concrete elapsed time as defined in this Special Provision.

(e) At least three concrete test cylinders shall be taken per load.

B. Reinforcing Steel

Deformed reinforcing bars shall comply with the size, spacing, dimension, and details shown on the plans and shall conform to ASTM A 615, Grade 60, and the requirements of Section 223 and 406 of the VDOT Road and Bridge Specifications.

Contractor may provide mechanical reinforcing steel bar coupling devices meeting the requirements of Section 406.03(e) of the Specifications for the main longitudinal reinforcing steel bars.

C. Casing

Casing shall be steel, rigid, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and to withstand pressure from concrete, the surrounding earth materials and water. The outside diameter of casing shall not be less than the specified size of the drilled shaft. The thickness of steel casings shall not be less than that specified in the plans. The dimensions are subject to American Pipe Institute tolerances applicable to regular steel pipe.

When approved by the City, the Contractor may elect to provide a casing larger in diameter than shown in the plans. All casing diameters shown on the plans refer to O.D. (outside dimension).

Casing pipe shall conform to ASTM A 252, Grade 2, for temporary and permanent applications. All casing, except permanent casing, shall be removed from drilled shaft excavations. Splices for permanent casing shall be welded in accordance with Section 407.04 of the VDOT Road and Bridge Specifications with no interior splice plates, producing a true and straight casing. All welding shall be in accordance with ANSI/AWS D1.1.

D. Crosshole Sonic Logging Tubes

Drilled shafts shall be equipped with access tubes for Crosshole Sonic Logging (CSL) tests at the locations shown in the plans and according to Section XV, of these Specifications. Access tubes for CSL testing shall be 2 inches I.D. schedule 40 steel pipe conforming to ASTM A 53, Grade A or B, Type E, F, or S. Pipes shall have a round, regular internal diameter, be free of defects or obstructions; including any defect at the pipe joints, to permit the free unobstructed passage of source and receiver probes. CSL probes should be 1.35 inches diameter or smaller and 6 to 10 inches long. Each tube or steel pipe shall be fitted with a watertight shoe onto the bottom and a removable cap at the top. Both, shoe and cap shall be watertight and free from corrosion, and the internal and external faces of the tubes clean to ensure passage of the probes and good bond with the concrete.

VII. CONSTRUCTION METHODS AND EQUIPMENT:

A. Protection of Existing Structures

All reasonable precautions shall be taken to prevent damage to existing structures and utilities in accordance with Sections 107.12 and 401.03 (g) of the VDOT Road and Bridge Specifications. These measures shall include but are not limited to, vibration monitoring and subsidence control during driving of casing, sheets, or drilling. See the Special Provision for Protection of Railway Interests for additional requirements.

B. Construction Sequence

The Contractor shall conduct one exploratory boring at each drilled shaft location to confirm the subsurface conditions prior to construction of the foundation. The depth of the test borings shall extend to rock, and the rock shall be continuously cored for at least 15 feet and be sampled in accordance with ASTM D2113. The borehole log for these borings shall be submitted as a part of the drilled shaft installation plan. The cost of exploratory borings shall be incidental to the cost of excavating the shaft.

Excavation to bottom of footing elevation and demolition of existing pier concrete shall be completed before shaft construction begins unless otherwise noted in the contract documents or approved by the City. Any disturbance to the footing area caused by shaft installation shall be repaired by the Contractor prior to the footing pour.

C. General Methods and Equipment

1. General

The method used for drilled shaft installation shall be suitable for the intended purpose and materials encountered. The dry method, wet method, temporary casing method, or permanent casing method may be used as necessary to produce a sound and durable foundation free of defects. When a particular installation method is required in the Contract, that construction method shall be used. If no particular method is specified for use, the Contractor shall select and use one of the construction methods cited above, appropriate for

the site conditions, to properly accomplish the work. The permanent casing method shall be used only when required in the Contract or authorized by the City. The Contractor shall submit his selected method of construction in the Drilled Shaft Installation Plan described in Section IV herein for approval.

Where soil and groundwater conditions vary along the site, a combination of methods may be used, as a single method of construction may be not appropriate for the entire job site. The Contractor may propose alternative methods of drilled shaft installation in his Drilled Shaft Installation Plan as appropriate, or a contingency plan to change installation method when new conditions are encountered.

2. Dry Construction Method

The dry construction method shall be used only at sites where the ground water level and soil and rock conditions are suitable to permit construction of the shaft in a relatively dry excavation, and where the sides and bottom of the shaft may be visually inspected by the City's representative prior to placing the concrete. The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation, placing the reinforcing cage, and concreting the shaft in a relatively dry excavation.

The dry construction method shall only be approved by the City when the trial shaft excavation demonstrates that: less 12 inches of water accumulates above the base over a one hour period when no pumping is permitted; the sides and bottom of the hole remain stable without detrimental caving, sloughing or swelling throughout the drilled shaft concrete elapsed time (as defined in Section VI. A. immediately following completion of excavation; and any loose material and water can be satisfactorily removed prior to inspection and prior to concrete placement. The Contractor shall use the wet construction method or the casing construction method for shafts that do not meet the above requirements for the dry construction method.

3. Wet Construction Method

The wet construction method may be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. This method consists of using water or slurry (mineral or polymer) to maintain stability of the borehole perimeter while advancing the excavation to final depth, placing the reinforcing cage, and concreting the shaft. Where drilled shafts are located in open water areas, exterior casings shall be extended from above the water elevation into the ground to protect the shaft concrete from water action during placement and curing of the concrete. The exterior casing shall be installed in a manner that will produce a positive seal at the bottom of the casing so that no piping of water or other materials occurs into or from the shaft excavation.

The wet construction method may be used in combination with the dry method and temporary or permanent casing methods. The wet method may involve desanding and cleaning the slurry (for mineral slurries); final cleaning of the excavation by means of a bailing bucket, air lift, submersible pump or other approved devices; and placing the shaft concrete with a tremie or concrete pump beginning at the shaft bottom. Temporary surface casings should be provided to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation, unless the Contractor demonstrates to the satisfaction of the City that the surface casing is not required. When using the wet method all drilled shaft operations shall be accomplished while maintaining at least 5 feet of positive head of fluid above the water table.

4. Temporary Casing Construction Method

The temporary casing method shall be used when the dry or wet construction methods are inadequate to prevent hole caving or excessive deformation of the hole. In this method the casing may be either placed in a predrilled hole or advanced through the ground by twisting, driving or vibration before being cleaned out.

When the casing is placed in a predrilled borehole and the temporary stability of the hole is needed, drilling slurry shall be used. The slurry that is trapped in the annular space behind the casing must be forced out of that space by the rising column of fluid concrete as the casing is being pulled. The slurry used to stabilize a borehole temporarily prior to the placement of casing must satisfy all of the criteria of drilling slurry for the wet method of construction.

5. Permanent Casing Construction Method

The permanent casing method shall be used to construct drilled shafts through weak caving soils that do not contribute significantly to the drilled shaft shear capacity only when required in the plans or approved by the City. In this method, before beginning the excavation, a permanent casing is installed to the projected depth by advancing it through the caving material by twisting, driving, or vibration. Unless specifically allowed by the plans, placement of permanent casing in an oversized hole or temporary casing outside the permanent casing beneath the ground surface will not be allowed. If full penetration of the permanent casing cannot be attained to the projected depth, excavate a selected depth inside the permanent casing, resume casing advancing, and repeat the process as necessary until the casing reaches the projected depth. Once the required elevation is reached, clean the excavation as indicated in XII of these specifications, lower the reinforcing cage, and concrete to completion.

VIII. EXCAVATION AND DRILLING EQUIPMENT:

The excavation and drilling equipment shall have adequate capacity, including power, torque and downthrust to excavate a hole of both the maximum diameter and to a depth of 20 percent beyond the depths shown on the plans or 15 feet whichever is greater.

The excavation and overreaming tools shall be of adequate design, size and strength to perform the work shown in the plans or described herein. When the material encountered cannot be drilled using conventional earth or rock augers and/or underreaming tools, the Contractor shall provide special drilling equipment, including but not limited to: rock core barrels, rock tools, air tools, and other equipment as necessary to construct the shaft excavation to the size and depth required. Blasting is not permitted to advance the excavation unless shown on the plans and specifications. Blasting for core removal will not be permitted.

The Contractor shall stabilize all drilled shaft excavations with steel casing and/or fluid above the portions of the excavations in rock. Stabilize excavations at all times from the beginning of drilling through concrete placement. Provide casing or slurry in rock if unstable material is anticipated or encountered during drilling. When slurry is not used, do not leave a partially excavated shaft open overnight unless the excavation is cased to rock.

For the purposes of this special provision, "Rock" is defined as a continuous intact natural material in which the penetration rate with a rock auger is less than 2 inches per 5 minutes of drilling using a drill rig capable of applying a minimum 35,000 pounds of down pressure (Crowd) while turning the auger for diameters equal to or less than 48 inches in diameter and at least 50,000 pounds of down pressure (Crowd) for augers greater than 48 inches in diameter. Rock augers shall be equipped with carbide teeth in good condition while performing this test. This definition excludes discontinuous loose natural materials such as boulders and man-made materials such as concrete, steel, timber, etc.

When slurry is used, the Contractor shall adjust the excavation operations so that the maximum time the slurry is in contact with the sidewalls of the uncased portions of the drilled shaft excavation (from time of drilling to completing concrete placement) does not exceed 24 hours. The slurry shall be agitated in the drilled shaft excavations a minimum of every 4 hours. If the 24 hour time limit is exceeded, overream the drilled shaft excavation a minimum of 1 inch and a maximum of 3 inches, or as required by the City, prior to performing other operations in the excavation. Overream with a grooving tool, overreaming bucket or other approved equipment at a minimum spacing of 12 inches. The Contractor bears all costs associated with both overreaming and additional shaft concrete placement at no additional cost to the City. If concrete placement is not completed within three days of beginning drilling, enlarge the design drilled shaft diameter by a minimum of 6 inches, or as required by the City, the entire length of the shaft at no additional cost to the City. Enlarging the drilled shaft includes replacing the steel casing with steel casing the same size to which the drilled shaft is enlarged at no additional cost to the City.

IX. EXCAVATIONS:

A. General

Shaft excavations shall be made at locations, shaft geometry, and dimensions shown in the contract documents. The Contractor shall extend drilled shaft tip (base) elevations when the City's representative determines that the material encountered during excavation is unsuitable and/or differs from that anticipated in the design of the drilled shaft.

The Contractor shall maintain a construction method log during shaft excavation. The information recorded shall be as indicated in the form provided by the City. For each drilled shaft installed, record on the form the location, dimensions, verticality, slurry test data, description of the materials encountered at all elevations, drilling time, elevation of the water table during excavation and seepage, description of any change in excavated material, elevation of top and bottom of the finished shaft, depth to the rock bearing stratum, condition of the bottom of the excavation or rock bearing surface, deviation from plan location, concrete data, a description of the tools and drill rigs used and any changes necessitated by changing ground conditions and other pertinent data to the drilled shaft operations. Submit a draft of this form for each completed drilled shaft within 24 hours of shaft completion. Report any unusual observation to the City's representative as soon as possible.

The Contractor shall provide areas for the disposal of unsuitable materials and excess materials removed from drilled shaft excavations and shall dispose them in accordance with applicable regulations.

The Contractor shall not permit any worker to enter the drilled shaft excavation for any reason unless: a suitable casing has been installed, the water level has been lowered and stabilized below the level to be occupied, and an adequate safety equipment and procedures have been provided to the personnel entering the excavation which includes OSHA certification for confined space entry.

B. Classified Excavation:

When designated in the contract documents, the Contractor shall perform classified excavation under the following excavation items.

1. Standard Excavation

Standard excavation is excavation accomplished with conventional rotary tools such as single or double-flight augers fitted with either soil or rock teeth, drilling buckets, and overreaming buckets attached to drilling equipment of the size, power, torque, and down thrust (crowd) approved for use by the Engineer after successful construction of a trial drilled shaft (if

required). Standard excavation also includes excavation that utilizes special tools and/or procedures that may be utilized by the contractor to facilitate excavation. For standard excavation, the penetration rate under full torque and down thrust (crowd) is greater than or equal to 2 inches in 5 continuous minutes of operation. The drill rig shall be in good condition and shall be capable of applying a minimum crowd of 35,000 pounds while turning the auger for diameters equal to or less than 48 inches, and at least 50,000 pounds of crowd for augers greater than 48 inches in diameter. Rock augers shall be equipped with carbide teeth in good condition.

2. Rock Socket

Rock Socket is an excavation that requires rock core barrels, shot barrels, churn drills, air tools and/or percussion drills to advance the excavation. Except when obstructions are encountered, rock socket will be paid below the depth where the approved drilling equipment described in "Standard Excavation" above, operating at maximum power, torque and down thrust (crowd), cannot advance the hole more than 2-inch in 5 minutes. Where Rock Sockets are specified by pay item and detailed on the plans, the Contractor shall provide a minimum penetration into rock as shown and as field adjusted by the Engineer.

C. Obstructions:

Surface and subsurface obstructions at drilled shaft locations shall be removed by the Contractor. Such obstructions may include, but are not limited to, man-made materials such as old concrete foundations and natural materials such as boulders. Special procedures and/or tools shall be employed by the Contractor after the hole cannot be advanced using conventional augers, drilling buckets and/or underreaming tools. Such special procedures/tools may include but are not limited to chisels, boulder breakers, core barrels, air tools, hand excavation, temporary casing, and increasing the hole diameter. Blasting shall not be permitted.

D. Lost Tools

Drilling tools that are lost in the excavation shall not be considered obstructions and shall be promptly removed by the Contractor without compensation. All costs due to lost tool removal shall be borne by the Contractor including, but not limited to, costs associated with the repair of hole degradation due to removal operations or an excessive time that the hole remains open.

X. CASINGS

Casings shall be steel, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified diameter of shaft, and the outside diameter of any excavation made below the casing shall not be less than the specified diameter of the shaft. No extra compensation will be allowed for concrete required to fill an oversized casing or oversized excavation. All casings, except permanent casings, shall be removed from shaft excavations. Any length of permanent casing installed below the shaft cutoff elevation, shall remain in place.

A. Temporary Casing

All subsurface casing shall be considered temporary unless specifically shown as permanent casing in the Contract. The Contractor shall be required to remove temporary casing before completion of concreting the drilled shaft. Telescoping, predrilling with slurry, and/or overreaming beyond the outside diameter of the casing may be required to install casing.

If the Contractor elects to remove a casing and substitute a longer or larger-diameter casing through caving soils, the excavation shall be either stabilized with slurry or backfilled before the new casing is installed. Other methods, as approved by the City, may be used to control the stability of the excavation and protect the integrity of the foundation materials.

Before the casing is withdrawn, the level of fresh concrete in the casing shall be a minimum of 10 feet above either the hydrostatic water level in the formation or the level of drilling fluid in the annular space behind the casing, whichever is higher. As the casing is withdrawn, care shall be exercised to maintain an adequate level of concrete within the casing so that fluid trapped behind the casing is displaced upward and discharged at the ground surface without contaminating or displacing the shaft concrete.

Temporary casings which become bound or fouled during shaft construction and cannot be practically removed shall constitute a defect in the drilled shaft. The Contractor shall be responsible to improve defective shafts to the satisfaction of the City. Such improvement may consist of, but is not limited to, removing the shaft concrete and extending the shaft deeper to compensate for loss of frictional capacity in the cased zone, providing straddle shafts to compensate for capacity loss, or providing a replacement shaft. All corrective measures including redesign of footings caused by defective shafts shall be done to the satisfaction of the City by the Contractor without either compensation or an extension of the completion date of the project. Additionally, no compensation will be paid for casing remaining in place.

B. Permanent Casing

Permanent casing shall be used when shown in the Contract. The casing shall be continuous between top and bottom elevations prescribed in the plans. After installation is complete, the permanent casing shall be cut off at the prescribed elevation and the shaft completed by installing necessary reinforcing steel and concrete in the casing.

In cases where special temporary casings are shown on the plans or authorized in writing to be used in conjunction with permanent casing, the Contractor shall maintain both alignment of the temporary casing with the permanent casing and a positive, watertight seal between the two casings during excavation and concreting operations.

XI. SLURRY:

Mineral or polymer slurries shall be employed when slurry is used in the drilling process unless other drilling fluids are approved by the City. Mineral slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the mineral suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement.

In locations with hard water or acidic groundwater, the slurry manufacturer shall measure the hardness, acidity, chloride and organic content of the mix water and groundwater and furnish for review and approval recommendations for modifications to the slurry that will ensure successful results in the conditions at the project site.

In locations or areas where saline or chemically contaminated ground water occurs, the use of attapulgite or sepiolite and/or additives instead of bentonite maybe needed. Furnish for review and approved recommendations for the type and modification to the proposed mineral slurry that will ensure successful results in the conditions at the project site.

During construction, the level of the slurry shall be maintained at a height sufficient to prevent caving of the hole. In the event of a sudden significant loss of slurry to the hole, the construction of that foundation shall be stopped until either a method to stop slurry loss or an alternate construction procedure has been approved by the City.

The level of mineral slurry in the shaft excavation shall be maintained at a level not less than 5 feet above the highest expected piezometric pressure head along the depth of the shaft, and the level of polymer slurry shall be maintained at a level not less than 6 feet above the highest expected piezometric pressure head along the shaft. It is anticipated that the highest piezometric pressure head is the static water elevation or the ground water elevation, however, the Contractor is responsible for determining the highest piezometric pressure head. If at any time the slurry construction method fails, to produce the desired final results, in the opinion of the City, the Contractor shall both discontinue this method and propose an alternate method for approval by the City.

A. Mineral Slurry

Mineral slurry shall be premixed thoroughly with clean fresh water with adequate time (as prescribed by the mineral manufacturer) allotted for hydration prior to introduction into the shaft excavation. Slurry tanks of adequate capacity will be required for slurry circulation, storage, and treatment. No excavated slurry pits will be allowed in lieu of slurry tanks without the written permission of the City. Desanding equipment shall be provided by the Contractor as necessary to control slurry sand content to less than 4 percent by volume at any point in the borehole at the time the slurry is introduced, including situations in which temporary casing will be used. The Contractor shall take all steps necessary to prevent the slurry from “setting up” in the shaft. Such methods may include but are not limited to agitation, circulation and/or adjusting the properties of the slurry. Disposal of all slurry shall be done off site in suitable areas by the Contractor.

It is the responsibility of the Contractor to maintain a stable suspension at all times and keep the stability of the excavation. The Contractor shall adjust the slurry properties as necessary to bring the slurry to specifications.

Property at 70°F (Units)	At the Time of Slurry Introduction in the Drilled Shaft	During Drilling and Before Concrete Placement in the Drilled Shaft	Test Method
Density in Fresh Water ^a (lb/ft ³)	63 to 69	64 to 75	Mud density balance API-13B-1, Section 1
Viscosity (sec per quart)	28 to 45	28 to 45	Marsh Cone Method API-13B-1, Section 22
pH	8 to 11	8 to 11	Electric pH meter or pH indicator paper strips
Sand Content ^b (%)	4% maximum	4% maximum	API-13B-1

- (a) Density values shall be increased by two pounds per cubic foot (lb/ft³) in salt water.
- (b) At time of concreting, sand content at any point in the drilled shaft excavation shall not exceed 4% (by volume); test for sand content as determined by the American Petroleum Institute.
- (c) Minimum mixing time shall be 10 minutes.
- (d) Storage time to allow for hydration shall be a minimum of 6 hours.

B. Polymer Slurry

If the Contractor proposes to use a polymer slurry, either natural or synthetic, it must be a product approved for use by the City. Mixing of polymer slurry in the borehole will not be permitted. Slurry properties at the time of mixing and at the time of concreting must be in conformance with the written recommendations of the manufacturer. However, whatever product is used, the sand

content at the base of the drilled shaft excavation shall not exceed 1 percent when measured by Method API 13B-1, Section 5, immediately prior to concreting.

The Contractor's slurry management plan shall include detailed provisions for controlling the quality of the slurry, including tests to be performed, the frequency of those tests, the test methods, and the maximum and/or minimum property requirements that must be met to ensure that the slurry meets its intended functions in the subsurface conditions at the construction site and with the construction methods that are to be used. The slurry management plan shall include a set of the slurry manufacturer's written recommendations.

Polymer slurry shall have the following properties:

Property at 70°F (Units)	At the Time of Slurry Introduction in the Drilled Shaft	During Drilling and Before Concrete Placement in the Drilled Shaft	Test Method
Density in Fresh Water ^a (lb/ft ³)	63 to 65	65 to 67	Mud density balance API-13B-1, Section 1
Viscosity (sec per quart)	50 maximum	50 maximum	Marsh Cone Method API-13B-1, Section 2.2
pH	8 to 10	8 to 10	Electric pH meter or pH indicator paper strips
Sand Content ^b (%)	0.3% maximum	1% maximum	API-13B-1

- (a) Density values shall be increased by two pounds per cubic foot (lb/ft³) in salt water.
- (b) At time of concreting, sand content at any point in the drilled shaft excavation shall not exceed 1% (by volume); test for sand content as determined by the American Petroleum Institute.
- (c) Minimum mixing time shall be 15 minutes.
- (d) Storage time to allow for hydration shall be minimum of 4 hours.

C. Water as Drill Fluid

If approved by the City, the Contractor may use only water as a drilling fluid. All of the provisions in the table shown in this section for mineral slurries shall be met, except that the maximum density shall not exceed 70 pcf.

D. Slurry Testing

Slurry testing shall include the following tests, as a minimum: Density test (API 13B-1, Section 1), viscosity test (Marsh funnel and cup, API-13B-1, Section 2.2 or approved viscometer), pH test (pH meter, litmus paper), and sand content test (API sand content kit, API 13B-1, Section 5).

Tests should be performed when the slurry temperature is above 40 degrees Fahrenheit.

Tests to determine density, viscosity and pH value shall be performed during the shaft excavation to establish a consistent working pattern. A minimum of four sets of tests shall be made during the first 8 hours of slurry use. When the results show consistent behavior, the testing frequency may be decreased to one set every four hours of slurry use.

The Contractor shall ensure that a heavily contaminated slurry suspension, which could impair the free flow of concrete, has not accumulated in the bottom of the shaft. Prior to placing concrete in any shaft excavation, the Contractor shall take slurry samples using a sampling tool approved by the City. Slurry samples shall be extracted from the base of the shaft and at

intervals not exceeding 10 feet up the slurry column in the shaft, until two consecutive samples produce acceptable values for density, viscosity, and pH.

When any slurry samples are found to be unacceptable, the Contractor shall take whatever action is necessary to bring the slurry within specifications requirements. Concrete shall not be poured until the slurry in the hole is re-sampled and tests results produce acceptable values.

Reports of all tests required above signed by an authorized representative of the Contractor, shall be furnished to the City on completion of each drilled shaft.

XII. EXCAVATION INSPECTION:

The Contractor shall provide equipment for checking the dimensions and alignment of each shaft excavation. The dimensions and alignment shall be determined by the Contractor under the direction of the City's representative. Final shaft depths shall be measured with a suitable weighted tape or other approved methods after final cleaning. Unless otherwise stated in the plans, a minimum of 50 per cent of the base of each shaft will have less than 1/2 inch of sediment at the time of placement of the concrete. The maximum depth of sediment or any debris at any place on the base of the shaft shall not exceed 1-1/2 inches. Shaft cleanliness will be determined by the City's representative, by visual inspection for dry shafts or other methods deemed appropriate by the City's representative for wet shafts.

For dry excavations, the maximum depth of water shall not exceed 3 inches prior to concrete pour.

For dry shafts, the sidewalls shall be visually free of cuttings that may have been smeared on the walls during the removal and insertion of drilling tools.

XIII. CONSTRUCTION TOLERANCES:

The following construction tolerances apply to drilled shafts unless otherwise stated in the Contract:

- (a) The center of the drilled shaft shall be within 3 inches of plan position in the horizontal plane at the plan elevation for the top of the shaft.
- (b) The vertical alignment of a vertical shaft excavation shall not vary from the plan alignment by more than 1 1/2% of the total length of the shaft.
- (c) After all the concrete is placed; the top of the reinforcing steel cage shall be no more than 6 inches above and no more than 3 inches below plan position.
- (d) The top elevation of the shaft shall have a tolerance of plus 1 inch or minus 3 inches from the plan top-of-shaft elevation.
- (e) Excavation equipment and methods shall be designed so that the completed shaft excavation will have a planar bottom. The cutting edges of excavation equipment shall be normal to the vertical axis of the equipment within a tolerance of $\pm 3/8$ inch per foot of diameter.

Drilled shaft excavations and completed shafts not constructed within the required tolerances are unacceptable. The Contractor shall be responsible for correcting all unacceptable shaft excavations and completed shafts to the satisfaction of the City. Materials and work necessary to complete corrections for out-of-tolerance drilled shaft excavations, including engineering analysis and redesign, shall be furnished without either cost to the City or an extension of the completion date of the project.

XIV. REINFORCING STEEL CAGE CONSTRUCTION AND PLACEMENT:

The reinforcing steel cage, consisting of longitudinal bars, ties, cage stiffener bars, spacers, centralizers, and other necessary appurtenances, shall be completely assembled and placed as a unit immediately after the shaft excavation is inspected and accepted, and prior to concrete placement. Internal stiffeners shall be removed as the cage is placed in the shaft so as not to interfere with the placement of concrete.

The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances given in Section XIII of this specification. Plastic spacing devices shall be used at sufficient intervals [near the bottom and at intervals not exceeding 10 feet up the shaft] to ensure concentric spacing for the entire cage length. Use a minimum of one spacer per 30 inches of circumference of the casing with a minimum of three at each layer. The spacers shall be of adequate dimension to provide the required clear cover between the outside of the reinforcing cage and the side of the excavated hole. Approved cylindrical feet (bottom supports) shall be provided to ensure that the bottom of the cage is maintained the proper distance above the base.

Hooks at the top of the reinforced steel cage shall not be bent outward if a temporary casing is to be used. Interior hooks must be designed to permit adequate clearance for the concrete tremie pipe or concrete pump (i.e. 10 inches minimum space). Hooks may be placed on dowels that may be rotated after concrete placement or casing removal and repositioned after the tremie or concrete pump is removed. The concrete must be fluid during dowel repositioning.

The elevation of the top of the steel cage shall be checked before and after the concrete is placed. If the upward displacement of the rebar cage exceeds 6 inches or if the downward displacement exceeds 3 inches, the drilled shaft will be considered defective. Corrections shall be made by the Contractor to the satisfaction of the City. No additional shafts shall be constructed until the Contractor has modified his rebar cage support in a manner satisfactory to the City's representative.

If the bottom of the constructed shaft elevation is lower than the bottom of the shaft elevation in the plans, a minimum of one half of the longitudinal bars required in the upper portion of the shaft shall be extended the additional length by adding longitudinal reinforcing bars at the bottom of the cage. Tie or spiral bars shall be continued for the extra depth and the stiffener bars shall be extended to the final depth. All longitudinal and transverse bars must be lap spliced or spliced with mechanical splices. Welding to the reinforcing steel will not be permitted unless specifically shown in either the plans or special provisions.

When concrete placement does not immediately follow cage placement, remove the steel from the excavation unless the City's representative directs otherwise. If the cage is removed, recheck excavation cleanliness in accordance with this special provision prior to reinstallation of the cage.

XV. INSTALLATION REQUIREMENTS FOR CSL INTEGRITY TESTS:

Drilled shafts shall be fitted with CSL test tubes to evaluate their integrity as indicated in this Special Provision. Install the access tubes or pipes as nearly parallel and far as possible from the longitudinal bars. The number of tubes to be installed per each drilled shaft diameter is as indicated in the table below:

<u>Drilled Shaft Diameter</u>	<u>Number of CSL Tubes</u>	<u>Tube Spacing^a</u>
3 ft to 5 ft	4 minimum	90 degrees
5.5 ft. to 7 ft	6 minimum	60 degrees
7.5 ft to 9 ft	8 minimum	45 degrees
Greater than 10 feet	10 minimum	36 degrees

(a) Spacing based on a central angle in degrees

The tubes shall be securely attached to the interior of the reinforcement cage with a minimum concrete cover of 3 inches, and they shall be wire-tied to the reinforcing cage every five feet to secure the tubes in position during placement of the reinforcing steel cage. In all cases the tubes shall be as near to vertical and parallel as possible. The Contractor shall install the tubes in the drilled shafts in a regular and symmetric pattern such that each tube is spaced a maximum distance possible from its adjacent tube and distributed around the drilled shaft perimeter as indicated by the central angle in the table above.

The tubes shall extend from the bottom of the drilled shaft to at least 3 feet above the top of the drilled shaft, or 2 feet above the ground surface for shafts with cut-offs below the ground surface. The tubes must be capped to prevent concrete or debris from entering during manipulation of the cage and concreting. Care must be taken during lifting and lowering the steel reinforcement so as not to damage the tubes. The CSL tubes shall be filled with clean water no later than 4 hours after concrete placement. Do not break the bond between the tube and the concrete by applying excessive torque, hammering, or other sort of stress while removing the caps or plugs from the pipes. For production shafts and upon completion of the CSL tests, remove all the water from the access tubes or drilled holes and fill with an approved grout. CSL testing procedures are found in Section XVII of these Specifications.

XVI. CONCRETE PLACEMENT:

A. General

Concrete placement shall be performed in accordance with the applicable portions of the general specifications on concrete materials in Section VI. A above and with the requirements herein.

Concrete shall be placed as soon as possible after reinforcing steel placement. Concrete placement shall be continuous from the bottom to the top elevation of the shaft. Concrete placement shall continue after the shaft excavation is filled until good quality concrete is evident at the top of shaft. Concrete shall be placed either by free fall or through a tremie or concrete pump. Free fall placement shall only be permitted in dry holes. Concrete placed by free fall shall fall directly to the base without contacting either the rebar cage or hole sidewall.

Subject to performance satisfactory to the City's representative in the construction of the trial shafts, concrete to be placed in dry shafts less than 5 feet in diameter may be placed by allowing the concrete to free fall up to 60 feet into the excavation; for shafts at least 5 feet in diameter the free fall distance may be increased to 100 feet. Drop chutes shall be used to direct concrete to the base during free fall placement.

The elapsed time from the beginning of concrete placement in the shaft to the completion of the placement shall not exceed 2-hours. Admixtures such as water reducers, plasticizers, and retarders shall not be used in the concrete mix unless permitted in the Contract or as approved by the City. All admixtures, when approved for use, shall be adjusted for the conditions encountered on the job. The Contractor may request a longer placement time provided he supplies a concrete mix that will maintain a minimum 4 inch slump throughout the drilled shaft concrete elapsed time in section VI. A as demonstrated by trial mix and slump loss tests.

During concrete placement the Contractor shall plot the theoretical and actual concrete volume curves on a pre-approved form.

Within the first 16 hours after a drilled shaft has achieved its initial concrete set (as determined by the City's representative), do not drill adjacent shafts or allow any equipment wheel loads or excessive vibrations to occur at any point within a 20 foot radius of the drilled shaft unless the

concrete has reached a strength of at least 1500 psi as determined by the Maturity Test Method in accordance with ASTM C 1074.

B. Tremies

Tremies may be used for concrete placement in either wet or dry holes. Tremies used to place concrete shall consist of a tube of sufficient length, weight, and diameter to discharge concrete at the shaft base elevation. The tremie shall not contain aluminum parts that will have contact with the concrete. The tremie inside diameter shall be at least 6 times the maximum size of aggregate used in the concrete mix but shall not be less than 10 inches. The inside and outside surfaces of the tremie shall be clean and smooth to permit both flow of concrete and unimpeded withdrawal during concreting. The wall thickness of the tremie shall be adequate to prevent crimping or sharp bends. Tremie pipe clamps shall not be placed below water or below an area where they cannot be observed or are inaccessible to personnel unless otherwise approved in writing.

The tremie used for wet excavation concrete placement shall be watertight. Underwater or under-slurry placement shall not begin until the tremie is placed to the shaft base elevation, and the concrete shall be kept completely separated from the water or slurry prior to the time it is discharged. Valves, bottom plates or plugs may be used for this purpose only if concrete discharge can begin within one tremie diameter of the base of the drilled shaft. Plugs shall either be removed from the excavation or be of a material which will not cause a defect in the shaft if not removed. The discharge end of the tremie shall be constructed to permit the free radial flow of concrete during placement operations. The tremie discharge end shall be immersed at least 7 feet in concrete at all times after starting the flow of concrete. The flow of the concrete shall be continuous. The level of the concrete in the tremie shall be maintained above the level of slurry or water in the borehole at all times to prevent water or slurry intrusion into the shaft concrete.

If at any time during the concrete pour, the tremie line orifice is removed from the fluid concrete column and discharges concrete above the rising concrete level, the shaft shall be considered defective. In such case, the Contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall removal and repour the shaft. All costs of replacement of defective shafts shall be the responsibility of the Contractor.

C. Pumped Concrete

Concrete pumps and lines may be used for concrete placement in either wet or dry excavations. All pump lines shall have a minimum 4 inch diameter and be constructed with watertight joints. Concrete placement shall not begin until the pump line discharge orifice is at the shaft base elevation. Pipe clamps or pipe welded shall not be below water or below an area where they cannot be observed or inaccessible to personnel unless otherwise approved in writing.

For wet excavations, a plug or similar device shall be used to separate the concrete from the fluid in the hole until pumping begins. The plug shall either be removed from the excavation or be of a material that will not cause a defect in the shaft if not removed.

The discharge orifice shall remain at least 7 feet below the surface of the fluid concrete. When lifting the pump line during concreting, the Contractor shall temporarily reduce the line pressure until the orifice has been repositioned at a higher level in the excavation.

If at any time during the concrete pour the pump line orifice is removed from the fluid concrete column and discharges concrete above the rising concrete level, the shaft shall be considered defective. In such case, the Contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall removal and repour the shaft. All costs of replacement of defective shafts shall be the responsibility of the Contractor.

D. Drop Chutes

Drop chutes shall be used to direct placement of free-fall concrete in excavations where the maximum depth of water does not exceed 3 inches. Free fall placement is not permitted in wet excavations. Drop chutes shall consist of a smooth tube of either one piece construction or sections that can be added and removed. A drop chute can also be a hopper with a short tube to direct the flow of concrete. Concrete may be placed through either the hopper at the top of the tube or side openings as the drop chute is retrieved during concrete placement. If concrete placement causes the shaft excavation to cave or slough, or if the concrete strikes the rebar cage or sidewall, the Contractor shall reduce the height of free fall and/or reduce the rate of concrete flow into the excavation. If caving or sloughing of the shaft walls occurs during free-fall placement of concrete, the shaft shall be considered defective. In such case, the Contractor shall remove the reinforcing cage and concrete, complete any necessary sidewall removal and repour the shaft. All costs of replacement of defective shafts shall be the responsibility of the Contractor. If concrete placement cannot be satisfactorily accomplished by free fall in the opinion of the City's representative, the Contractor shall use either tremie or pumping techniques to accomplish the pour.

XVII. NONDESTRUCTIVE EVALUATION:

A. General

Each completed drilled shaft shall be subjected to nondestructive tests to evaluate their structural integrity. The Contractor shall be responsible for performing and submitting reports of such tests to the City's representative in a timely manner. All testing shall be conducted after the concrete has cured for at least 48 hours. The Contractor shall employ a registered Professional Engineer registered in the Commonwealth of Virginia who has been qualified to perform, evaluate and report the tests. The report on the tests on any given shaft must be submitted to the City within 3 working days of the performance of the tests on that shaft. The City will evaluate and analyze the results and provide to the Contractor a response regarding the acceptability of the shaft that was tested within 3 working days of receipt of the test report.

The Contractor may continue to construct drilled shafts before the receipt of notice of acceptance of the tested shaft or shafts; however, if the tested shaft(s) are found by the City to be unacceptable, the Contractor shall be required to repair, at the Contractor's expense, the unacceptable shaft to the satisfaction of the City and (a) prove to the satisfaction of the City, at no expense to the City, the acceptability of all shafts constructed since the unacceptable shaft was constructed and the acceptability of the procedure to be used in constructing future shafts, or (b) cease all drilled shaft construction until a new construction procedure acceptable to the City has been proposed by the Contractor and accepted by the City. In the latter case, those drilled shafts constructed after the unacceptable shaft shall be repaired to the satisfaction of the City at the Contractor's expense. If any repair procedures or revisions to the Contractor's installation procedure are proposed by the Contractor, the Contractor shall submit a written plan to the City to repair defects and revise construction procedures. If these plans involve changes to the structural design of the shafts, shaft caps, or to the geometry of the shafts, any redesign proposed in the Contractor's plan to the City shall be performed at the Contractor's expense by a Professional Engineer registered in the Commonwealth of Virginia.

The City may require that additional shafts be tested. If the testing of the additional shaft(s) indicates the presence of a defect in any additional shaft, the testing cost for that shaft will be borne by the Contractor and the Contractor shall repair the shaft at the Contractor's expense, as above. City

B. Crosshole Sonic Logging CSL Test

1. General

Crosshole Sonic Logging, CSL, is a nondestructive testing, NDT, method that measures the time for an ultrasonic pulse to travel from a signal source inside an access tube to a receiver inside another access tube and evaluates the integrity of drilled shafts. In uniform, good quality concrete, the travel time between these equidistant tubes will be relatively constant from the bottom to the top of the drilled shafts and correspond to a reasonable concrete pulse velocity. In uniform, good quality concrete, the CSL test will also produce records with good signal amplitude and energy. Longer travel times and lower amplitude/energy signals indicate the presence of irregularities such as poor quality concrete, voids, honeycombs, or soil intrusions. The signal will be completely lost by the receiver and system recorder for more severe defects such as voids and soil intrusions.

The Contractor shall install access tubes intended for Crosshole Sonic Logging CSL testing and perform the test(s) as indicated in the plans, and in Sections IV and XV herein. When the Contractor is required to perform CSL tests in the Contract, he must only employ experienced personnel and engage the services of approved independent testing firm with previous experience in this sort of testing. The Contractor shall submit to the City for his approval the list of personnel and testing firms he intends to use during the CSL testing program along with their competence and field experience to perform evaluate, and report the results of CSL tests. The Contractor shall perform the CSL tests in the number and locations specified, and he shall execute the test after at least 48 hours of concrete curing to allow for curing of the concrete. The City may specify a longer curing time when retarders are used in the mix design, or other factors that may result in a slower rate of concrete setting. All CSL testing must be completed within forty five calendar days of concrete placement.

Prior to beginning the CSL test, the Contractor shall assure that the test probes can pass through and down the tubes to the bottom of every installed tube. If a tube is obstructed, the Contractor, at his expense, shall core a hole large enough to accommodate the probe through its full length in the drilled shaft and near the obstructed tube to the depth indicated in the plans for that CLS tube. Core equipment, procedure, and location of the hole shall be approved by the City prior to beginning coring. Logged results of the core drilling shall be submitted to the City along with the cores. The CSL test may commence after the core hole is inspected and the probes can pass through.

The Contractor is responsible for submission of the CSL test report to the City within 3 work days of its performance for a specific drilled shaft. The City will evaluate and analyze the CSL test results within 3 working days of their receipt and provide the Contractor with a response regarding the acceptability of the drilled shaft tested.

2. Equipment for the Crosshole Sonic Logging, CSL, Test

The CSL test equipment consists of the following components:

- a. A microprocessor-based CSL system or analyzer for display of individual CSL records, analog-digital conversion and recording of CSL data, analysis of receiver responses, and printing of CSL logs.
- b. Ultrasonic emitter and receiver probes for 2 inches I.D. pipe.
- c. An ultrasonic voltage pulse to excite the source with a synchronized triggering system to start the recording system.
- d. Winch, tripod and connecting cables.
- e. A depth measurement device to determine recorded depths.
- f. Appropriate filter/amplification and cable systems for CSL testing.

3. Logging Procedures for Crosshole Sonic Logging, CSL, Test

The test should proceed from the bottom to the top of the test tubes and in depth increments of about 3 inches to include the full depth of both tubes. Any slack shall be removed from the cables prior to pulling the probes providing accurate depth measurement records. Test a pair of perimeter and/or diagonal tubes, and include evaluation of the condition of the drilled shaft bottom. The source and receiver should be lifted simultaneously at a speed less than 1 ft per second, and a set of readings carefully taken at their corresponding depths. The CSL tests shall be carried out with the source and receiver probes in the same horizontal plane unless test results indicate potential anomalies/defects, in which case the questionable zone may be further evaluated with fan shape or angled tests (source and receiver are vertically offset inside the tubes). Equipment, procedure, and evaluation shall be adjusted to detect, locate, and assess the extent of any irregularity or void that appears in the path of the sonic pulse. Any anomalies/defects indicated by longer pulse arrival times and significantly lower amplitude/energy signals should be reported to the City's representative on site and any further tests shall be carried out as necessary to evaluate the extent of such anomalies/defects at no additional cost to the City.

Additional testing shall be conducted in the event anomalies should be detected or suspected during the test. Information of the drilled shaft bottom and top elevations, length, along with construction dates shall be provided to the testing organization before or at the time of the CSL tests. Levels will be taken on top of each tube, and actual tube plumbness and length be recorded. CLS tests shall be conducted between pairs of tubes, and the determination of which pairs to be tested made by the independent testing agency.

4. Reporting Results of the Crosshold Sonic Logging, CSL, Test

Results of CSL test shall be presented in a report including:

- a. A brief explanation of how the test was performed, the CSL logs, the analyses, and the test results of each drilled shaft.
- b. The arrangement of the tubes and their dimensions per drilled shaft tested.
- c. A Plan View of the CSL test locations in relation to the bridge foundation.
- d. Arrival time of acoustic pulse versus depth in each pair of tubes for every drilled shaft tested.
- e. Pulse energy/amplitude versus depth in each pair of tubes for every drilled shaft tested.
- f. A CSL log for each pair of tubes tested, and when applicable, with any anomaly/defect zones properly discussed. Any zone with long arrival times and low power relative to other zones should be considered anomalous.

XVIII. ACCEPTANCE OF DRILLED SHAFTS:

Acceptance of drilled shafts shall be based on meeting the requirements as set forth in the Contract Documents. Drilled shafts will not be acceptable if:

A. Based on Specifications

1. Drilled shafts are constructed disregarding any requirements of the Specifications or this Special Provision for Drilled Shaft.
2. Drilled shaft excavations are constructed out of tolerance. The Contractor shall correct completed drilled shaft to acceptable tolerances before proceeding with new drilled shaft construction and submit correction for the City 's approval.

3. When applicable, slurry out of tolerance, especially during late introduction into the drilled shaft and before concreting.
4. Cave-in of the drilled shaft walls due to improper use of casing or slurry; or failure to use weighting agents in the slurry in running groundwater.
5. Temporary casing that cannot be removed.
6. Horizontal separations or severe neck in the drilled shaft walls when pulling temporary casing with concrete adhering to it.
7. Failure to agitate slurry or to place concrete in a timely manner causing excessive build-up of mud cake on the wall of the excavation.
8. Horizontal sand lens in concrete produced by tremie or pump line pulled out of concrete when concreting under slurry or water.
9. Quarter-moon-shaped soil intrusion on the side of the drilled shaft created by interruption in flow of concrete being pumped or tremied into slurry-filled hole or use of telescoping casing where concrete from inner casing spills into the over break zone behind outer casing.
10. Soft or loose drilled shaft bottom caused by incomplete bottom cleaning, side sloughing, or sedimentation of cuttings from slurry column where base bearing is required.
11. Voids outside of the reinforcing steel cage when low slump concrete is introduced into the drilled shaft.
12. Honeycombing, washout of fines, or water channels in the concrete if concrete is placed directly into water.
13. Folded-in debris from insufficient cleaning of the drilled shaft excavation or excessive sand in the slurry.
14. Drilled shafts for which the mix design has been altered or extra water has been added without the approval of the City.
15. Drilled shaft constructed in such a manner that the drilled shaft cannot be completed within the required tolerances. The Contractor shall submit correction methods for the City's approval.

Final acceptance decision on whether repairs can or should be made or if the drilled shaft is rejected and must be replaced will be made by the City as necessary applying criteria set forth herein and sound engineering judgment on a drilled shaft by drilled shaft basis.

B. Based on the Cross Hole Sonic Logging (CSL) Tests

Rejection of a drilled shaft based on the drilled shaft cross hole sonic logging testing shall be conclusive evidence that a defect exists in the drilled shaft that will result in inadequate or unsafe performance of the drilled shaft under service loads. The acceptance of each drilled shaft shall be the decision of the City based on the results of the drilled shaft integrity testing report(s) and other information on the drilled shaft placement. If the CSL records are inconclusive, the City may require coring or excavation of the drilled shaft to verify drilled shaft conditions at no additional cost.

In the event testing discloses voids or discontinuities in the concrete which indicate that the drilled shaft is not structurally adequate, the drilled shaft shall be rejected, and construction of additional drilled shafts shall be suspended until the Contractor repairs, replaces or supplements the defective work, and the City approves the remedial work. The Contractor shall suspend drilled shaft construction until the City approves proposed changes to the methods of drilled shaft construction submitted in writing by the Contractor.

In the case that any drilled shaft is determined to be unacceptable, the Contractor shall submit a plan for remedial action to the City for approval. Any modifications to the foundation drilled shafts and load transfer mechanisms caused by the remedial action will require calculations and working drawings prepared by and stamped by a Professional Engineer, hired by the Contractor and registered in the Commonwealth of Virginia, for all foundation elements affected. The Contractor shall provide all labor and materials required to design and repair or remediate drilled shafts at no additional cost to the City and with no extension of the contract time.

The Contractor may continue to construct drilled shafts at his own risk before the receipt of notice of acceptance by the City of the previously tested drilled shafts or drilled shafts constructed by a modified means and method of construction; however, if the City finds the tested drilled shaft or drilled shafts to be unacceptable, the Contractor shall repair to the satisfaction of the City, at the Contractor's sole expense, the unacceptable drilled shafts and (a) prove to the satisfaction of the City, at no expense to the City, the acceptability of all drilled shafts constructed since the unacceptable drilled shaft was built and the acceptability of the procedure to be used in construction of future drilled shafts, or (b) cease all drilled shaft construction until a new construction procedure has been proposed by the Contractor and accepted by the City. In the latter case, drilled shafts built after the unacceptable drilled shaft shall be repaired at the Contractor's expense and to the satisfaction of the City.

XIX. METHOD OF MEASUREMENT:

A. Drilled Shaft Standard Excavation

The quantities to be paid shall be the length in feet of completed standard excavation of the diameter shown on the plans, exclusive of the linear feet of authorized rock socket, measured in linear feet along the centerline of shaft from the plan top of shaft elevation to the final authorized and accepted bottom of shaft elevation.

B. Drilled Shaft Rock Socket

The quantities to be paid shall be the length in feet of completed rock socket of the diameter shown on the plans measured in linear feet along the centerline of the shaft from the authorized elevation for measurements as rock socket to the final authorized and accepted bottom of shaft elevation.

For pay purposes, after an elevation is authorized for rock socket, earth seams, rock fragments and voids in the excavation less than 3 feet in total length will be considered rock socket. If the material excavated is discontinuous, payment will revert to standard excavation at the elevation where rock socket is no longer encountered.

C. Crosshole Sonic Logging (CSL) Testing

CSL testing will be measured per each shaft tested.

D. Permanent Steel Casing

The quantity of "Permanent Steel Casing" to be paid for will be the linear feet of permanent steel casing required to be used. The length to be paid for will be measured along the permanent casing from the top of the casing to the tip elevation shown on the plans or as directed by the City. Permanent casing will be paid for only when permanent casing is authorized or when the City directs the Contractor to leave a casing in place such that it becomes a permanent part of the shaft. No payment will be made for temporary steel casings that become bound or fouled during shaft construction and cannot be practically removed.

XX. BASIS OF PAYMENT:

A. Drilled Shaft Standard Excavation

Drilled Shafts Standard Excavation shall be paid for at the contract unit price per linear foot for drilled shafts of the diameter specified. Such payment shall be full compensation for excavating the shaft, for temporary casing or slurry as necessary, installing crosshole sonic logging tubes, concrete complete and in place, reinforcing steel and bar couplers, and furnishing all labor, tools, equipment, materials and incidentals necessary to complete the drilled shaft.

B. Drilled Shaft Rock Socket

Drilled Shaft Rock Socket shall be paid for at the contract unit price per linear foot for the diameter specified. Such payment shall be full compensation for excavating the shaft, for temporary casing or slurry as necessary, installing crosshole sonic logging tubes, concrete complete and in place, reinforcing steel and bar couplers, and furnishing all labor, tools, equipment, materials and incidentals necessary to complete the drilled shaft.

C. Crosshole Sonic Logging (CSL) Testing

CSL testing will be paid for at the contract unit price for each shaft tested. Such payment shall be full compensation for all costs related to the mobilization, installation, instrumentation, performance and documentation of the CSL tests.

D. Permanent Steel Casing

Payment will be made at the contract unit price per linear foot for "Permanent Steel Casing" Such payment will include, but is not limited to, furnishing all material, labor, tools, equipment and all incidentals necessary to install the casing in the shaft excavation.

Payment will be made under:

Pay Item	Pay Unit
Drilled Shaft Standard Excavation (48-inch diameter)	Linear Foot
Drilled Shaft Rock Socket (42-inch diameter)	Linear Foot
Crosshole Sonic Logging Testing	Each
Permanent Steel Casing	Linear Foot

SPECIAL PROVISION FOR ARCHITECTURAL TREATMENT

I. DESCRIPTION

This work shall consist of developing, furnishing and constructing textured concrete surfaces by means of concrete form liners in accordance with these specifications and in reasonably close conformity with the lines, patterns, textures, colors and dimensions shown on the plans.

Architectural treatment shall be chiseled limestone texture with a maximum relief of 1.75 inches and no individual stones or joint lines. Architectural treatment shall be used on the following concrete elements as indicated in the plans:

- Face of Retaining Wall AE
- Face of Retaining Wall AW
- Face of Abutment B Wingwalls

Any proposed aesthetic treatment other than that above shall be submitted to the City for review and approval. Information to be submitted for review shall include reasons for the recommended aesthetics and detailed description of aesthetics, including applicable material and/or manufacturer's specifications.

II. QUALITY ASSURANCE

The products shall be supplied by a manufacturer having a minimum of three consecutive years of experience in textured/colored concrete fabrication. The Contractor shall furnish evidence to the satisfaction of the Engineer that the proposed products have been successfully used in similar applications. The Engineer shall approve the pattern, color and texture of the sample walls prior to proceeding with the work.

III. MATERIALS

Form Liner: Form liner shall be a high quality re-usable product manufactured of high strength urethane which attaches easily to conventional forming systems and shall not compress more than 1/32".

Release Agent: The release agent shall be compatible with the form liner special surface finish and color system to be applied, if applicable.

Wall Ties: The wall ties shall have set break-backs at 2" minimum from the finished concrete surface.

Penetrating Sealer: Concrete surface coatings, if applicable, shall be from the VDOT current list of approved surface color coatings.

IV. CONSTRUCTION REQUIREMENTS

Representative shop drawings shall be provided for form liner patterns prior to beginning any work. Shop drawings shall indicate the layout of the finished patterns and shall be drawn at a scale sufficient to show the detail of the architectural treatment and patterns. Shop drawings shall indicate the specific form liner arrangement that correlates to the position that each form liner will be used on the proposed structure.

Shop drawings shall be submitted in accordance with Section 105.10 of the Specifications for review and approval. If necessary, the shop drawings shall be revised by the Contractor, at no additional expense, until the proposed form liner patterns and arrangement receive the approval of the City.

Once the representative shop drawings have been approved, the Contractor shall provide and erect on site, sample panels of the form liner patterns and coloration, which shall include a joint between two form liner panels. The size of the sample panels shall be 4' x 8' x 8" thick.

The form liners shall be capable of withstanding anticipated concrete pour pressures without leakage, causing physical or visual defects. The form liners shall be removable without causing concrete surface deterioration or weakness in the substrate. Form release agents, form stripping methods and patching materials, as well as related construction shall be mutually compatible with surface finish and concrete stain to be applied so as to produce an acceptable finished product.

Form liner butt joints shall be carefully blended into the approved pattern and finished off to the final concrete surface. Hand tooling of the finished surface may be required by the City, so that no visible vertical or horizontal seams or conspicuous form marks created by butt joining form liners will be evident.

Finished texture and pattern shall be continuous without visual disruption to the satisfaction of the Engineer.

Liquid curing compound shall not be used on concrete surfaces that are to receive penetrating color stain.

V. MEASUREMENT AND PAYMENT

Architectural Treatment will be paid for at the contract unit price per square yard, complete-in-place. This price shall include furnishing and installing all form liners, concrete, shop/working drawings, sample panels, developing and preparing working drawings, developing and furnishing of all form liners, constructing and finishing all sample panels, the services of the manufacturer's representative, applying the texture form liner finish, concrete to fill the form liners, sample panel removal and all materials, labor, equipment, tools, and incidentals to complete the work for architectural treatment.

Payment will be made under:

Pay Item	Pay Unit
Architectural Treatment	Square Yard

I. DESCRIPTION

This work shall consist of furnishing and applying concrete surface color coating in accordance with this provision and in conformity with the details and locations indicated on the plans. The color of the coating shall be light grey.

II. MATERIALS

Concrete surface color coating shall be TEX-COTE XL 70 or alternative approved by the City.

III. DETAILED REQUIREMENTS

Except as otherwise specified on the plans, the concrete surface color coating shall be applied to the following surfaces of the bridge structure:

- A. All surfaces of concrete railing, the edge of deck slab and the underside of the bridge deck overhangs from the deck edge to the steel girder.
- B. Pier walls from 6 inches below finished grade to the upper limits of the pier caps but excluding the top of the cap.
- C. Exposed surfaces of abutment walls from 6 inches below finished grade to and including the top of the wingwall, excluding bridge seats and portion of back wall between limits of exterior structural members.
- D. Exposed surfaces of retaining walls without architectural texture.

Concrete surface color coating shall be applied to exposed surfaces of other concrete structures as specified on the plans. Finish color shall be light grey. Contractor shall submit physical color samples to the City for approval prior to ordering materials.

The concrete surface color coating shall be applied in accordance with the manufacturer's recommendations. Application to concrete railing shall be by spray equipment to achieve a smooth finish. Application to other areas may be by roller or spray equipment. The concrete surface color coating shall not be applied until all concrete placement operations for the particular structure have been completed. The concrete surface shall be clean, free of any curing agents, form release agents, foreign substances or signs of efflorescence at the time of application.

All work shall be performed by experienced workmen familiar with concrete finishing work and with the materials specified. Surfaces not to be treated shall be protected from splatter.

Materials shall be delivered to the job site in sealed containers bearing the manufacturer's labels. Materials shall be mixed and applied in accordance with the manufacturer's printed instructions of which two copies shall be furnished the Engineer.

IV. MEASUREMENT AND PAYMENT

Concrete Surface Color Coating will be paid for on a lump sum basis wherein no other measurement will be made and will be paid for at the contract lump sum price which price shall be full compensation for preparation of surfaces and for applying coating.

Payment will be made under:

Pay Item	Pay Unit
Concrete Surface Color Coating	Lump Sum

SPECIAL PROVISION FOR PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

- A. Section includes architectural precast concrete cladding and load-bearing units for pylons.

1.3 DEFINITIONS

- A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by the Owner.

1.4 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at location to be determined by the Owner.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.
- C. Shop Drawings:
 - 1. Detail fabrication and installation of architectural precast concrete units.
 - 2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.
 - 3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
 - 4. Indicate type, size, and length of welded connections by AWS standard symbols. Detail loose and cast-in hardware and connections.
 - 5. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
 - 6. Indicate locations, extent, and treatment of dry joints if two-stage casting is proposed.
 - 7. Include plans and elevations showing unit location and sequence of erection for special conditions.

8. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.
 9. Indicate relationship of architectural precast concrete units to adjacent materials.
 10. Indicate locations, dimensions, and details of facings, anchors, and joint widths.
 11. If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
- D. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches. When other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.
- E. Delegated-Design Submittal: For architectural precast concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Show governing panel types, connections, types of reinforcement, including special reinforcement, and concrete cover on reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from architectural precast concrete.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator
- B. Material certificates.
- C. Material Test Reports: For aggregates.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A precast concrete erector qualified and designated by PCI's Certificate of Compliance to erect Category A (Architectural Systems) for non-load-bearing members.
- B. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 1. Designated as a PCI-certified plant for Group A, Category A1 - Architectural Cladding and Load Bearing Units or designated as an APA-certified plant for production of architectural precast concrete products.
- C. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units

required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D.1.1M, "Structural Welding Code - Steel"; and AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."
- E. Sample Panels: After sample approval and before fabricating architectural precast concrete units, produce a minimum of two sample panels of the type noted below for review by the Owner. Incorporate full-scale details of architectural features, finishes, joints, textures, and transitions in sample panels.
 - a. one face of a pylon lower section
 - b. one corner of the upper section

1.8 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation. Coordinate with cast-in-place concrete elements and with electrical conduits and lighting details.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground or other re-handling.
- B. Support units during shipment on non-staining shock-absorbing material.
- C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
- D. Place stored units so identification marks are clearly visible, and units can be inspected.
- E. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.
- F. Lift and support units only at designated points indicated on Shop Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design architectural precast concrete units.

- B. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.
- C. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated.
 - 1. Dead Loads: Self weight
 - 2. Wind Loads: 40 psf in any feasible direction
 - 3. Pedestrian Loads: concentrated load of 200 pounds in any direction

2.2 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that provides continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.
 - 1. Mold-Release Agent: Commercially produced form-release agent that does not bond with, stain or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.
- B. Form Liners: Use with manufacturer's recommended form-release agent that does not bond with, stain, or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.
- C. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete mixture to depth of reveal specified.

2.3 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A185, fabricated from galvanized-steel wire into flat sheets.
- C. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.
 - 1. For surfaces exposed to view in finished structure, use gray or white cement, of same type, brand, and mill source.

- B. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33/C 33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
 - 1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.
 - 2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand compatible with coarse aggregate; to match approved finish sample.
- C. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.
- D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.

2.5 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.
- B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or Type B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.
- C. High-Strength, Low-Alloy Structural Steel: ASTM A 572/A 572M.
- D. Carbon-Steel Structural Tubing: ASTM A 500/A 500M, Grade B or Grade C.
- E. High-Strength Bolts and Nuts: ASTM A 325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563; and hardened carbon-steel washers, ASTM F 436.
- F. Zinc-Coated Finish: For exterior steel items and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123 or ASTM A 153. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035B or SSPC-Paint 20

2.6 STAINLESS-STEEL CONNECTION MATERIALS

- A. Stainless-Steel Plate: ASTM A 666, Type 304, Type 316, or Type 201.
- B. Stainless-Steel Bolts and Studs: ASTM F 593, Alloy Group 1 or 2 hex-head bolts and studs; ASTM F 594, Alloy Group 1 or 2 stainless-steel nuts; and flat, stainless-steel washers.
 - 1. Lubricate threaded parts of stainless-steel bolts with an antiseize thread lubricant during assembly.
- C. Stainless-Steel-Headed Studs: ASTM A 276, Alloy 304 or Alloy 316, with minimum mechanical properties of PCI MNL 117, Table 3.2.3.

2.7 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C 150/C 150M, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.
- B. Nonmetallic, Nonshrink Grout: Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, Grades B and C and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.
- C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881/C 881M, of type, grade, and class to suit requirements.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
- B. Limit use of fly ash and ground granulated blast-furnace slag to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.
- C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.
- D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.
- E. Normal-Weight Concrete Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 5000 psi minimum.
 - 2. Maximum water-Cementitious Materials Ratio: 0.45
- F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to ASTM C 642, except for boiling requirement.
- G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.
- H. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.9 MOLD FABRICATION

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement by release agent.
 - 1. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during concrete placement. Coat form liner with form-release agent.
- B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
 - 1. Form joints are not permitted on faces exposed to view in the finished work.
 - 2. Edge and Corner Treatment: Uniformly chamfered or as indicated.

2.10 FABRICATION

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
 - 1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.
- C. Cast-in slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings. Cast openings rather than drilling or cutting, unless otherwise approved in writing by the Owner.
- D. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement. Completely conceal support devices to prevent exposure on finished surfaces.
- E. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses and specified in-place loads.
- F. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.
- G. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.
- H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 117.
1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants." Ensure adequate bond between face and backup concrete, if used.
- I. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.
- J. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that does not show in finished structure.
- K. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- L. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Owner's approval.

2.11 FABRICATION TOLERANCES

- A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

2.12 FINISHES

- A. Exposed faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved sample panels and as follows:
1. Acid-Etched Finish: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attack.
- B. Finish exposed top and back surfaces of architectural precast concrete units to match face-surface finish.

- C. Finish unexposed surfaces of architectural precast concrete units with as cast finish.

2.13 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, ASTM C 1610/C 1610M, ASTM C 1611/C 1611M, ASTM C 1621/C 1621M, and ASTM C 1712.
- B. Owner will employ an independent testing agency to evaluate architectural precast concrete fabricator's quality-control and testing methods.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine supporting structural conditions and members for compliance with requirements for installation tolerances, elevations, bearing surface tolerances, and other conditions affecting performance of the Work.
- B. Do not install precast units until supporting cast-in-place concrete has attained minimum allowable design compressive strength.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.
- E. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.
 - 1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses. Install temporary steel or plastic shims as precast concrete units are being erected.
 - 2. Unless otherwise indicated, maintain uniform joint widths of 1/2 inch.
- F. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
- G. Welding: Comply with applicable requirements in AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work. Clean weld-affected areas and apply a minimum 4.0-mil thick coat of galvanized repair paint to galvanized surfaces.
- H. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment. For bolting requirements, see VDOT Road and Bridge specifications.

- I. Grouting Connections and Joints: Grout connections where required or indicated. Retain flowable grout in place until hard enough to support itself. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for not less than 24 hours after initial set.

3.2 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.3 FIELD QUALITY CONTROL

- A. Owner will engage a qualified special inspector to perform inspection of precast concrete members.
- B. Testing agency will report test results promptly and in writing to Contractor and Owner.
- C. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

3.4 REPAIRS

- A. Repair architectural precast concrete units if permitted by Owner. Owner reserves the right to reject repaired units that do not comply with requirements.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780/A 780M.
- D. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.5 CLEANING

- A. Clean surfaces of precast concrete units exposed to view.
- B. Clean mortar, plaster, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
 - 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.
 - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

SPECIAL PROVISION FOR DECORATIVE METAL PANELS

PART 1 GENERAL

1.1 Section Includes

- A. Decorative metal panels with a translucent light diffusing panel backing.

1.2 Related Sections

- A. Special Provisions for Precast Architectural Concrete.

1.3 References

- A. ASTM A 36 - Carbon Structural Steel.
- B. ASTM E488 - Standard Test Methods for Strength of Anchors in Concrete Elements
- C. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- D. ASTM F594 - Standard Specification for Stainless Steel Nuts

1.4 Submittals

- A. Product Data: Submit manufacturer's product data for materials to be incorporated.
- B. Fabricator qualifications: Submit list of project completed by the fabricator in the last three years of similar scope, including contact information from references. Owner will review and approve the fabricator.
- C. Design drawings showing how the design intent shown in the contract plans will be developed in the metal panels.
- D. Mock-up Samples: Submit samples of proposed coatings on metal panels a minimum of 36 square inches in size. Provide one for each color option available or proposed. Samples shall illustrate workmanship, color, and texture of proposed panels.
- E. Shop Drawings: Submit manufacturer's shop drawings, indicating materials, dimensions, welding, fasteners, hardware, mounting, finish, attachment of diffuser, and accessories.
- F. Sample Panels: After approval of design drawings, shop drawings, mock-up samples and before fabricating metal panels, produce one full size panel for review by Owner. Incorporate full-scale details of architectural features, finishes, joints, textures, and transitions in sample panels.
- G. Installation Instructions: As prepared by the fabricator.

1.5 Delivery, Storage and Handling

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation.
- B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions. Keep temporary protective coverings in place. Protect materials and finish from damage during handling and installation.

PART 2 PRODUCTS

2.1 Manufacturer

- A. Fabricator Qualifications: A firm experienced in producing decorative metal articles similar to that indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

2.2 Performance Requirements

- A. Delegated Design: Engage a qualified professional engineer to design decorative metal panels.
- B. Structural Performance: Provide decorative metal panels and connections capable of withstanding the following design loads.
 - 1. Dead Loads: Self weight
 - 2. Pedestrian Loads: concentrated load of 300 normal to the panel, applied at the bottom edge

2.3 Materials

- A. Panels: Metal panels shall be steel conform to ASTM A 36. Minimum thickness shall be ¼ inch. Panel edges shall be stiffened by continuous uncut plate or attached structural members.
- B. Finish: Provide two-coat powder coat finish with a zinc rich primer and a super durable TGIC polyester thermoset topcoat. The topcoat color shall be as specified on plans. Coating shall be resistant to abrasion, humidity and corrosion in exterior applications. It shall be anti-graffiti, scratch resistant and non-combustible.
- C. Light diffusing panel backing: Panels shall be polycarbonate sheet conforming to ASTM C 1349, Appendix X1, Type I (standard, UV stabilized) or approved equal. Nominal thickness shall be ¼-inch minimum. Visible light transmittance of not more than 50 percent when measured according to ASTM D 1003.
- D. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. Anchors in cast-in-place concrete shall be capable of sustaining, without failure, a load equal to four times the design load, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 2. Conceal fasteners for interconnecting components and for attaching decorative metal panels to other work to the greatest extent possible. Provide tamper-proof fasteners for exposed fasteners unless otherwise indicated.
 - 3. Fasteners shall be stainless steel, Type 304. Bolts, nuts, and washers shall conform to the requirements of ASTM F 593 and F 594.

PART 3 EXECUTION

3.1 Fabrication

- A. Decorative metal panels shall be cut from a solid sheet of metal using computer-controlled equipment, to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and planes.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and sharp or rough areas on exposed surfaces.
- C. Grind smooth and polish exposed metal edges and corners.
- D. Provide necessary lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as needed to receive finish hardware, screws, and similar items unless otherwise indicated.
- E. Comply with AWS for recommended practices in shop welding. Clean exposed welded joints of flux, and dress exposed and contact surfaces prior to coating.
- F. Fabricated panels shall be shot blasted prior to coating.

3.2 Installation

- A. Examine pylons prior to installation of metal panels. Provide notice of conditions that would adversely affect installation or subsequent performance of the panels. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Install panels in accordance with manufacturer's instructions at locations indicated on the drawings.
- C. Coordinate installation of anchorages for decorative metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation. Field-drilling of holes in metal work will not be allowed.
- D. Install panels level, plumb, square, accurately aligned, correctly located, and without warp.
- C. Use hardware and fasteners in accordance with manufacturer's instructions.
- D. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Owner.
- E. Remove and replace damaged components that cannot be successfully repaired as determined by Owner.
- F. Provide anchorage devices and fasteners where needed to secure decorative metal to in-place construction.
- G. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
- H. Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location. Retain protective coverings intact; remove coverings simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.

3.3 Cleaning

- A. Clean panels in accordance with manufacturer's instructions. Do not use harsh cleaning materials or methods that would damage finish.
- B. Protect installed panels from damage during construction.

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
WAVE EQUATION ANALYSIS

SECTION 403.06 (d) 1 of the Specifications is replaced by the following:

Pile driving equipment furnishing by the Contractor shall be subject to the approval of the Engineer.

Prior to driving test piles, the Contractor shall furnish the Engineer the following information pertaining to the proposed pile driving equipment:

At each driving test location, where different subsurface conditions exist, the Contractor shall furnish a Wave Equation Analysis of pile driving performed by a Professional Engineer experienced in such work, demonstrating that the piles can be driven with reasonable effort to the required penetration, length and capacity without damage. This analysis shall include copies of computer input and output sheets and graphs showing soil resistance versus blow count as well as maximum tensile and compressive stresses versus blow count. Analyses shall be run at the estimated tip elevation as well as other higher elevations to define maximum stress levels in the pile during driving or a drivability analysis can be performed.

The Contractor shall use a hammer of suitable size and type for the indicated pile and subsurface conditions at the structure site. Unless documentation supporting other values can be provided, the following hammer efficiencies shall be used in a wave equation analysis:

<u>Hammer Type</u>	<u>Efficiency in Percent</u>
Single acting air/steam	67
Double acting air/steam	50
Diesel	80
Hydraulic	90

The criteria which the Engineer will use to evaluate the driving equipment will include both the required number of hammer blows per inch and the pile stresses at the required Nominal Pile Resistance as measured during driving. The required number of hammer blows indicated by calculations at the required Nominal Pile Resistance as measured during driving shall be a maximum of 6 per inch for the driving equipment to be acceptable and shall be on the rising (or linear) portion of the resistance versus blow count curve.

Should the Wave Equation Analysis indicate the possibility of excessive driving stresses, the Contractor shall submit to the Engineer proposed corrective measures (modification of hammer stroke or other appropriate action) for approval.

Soil setup (pile freeze effect) may be considered when establishing initial driving criteria. If soil setup is considered, two wave equation analyses, one modeling the end of initial drive conditions and the second modeling the beginning of restrike conditions, must be performed. In lieu of performing the two additional wave equation analyses, a pile drivability analysis may be performed when considering soil setup. However, hammers requiring the consideration of soil setup for approval may require restrikes of the driving test piles, at the Contractors expense, for verification purposes.

Contractor notification of acceptance or rejection of pile driving equipment will be made within 20 days of receipt of the data form and Wave Equation Analysis.

After the driving test piles have been installed, if initial parameters selected are judged to be inappropriate, the Contractor may be required to submit a refined wave equation analysis along with the

pile order list. The refined analysis shall include any modifications or changes deemed appropriate from the results of any Dynamic Pile Testing and/or pile load test that are required to be performed.

The Engineer will determine driving resistance criteria and/or minimum tip elevations to be used for production piles from the above information.

During production pile driving operations, the Contractor shall use the approved system. Any change in the driving system will only be considered after the Contractor has submitted revised pile driving equipment data and wave equation analysis.

Approval of pile driving equipment shall not relieve the Contractor of the responsibility to drive piles, free of damage, to the bearing and tip elevation shown on the plans, specified in the special provisions, or mandated by the Engineer. In addition, approval of pile driving equipment relative to driving stress damage shall not relieve the Contractor of responsibility for piles damaged because of misalignment of the leads, failure of capblock or cushion material, failure of splices, malfunctioning of the pile hammer, or other improper construction methods.

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
CG-12 DETECTABLE WARNING SURFACE

I. DESCRIPTION

This work shall consist of providing all labor, tools, equipment, and materials required to furnish and install detectable warning surfaces in the location(s) specified on the plans or in the proposal. The Contractor shall perform the work according to the details shown on the plans or in this special provision, Section 504 of the Specifications, and as directed by the City.

II. MATERIALS

Materials shall conform to the requirements of Section 504 of the Specifications.

Permanent, durable materials suitable for heavy traffic outdoor areas or concrete pavers approved by the City may be used to construct the detectable warning surfaces where called for in the plans and other contract documents. Concrete paver units shall conform to the current ASTM C936 specifications and the details and requirements shown in the plans. Other durable materials shall be in accordance with City approved manufacturer's design and specification requirements.

Products not on the VDOT Materials Approved Product list shall be submitted to the City for approval prior to use.

All detectable warning surfaces shall meet the ADA Standards as set forth by the United States Access Board.

The detectable warning shall be "brick red" unless otherwise noted in the plans or directed by the City.

III. PROCEDURES

Construct sidewalk curb ramps according to Section 504 of the Specifications except for detectable warning/truncated domes that shall be furnished or constructed in accordance with the details in this specification, the manufacturer's recommendations, the Standard Drawings and the Plans. Where brick banding is adjacent to curb ramps, it shall be continued to the limits of detectable warning surface.

All permanent installations of detectable warning surfaces shall be "wet set" in freshly placed concrete.

Surface mounted detectable warning surfaces are permitted only for temporary installations where the detectable warning will be in service 6 months or less.

The Contractor shall provide the City with the manufacturers installation instructions.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 515—PLANING OR MILLING PAVEMENT**

SECTION 515—PLANING PAVEMENT of the Specifications is completely replaced with the following:

SECTION 515—PLANING OR MILLING PAVEMENT**515.01—Description**

This work shall consist of planing (milling) of rigid or flexible pavement to the designated depth specified in the plans or other Contract documents in preparation for pavement repair or pavement overlay. For the purposes of this section, rigid pavement shall mean hydraulic cement concrete pavement or hydraulic cement concrete surfaced pavements. Flexible pavement shall mean asphalt concrete or asphalt concrete surface pavements. Planing as used herein is also referred to as milling or grinding. Milled cuttings shall be removed and disposed of by the Contractor in accordance with the requirements of Section 106.04 of the Specifications or used in the work if permitted in the Contract or directed by the City.

515.02—Equipment

Planing shall be performed with a pavement planing or pavement grinding machine of a type that has operated successfully on work comparable to that specified in the Contract. Milling and cold planing equipment shall be capable of accurately cutting to the length, width, depth and typical section specified in the Contract in flexible pavement or rigid pavement while leaving a uniformly cut or ground roadway surface capable of handling traffic prior to overlay placement. The milling equipment shall not damage the underlying pavement surface. The milling machine shall be equipped with an automatic grade control system that will control the longitudinal profile and cross slope of the existing pavement milled surface as the milling operations proceed. The ground speeds of the machine and the cutting equipment shall be independent. The machine shall have a self-contained water system for the control of dust and fine particles. The width of the machine shall allow for the passage of controlled public traffic while in use. The machine shall have a dust collection system or have a system to minimize dust created by the planing (milling) operation from escaping into the atmosphere.

The Contractor shall continuously monitor the cutting or grinding head of the machine so as to ensure and maintain the creation of a uniformly textured milled surface. Equipment and vehicles in use under traffic shall be equipped according to the requirements of the Work Area Protection Manual.

515.03—Procedures

Limitations of operations for planing operations shall be in accordance with the requirements of Section 108.02 of the Specifications and as specified in the Contract.

The Contractor may perform either regular planing or performance based planing at his option unless otherwise specified in the Contract. Unless otherwise directed by the City, the finished surface for regular pavement planing and performance planing shall have a tolerance of plus or minus 1/4 inch per foot between any two contacts of the resultant surface and the testing edge of a 10-foot straightedge.

No application of pavement overlay shall decrease the vertical clearance under a bridge. In situations where the existing pavement under the overpass cannot be planed in direct proportion to the proposed overlay, the new pavement is to be tied down to the existing pavement under the

overpass no less than 75 feet from the outer edges of the overpass in accordance with Standards.

The finished surface macrotexture for performance planing shall have a pavement macrotexture MTD (mean texture depth) of less than 2.0 millimeters. Testing for performance pavement planing shall be as described hereinafter.

Irregularities and high spots of existing pavement shall be eliminated. The pavement surface shall be milled, ground or planed to the designated grade or gradient as specified on the plans, or where not specified as a grade, shall parallel that of the existing roadway. Transversely, the cross slopes of tangent sections shall be planed to approximately 1/4 inch per foot or as directed by the City. Superelevated curves shall be planed as directed by the City. Where the pavement is to be resurfaced by means of the application of an overlay on curb and gutter roadways, a 1-inch shoulder shall be cut along the gutter line to eliminate the necessity of feathering the edge of the new surface. Payment for providing the 1-inch shoulder shall be based on the total square yards of removed material regardless of the variable depth of the pass.

The finished planed surface shall be true to grade, free from gouges, grooves, ridges, soot, oil film, and other imperfections and shall have a uniformly textured appearance suitable as a temporary riding surface.

Humps and depressions that exceed the specified tolerances and require additional grinding or planing will be subject to correction or replacement as directed by the City at no additional cost to the City.

The Contractor shall ensure positive drainage is provided for all planed surfaces in accordance with the requirements of Section 315.05(c) of the Specifications. When planing curb and gutter sections the Contractor shall endeavor to work with existing drainage and grades to maintain positive flow. In the event of significant buildup of standing water, the Contractor may be required to erect signage to warn motorists, sweep the roadway to vacate the water, or in extreme cases, close the lane to traffic until proper drainage of the planed surface can be restored.

Temporary transverse pavement-wedge tie-ins shall be constructed where planed existing pavement is to remain temporarily without overlay to the extent allowed or required herein, in Section 315 of the Specifications, elsewhere in the Contract documents, or by the City. Each tie-in shall be constructed no less than 3 feet in length for every inch of depth of pavement planing performed and shall consist of a mix that is suitable for a riding surface that provides a smooth transition between planed existing pavement and existing pavement or bridge decks. Such tie-ins shall be constructed prior to the planed surface being opened to traffic.

When planing to a depth of 2 inches or less at a bridge, the planed (milled) surface at the bridge may be left unpaved for up to 10 days.

Additional or other limitations and conditions to planing operations will be as specified and applicable to the Contract.

515.04—Performance Pavement Planing Testing

This section gives testing procedures and criteria for opening a section of performance planed pavement to public traffic on roadways with posted speed limits of 55 mph or greater as specified herein. The test procedure performed by the Contractor shall measure the mean texture depth (MTD) of the resultant macrotexture surface after performance planing operations have been completed. The measurement for performance planed surface texture shall be conducted in accordance with the requirements of ASTM E965 using a volumetric technique. The Contractor shall randomly select 10 locations at each site. Each individual location shall be tested and the average MTD of the entire 10 locations per site determined. Prior to opening a lane or roadway to traffic the average MTD of the performance planed site shall be less than 2.0 millimeters and

the upper limit for any one MTD measurement shall not exceed 3.10 millimeters in order for that site to be exposed to traffic.

515.05—Measurement and Payment

Where pavement is to be planed to a uniform depth, planing will be measured in square yards of removed pavement of the surface area to the depth(s) specified in the contract documents. The City may direct the depth to be adjusted during the initial pass $\pm \frac{1}{2}$ inch due to field conditions at no additional cost, except where such adjustment constitutes a changed condition as explained herein. The planed area is defined as the actual length and width of the planed pavement surface visually verified and accepted by the City for payment. If scabbing or laminations still exist after planing to the maximum potential depth of the initial pass, the City may direct the Contractor to perform additional passes or to increase the depth beyond the maximum potential depth of the initial pass. Such additional passes or increased depth beyond the maximum potential depth of the initial pass will also be measured and paid for in square yards for the depth authorized by the City. Such additional depth passes (beyond the maximum potential depth of the original pass) will not be adjusted, as in averaging or as a percentage of original depth or maximum potential depth of the initial pass, to achieve final measurement or payment. In the event the authorized adjustment of the $\frac{1}{2}$ inch for field conditions by the City changes the requirements of the “square up” provisions (in excess of 2 inches), this will be considered a changed condition in accordance with the provisions of Section 104.02 of the Specifications.

Where planing is variable depth and used to tie into existing structures such as curbs and combination curb and gutters and at bridges, except in cases as mentioned below, such tie-in planing will be measured in square yards of removed pavement for the full surface area (the actual length and width of the planed pavement surface visually verified and accepted by the City for payment) within the range of depth specified in the contract documents. **Note:** The City may direct the depth to be adjusted during the initial pass $\pm \frac{1}{2}$ inch of the specified depth due to field conditions such as scabbing or delamination at no additional cost, except where such adjustment constitutes a changed condition as explained herein.

If scabbing or laminations still exist after planing to the maximum potential depth of the initial tie-in planing pass, the City may direct the Contractor to perform additional passes or to increase the depth beyond the maximum potential depth of the initial **pass**. Additional passes or depths beyond the maximum potential depth of the initial **pass**, authorized by the City, will also be measured and paid for in square yards of removed pavement of the additional surface area for the depth authorized by the City. Areas of variable depth tie-in planing will not be adjusted, as in averaging or as a percentage of original depth, to achieve final measurement or payment. In the event the authorized adjustment of the $\frac{1}{2}$ inch for field conditions by the City changes the requirements of the “square up” provisions, this will be considered a changed condition in accordance with Section 104.02 of the Specifications.

Planing performed to tie-in overlaid pavement to existing pavement or bridge decks that is determined by the City to be a part of the mainline planing operations will not be measured for separate payment, the cost of which, shall be included in the price bid for the appropriate depth range of flexible or rigid pavement planing.

This price shall include furnishing vehicles, labor, tools, materials, incidentals, safety equipment, warning devices, and removing and disposing of existing pavement.

Payment will be made under:

Pay Item	Pay Unit
Flexible pavement planing (depth)	Square yard

Replacement of Franklin Road Bridge over NS Railway

City of Roanoke, Virginia

**Special Modifications to the
VDOT Road and Bridge Specifications**

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 207—SELECT MATERIAL

SECTION 207—SELECT MATERIAL of the Specifications is amended as follows:

Section 207.03—Job Mix Formula for Select Material, Type I is amended to replace the first paragraph with the following:

The Contractor shall submit or shall have the source of supply submit a job-mix formula for each mixture for the Engineer's approval through the "Producer Lab Analysis and Information Details" (PLAID) website <https://plaid.vdot.virginia.gov> prior to starting work. The formula shall establish a single percentage of aggregate passing each required sieve size denoted in Table II-6 and shall be in effect until a modification is approved by the Engineer. If unsatisfactory results or other changed conditions make it necessary, the Contractor shall prepare and submit a new formula for the Engineer's approval.

Section 207.05—Acceptance of Select Material, Type I is amended to replace the first and second paragraphs with the following:

Sampling and testing for determination of grading, moisture, and Atterberg limits shall be performed by the Contractor. The Contractor shall provide such test results within 48 hours of sampling to the Department through the "Producer Lab Analysis and Information Details" (PLAID) website <https://plaid.vdot.virginia.gov>. The Contractor shall maintain appropriate, current quality control charts. The Department will perform independent monitor tests. If there is a statistically significant difference between the two sets of results, an investigation will be made to determine the reason for the difference. If it is determined that the material does not conform to the requirements of the Contract, the material will be rejected or a payment adjustment will be made in accordance with the requirements of Section 207.07.

Determination of gradation and Atterberg limits will be based on a mean of the results of tests performed on four samples taken in a stratified random manner from each lot. Lots of 2000 tons or 4000 tons may be used at the discretion of the Engineer when warranted by annual plant shipping quantity and past performance. If visual examination reveals that the material is obviously contaminated or segregated, the material will be rejected without additional sampling or testing. If it is necessary to determine the gradation and Atterberg limits of the material in an individual location, one sample taken from the material in question will be tested and the results will be compared to the job-mix formula with the tolerances specified in Table II-7 and Table II-8 for one test. The results obtained will apply only to the material in question.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 208—SUBBASE AND AGGREGATE BASE MATERIAL

SECTION 208—SUBBASE AND AGGREGATE BASE MATERIAL of the Specifications is amended as follows:

Section 208.04—Job Mix Formula is amended to replace the first paragraph with the following:

The Contractor shall submit, or shall have the source of supply submit a job-mix formula for each mixture for the Engineer's approval through the "Producer Lab Analysis and Information Detail" (PLAID) website <https://plaid.vdot.virginia.gov> prior to starting work. The formula shall be within the design range specified in Table II-9. If unsatisfactory results or other conditions make it necessary, the Contractor shall prepare and submit a new job-mix formula for approval.

Section 208.06—Acceptance is amended to replace the second and third paragraphs with the following:

Sampling and testing for determination of grading, moisture, and Atterberg limits shall be performed by the Contractor. The Contractor shall provide such test results within 48 hours of sampling to the Department through "the Producer Lab Analysis and Information Details" (PLAID) website <https://plaid.vdot.virginia.gov>. The Contractor shall maintain appropriate current quality control charts. The Department will perform independent monitor tests at a laboratory of its choice. If there is a statistically significant difference between the two sets of results, an investigation will be made to determine the reason for the difference. If it is determined that the material does not conform to the requirements of the Contract, the material will be rejected or a payment adjustment will be made in accordance with the requirements of Section 208.08.

Determination of gradation and Atterberg limits will be based on a mean of the results of tests performed on four samples taken in a stratified random manner from each lot. Lots of 2000 tons or 4000 tons may be used at the discretion of the Engineer when warranted by annual plant shipping quantity and past performance. Samples shall be obtained by methods approved by the Engineer. Any statistically acceptable method of randomization may be used to determine the time and location of the stratified random sample to be taken. The Department shall be advised of the method to be used prior to the beginning of production.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 214—HYDRAULIC CEMENT

SECTION 214—HYDRAULIC CEMENT of the Specifications is amended as follows:

Section 214.02(b) Portland cements is amended by replacing 1. with the following:

1. The SO₃ content as specified in AASHTO M85 will be permitted, provided supporting data specified in AASHTO M85 are submitted to the Department for review and acceptance prior to use of the material.

Section 214.02(b) Portland cements is amended by deleting 3., 4., and 5.

Section 214.02—Detail Requirements is amended by adding the following:

- (c) **Expansive hydraulic cement** shall conform to the requirements of ASTM C 845 Type K.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 215—HYDRAULIC CEMENT CONCRETE ADMIXTURES

SECTION 215—HYDRAULIC CEMENT CONCRETE ADMIXTURES of the Specifications is amended as follows:

Section 215.02(g) Fly ash is replaced with the following:

- (g) **Pozzolan** shall conform to Section 241 of the Specifications.

Section 215.02—Materials is amended by adding the following:

- (k) **Metakaolin** shall conform to the requirements of AASHTO M321

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 217—HYDRAULIC CEMENT CONCRETE

SECTION 217—HYDRAULIC CEMENT CONCRETE of the Specifications is amended as follows:

Section 217.02(a) Cementitious Materials is replaced with the following:

Cementitious materials shall be a blend of mineral admixtures and Portland cement or a blended cement. In overlay concretes, expansive hydraulic cement is permitted in lieu of Portland cement. Portland cement (Types I, II, III) blended cements (Type IP, Type IS) or expansive cement (Type K) shall comply with Section 214 of the Specifications. Flyash, ground granulated iron blast-furnace slag (GGBFS), silica fume or metakaolin shall conform to Section 215 of the Specifications. As a portion of the cementitious material, Table 1 lists the minimum percents of specific pozzolans required by mass of the cementitious material depending on the alkali content of the cement. Any other mineral admixture or any other amount or combination of mineral admixtures may be used if approved by the Engineer. As a portion of the cementitious material, the fly ash content shall not exceed 30 percent for Class F, the ground granulated blast-furnace slag content shall not exceed 50 percent and the silica fume content shall not exceed 10 percent unless approved by the Engineer. Class C Flyash or other pozzolans may be used provided the contractor demonstrates that the percent usage of Class C Flyash or other pozzolans have a maximum expansion of 0.15% according to ASTM C227 at 56 days using borosilicate glass as aggregate. Blended cements require no further pozzolan additions to meet minimum pozzolan content to compensate for the alkali-silica reaction.

Up to 7 percent silica fume may be added to all combinations of cementitious materials to reduce early permeability without approval by the Engineer. Other silica fume additions must be approved by the Engineer.

Table 1 – Minimum percent pozzolan required by mass of cementitious material as a portion of the total cementitious materials and are based upon the alkali content of the cement.

	Total Alkalies of Cement is less than or equal to 0.75%	Total Alkalies of Cement is greater than 0.75% and less than or equal to 1.0%
Class F Flyash	20%	25%
GGBF Slag	40%	50%
Silica Fume	7%	10%
Metakaolin	7%	10%

TABLE II-17 Requirements for Hydraulic Cement Concrete is replaced with the following:

**TABLE II-17
Requirements for Hydraulic Cement Concrete**

Class of Concrete	Design Min. Laboratory Compressive Strength at 28 Days (f'c) (psi)	Aggregate Size No. ⁶	Design Max. Laboratory Permeability at 28 Days (Coulombs) ⁵	Design Max. Laboratory Permeability at 28 days - Over tidal water (Coulombs) ⁵	Nominal Max. Aggregate Size (in)	Min. Grade Aggregate	Min. Cementitious Content (lb./cu yd)	Max. Water /Cementitious Mat. (lb. Water/lb. Cement)	Consistency (in of slump)	Air Content (percent) ¹
A5 Prestressed and other special designs ²	5,000 or as specified on the plans	57 or 68	1,500	1,500	1	A	635	0.40	0-4	4 1/2 ± 1 1/2
A4 General	4,000	56 or 57	2,500	2,000	1	A	635	0.45	2-4	6 1/2 ± 1 1/2
A4 Post & rails	4,000	7,8 or 78	2,500	2,000	0.5	A	635	0.45	2-5	7 ± 2
A3 General	3,000	56 or 57	3,500	2,000	1	A	588	0.49	1-5	6 ± 2
A3a Paving	3,000	56 or 57	3,500	3,500	1	A	564	0.49	0-3	6 ± 2
A3b Paving	3,000	357	3,500	3,500	2	A	N/A	0.49	0-3	6 ± 2
B2 Massive or lightly Reinforced	2,200	57	N.A.	N.A.	1	B	494	0.58	0-4	4 ± 2
C1 Massive Unreinforced	1,500	57	N.A.	N.A.	1	B	423	0.71	0-3	4 ± 2
T3 Tremie seal	3,000	56 or 57	N.A.	N.A.	1	A	635	0.49	3-6	4 ± 2
Latex hydraulic cement concrete overlay ³	3,500	7,8 or 78	1,500	1,500	0.5	A	658	0.40	4-6	5 ± 2
Silica fume, silica fume /Class F Fly Ash or silica fume/slag concrete overlay ⁴	5000	7,8 or 78	1,500	1,500	0.5	A	658	0.40	4-7	6 ± 2
Class F Fly Ash or slag overlay	4000	7,8 or 78	1,500	1,500	0.5	A	658	0.40	4-7	6 ± 2

(See next page for notes on TABLE II-17).

(See next page for notes on TABLE II-17).

----- (TABLE II-17 Notes) -----

- ¹ When a high-range water reducer is used, the upper limit for entrained air may be increased by 1% and the slump shall not exceed 7 inches.
- ² When Class A5 concrete is used as the finishing bridge deck riding surface, or when it is to be covered with asphalt concrete with or without waterproofing, the air content shall be $5 \frac{1}{2} \pm 1 \frac{1}{2}$ percent.
- ³ The latex modifier content shall be 3.5 gallons per bag of cement. Slump shall be measured approximately 4.5 minutes after discharge from the mixer.
- ⁴ Silica fume with a minimum of 7% by weight of cementitious material; silica fume with a range of 2.5-5 % shall be combined with Class F Fly Ash in range of 15-20% and minimum cement of 77.5% by weight of cementitious material; silica fume with a range of 2.5-5% shall be combined with Ground Granulated Blast Furnace Slag in the range of 30-35% and a minimum cement of 67.5% by weight of cementitious material.
- ⁵ The permeability testing does not apply to small bridges identified on the bridge plans and to concrete structures and incidental concrete as described in Sections 219, 232, 302, 415, 502, 504, 506 and 519. Curing and testing of test cylinders for permeability will be in accordance with VTM 112.
- ⁶ The contractor may use different aggregate sizes or a combination of sizes to increase the coarse aggregate content of the concrete as approved by the Engineer. The maximum size of the coarse aggregate shall not exceed 2.5 inches.

Note: With the approval of the Engineer, the Contractor may substitute a higher class of concrete for that specified at the Contractor's expense.

Section 217.02(b) Formulated latex modifier is amended by adding the following:

For latex-modified concrete, Type I, Type II, Type III or Type K, cement shall be used without mineral admixtures.

Section 217.04(a)4. Admixtures is replaced with the following:

4. **Admixtures** shall be dispensed and used according to the manufacturer's recommendations. They shall be added within a limit of accuracy of 3 percent, by means of an approved, graduated, transparent, measuring device before they are introduced into the mixer. If more than one admixture is to be used, they shall be released in sequence rather than in the same instant. Once established, the sequence of dispensing admixtures shall not be altered. However, when the amount of admixture required to give the specified results deviates appreciably from the manufacturer's recommended dosage, use of the material shall be discontinued.

Section 217.05—Equipment is amended to replace the first paragraph with the following:

Equipment and tools necessary for handling materials and performing all parts of the work will be approved by the Engineer and must be in accordance with one of the following procedures:

1. having a current National Ready Mix Concrete Association Plant and Truck Certification, or
2. having a Department approved self-certification program in-place prior to the production of concrete for the Department.

Failure to comply with one or the other of these procedures will result in the concrete production being unapproved and work will not be allowed to proceed.

Section 217.05(a) Batching Equipment is amended to replace the second paragraph with the following:

Scales used for weighing aggregates and cement shall be approved and sealed in accordance with the requirements of Section 109 of the Specifications.

Section 217.05—Equipment is amended to add the following:

(d) **High Performance Volumetric Mixers (HPVMs):** The Contractor may produce the specified class of hydraulic cement concrete in Table II-17 in accordance with Section 217.02(a) of the Specifications provided that the manufacturer's equipment meets the tolerance requirements of Section 217.04(a) of the Specifications and has a stamped plate from the Volumetric Mixers Manufacturers Bureau stating that the equipment conforms to the requirements in ASTM C685.

The hydraulic cement concrete shall be mixed at the point of delivery by a combination of materials transport and mixer unit conforming to the following:

1. The unit shall be equipped with calibrated proportioning devices for each ingredient added to the concrete mix. The unit shall be equipped with a working recording meter that is visible at all times and furnishes a ticket printout with the calibrated measurement of the mix being produced. If at anytime the mixer fails to discharge a uniform mix, production of concrete shall halt until any problems are corrected.
2. Each unit shall have a metal plate(s) attached in a prominent place by the manufacturer on which the following are plainly marked: the gross volume of the transportation unit in terms of mixed concrete, the discharge speed and the mass calibrated constant of the machine in terms of volume.
3. HPVMs shall be calibrated by a Department approved testing agency in accordance with the manufacturer's recommendations at an interval of every 6 months or a maximum production of 2500 cubic yards, whichever occurs first prior to use on the project. The yield shall be maintained within a tolerance of ± 1 percent and verified using a minimum 2 cubic feet container every 500 cubic yards or a minimum once per week.
4. The three cubic feet initially discharged from the truck shall be discarded and not used for concrete placement. Acceptance of the specified class of concrete shall comply with Section 217.08 of the Specifications except that the sample secured for acceptance testing will be taken after four cubic feet is discharged from the delivery vehicle. During discharge, the consistency as determined by ASTM C143 on representative samples taken from the mixer discharge at random intervals shall not vary more than 1 inch. Acceptance tests shall be performed on each load. If test data demonstrates that consistency of concrete properties are being achieved, the Engineer may reduce testing requirements.
5. The HPVM shall be operated by a person who is a certified operator by the HPVM manufacturer. Any equipment adjustments made during the on-site production of concrete shall be done under the direct on-site supervision of the producer's VDOT Concrete Plant and Field Certified Technician.

Each load of HPVM produced concrete shall be accompanied by a Form TL-28 signed by the producer's VDOT Certified Concrete Plant Technician or a designated company representative working under the direct on-site supervision of the producer's VDOT Concrete Plant and Field Certified Technician. The form shall be delivered to the Inspector at the site

of the work. Loads that do not carry such information or do not arrive in satisfactory condition shall not be used.

Section 217.07—Proportioning Concrete Mixtures is amended to replace the first paragraph with the following:

The Contractor is responsible for having a Certified Concrete Plant Technician available during batching operations, and a Certified Concrete Field Technician shall be present during placing operations.

Section 217.07—Proportioning Concrete Mixtures is amended to delete the third paragraph beginning with “A Certified Concrete Batchers”.

Section 217.07—Proportioning Concrete Mixtures of the Specifications is amended to replace the eleventh paragraph with the following:

Except for latex hydraulic cement concrete, concrete mixtures shall be developed and/or verified by any one of the following three options listed below.

The mix design(s) as determined by the respective option shall be valid provided there is no change in sources of aggregate, chemical admixtures, mineral admixtures or hydraulic cement. All concrete mixtures shall contain the minimum amount of mineral admixtures or combination thereof expressed as a percent of the total cementitious materials in accordance with Section 217.02(a). All quantities of materials shall be weighed in accordance with tolerances specified in Section 217.04. Neither the quantities of coarse or fine aggregates used in concrete production shall deviate by more than $\pm 5\%$ by weight from the batch weights of the approved mix design.

When low permeability concrete is specified, two 4 X 8 inch specimens shall be molded from concrete representing the proposed mix design and tested in accordance with VTM 112 to validate conformance. For trial batches, the tested permeability value shall be considered satisfactory provided it is 500 coulombs less than the specified maximum value for the class of concrete specified.

Option 1 - Prescriptive Method:

Mix proportions for normal, heavy weight, and lightweight concrete shall be established by the methods described in ACI 211, on an absolute volume basis, for the respective aggregate size and meeting all the requirements of Table II-17 for the class of concrete indicated. Aggregate properties obtained from the aggregate producer shall be used for design purposes.

Once the proposed mix design has been established, the contractor or their concrete supplier shall produce one 3-cubic yard production verification batch using the same type of equipment intended for use in supplying concrete to the Department. The proposed mix design will be considered acceptable provided that the plastic properties of the concrete are within the Department's specification limits for the given class of concrete. Strength tests of the verification batch must equal or exceed $f'c$ for the intended class of concrete.

Option 2 - Trial Batch Mix Design Method:

The minimum cementitious content requirement in Table II-17 shall be waived provided that the maximum water-cementitious ratio requirement of Table II-17 is met for the respective class of concrete. The required grading for fine and coarse aggregate shall be waived provided the coarse aggregate meets the nominal maximum size as required in Table II-17 for the respective class of concrete.

The Contractor or their concrete supplier shall prepare a minimum of 3 trial concrete batches with differing cementitious materials contents over a range anticipated to encompass the design strength, $f'c$, plus overdesign, and water-cementitious ratios encompassing the range permitted for the classes of concrete being evaluated. Trial batches may be produced in either;

Option 2A: Small scale laboratory batches, or

Option 2B: Truck batches with a minimum batch volume of 3 cubic yards each.

The plastic properties of the trial concrete batches shall meet the requirements for consistency and air content in Table II-17 and meet the additional requirements listed below:

- The concrete temperature of the trial batches, as batched and sampled, shall be a minimum of 68 degrees F.
- Air content of the trial batches shall within a range of -1.0 to + 1.5 percentage points of the median design air content for the classes of concrete being evaluated.
- Slump of the trial batches shall be within ± 1 inch of the maximum slump permitted for the class of concrete.

Three 4 X 8 inch test specimens shall be molded from each batch, cured in accordance with ASTM C 31 for acceptance specimens, and then compression tested at an age of 28 days. The strength results of these tests shall be plotted on a graph to establish the relationship between the water-cementitious ratio and the compressive strength. Alternately, the relationship can be established between the cementitious content and the compressive strength. The design water-cementitious ratio, or design cementitious content, can then be derived from the graph to satisfy the required design strength plus an appropriate overdesign to be designated as $f'cr$. The required cementitious materials content determined from these tests can be interpolated from the established graph. If desired, the design water-cementitious ratio or cementitious content can be determined from a polynomial regression analysis of the plotted strength data.

Test results from prior trial concrete batches are acceptable for use provided that they represent the same material sources proposed for the Department work, meet the requirements for trial concrete batches as stated above and are less than 18 months old.

The required cementitious content to satisfy the strength requirement for the respective class of concrete shall be determined in accordance with either of the two following procedures:

1. When the concrete production facility has sufficient data to establish a production standard deviation (s), as described in **Documentation of Previous Field Experience or Production Standard Deviation (s)**. The cementitious content required to meet the design strength requirement, $f'cr$, then the $f'cr$ shall be based upon the following equation:

$$f'cr = f'c + 3s$$

2. When the concrete production facility does not have a production standard deviation established the cementitious content required to meet the design strength requirement, $f'cr$, then the $f'cr$ shall be based upon the following equation :

$$f'cr = f'c + 1700 \text{ psi.}$$

Once the proposed mix design has been established, the contractor or their concrete supplier shall produce one 3-cubic yard production verification batch using the same type of

equipment intended for use in supplying concrete to the Department. The proposed mix design will be considered acceptable provided that the plastic properties of the concrete are within the Department's specification limits for the given class of concrete. Strength tests of the verification batch must equal or exceed $f'c$ for the intended class of concrete. The requirement for a production verification batch shall be waived when the trial batching is performed by Option 2B -Truck batches.

Option 3 - Documented Field Experience Method:

The minimum cementitious content requirement in Table II-17 shall be waived provided that the maximum water-cementitious ratio requirement of Table II-17 is met for the respective class of concrete. The required grading for fine and coarse aggregate shall be waived provided the coarse aggregate meets the nominal maximum size as required in Table II-17 for the respective class of concrete.

An existing concrete mixture shall be considered acceptable for use provided that the contractor or their concrete supplier has a satisfactory test record of previous field experience as described in:

Documentation of Previous Field Experience or Production Standard Deviation (s), and that the proposed concrete mixture meets the following requirements:

1. The water cementitious ratio of the proposed concrete mixture is less than or equal to the maximum water cementitious ratio specified for the respective class of concrete.
2. The documented average strength, $f'cr$, equals or exceeds the design compressive strength $f'c$ for the respective class of concrete in accordance with the following equation: $f'cr = f'c + 3s$
3. The proposed concrete mixture contains the same aggregate sources, supplementary cementitious materials type, and admixture type as those used to establish the previous field experience test record.
4. The consistency (slump) and air content are within the specification limits for the respective class of concrete.

Documentation of Previous Field Experience or Production Standard Deviation (s)

An acceptable test record to document previous field experience and/or to establish a production facility standard deviation shall represent a minimum of 30 consecutive compressive strength tests results, encompass a production period of at least 45 days and test data not more than 18 months old. A test record of less than 30 tests, but not less than 15 tests, shall be permitted provided a modification factor is applied to the production facility sample standard deviation as shown below:

Multiply Standard Deviation by Modification Factor	
Number of Test	Modification Factor
15	1.16
20	1.08
25	1.03
30	1.00

The test record does not necessarily have to be based on Department projects provided that documentation of the source(s) of concrete strength test results accompanies the submittal.

Section 217.08—Acceptance is replaced with the following:

- (a) **Air Consistency Tests:** Air and consistency tests will be performed by the Department prior to discharge of concrete into the forms to ensure that specification requirements are consistently being complied with for each class of concrete. The sample secured for the tests shall be taken after at least two cubic feet of concrete has been discharged from the delivery vehicle. The two cubic feet discharged is not to be used as part of the test sample. Any deviation from sampling and testing procedures must be approved by the Engineer. The Contractor shall provide a receptacle conforming to the requirements of ASTM C31, Section 5.9, for the Department's use in obtaining the sample. If either determination yields a result that is outside of the allowable range for air content or consistence, the following procedure will be used:
1. The Engineer will immediately perform a recheck determination. If the results confirm the original test results, the load will be rejected.
 2. The Contractor's representative will be immediately informed of the test results.
 3. The Contractor's representative shall notify the producer of the test results through a pre-established means of communication.

The Engineer may perform any additional tests deemed necessary and reject all remaining material that fails the tests.

Entrained air content will be determined in accordance with the requirements of ASTM C231 or ASTM C173. Acceptance or rejection will be based on the results obtained from these tests.

In general, a mixture that contains the minimum amount of water consistent with the required workability shall be used. Consistency will be determined in accordance with the requirements of ASTM C143. Adding cement to loads previously rejected for excessive water content or consistency will not be permitted.

- (b) **Strength Tests:** The 28-day compressive strengths (f'_c) specified in Table II-17 are the strengths used in the design calculations. The Engineer will verify design strengths by tests made during the progress of the work in accordance with the requirements of ASTM C31 (Standard Practice for Making and Curing Concrete Test Specimens in the Field) and ASTM C39 (Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens) with the exception that the fresh concrete sample used for testing is to be secured after at least two cubic feet has been discharged from the delivery vehicle. The two cubic feet discharged is not to be used as part of the test sample. Any deviation from sampling and testing procedures must be pre-approved by the Engineer. The use of ASTM C42 (Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete) will be at the Engineer's discretion. If the 28-day design compressive strength (f'_c) test results do not conform to the strength requirements specified in Table II-17, immediate steps shall be taken to adjust the mixture design. In addition, the Engineer may require removal of or corrective measures be applied to any concrete that does not meet the requirements of Table II-17. If the concrete cylinder strength, f'_{cyl} , is less than the specified compressive strength found in Table II-17, the criteria in Table II-17A shall apply:

Table II – 17A Price Reduction or Action Taken due to f'_{cyl} not meeting the specification value f'_c listed in Table II-17

Condition	Concrete is a Pay Item	Concrete is <u>Not</u> a Pay Item
f'_{cyl} is greater than or equal to 98% f'_c	A	A
f'_{cyl} is greater than or equal to 90% f'_c and less than 98% f'_c	B	C
f'_{cyl} is less than 90% f'_c	D	D
f'_{cyl} is not available due to the Contractor's inappropriate handling and storage of specimens in accordance with ASTM C31	D	D

f'_c is the 28-day design compressive strength found in Table II-17.

f'_{cyl} is the actual average tested strength of the standard-cured concrete cylinder made and tested in accordance with ASTM C31 and ASTM C39.

A = full payment

B = pay reduction = $[(f'_c - f'_{cyl})/f'_c] \times$ contract unit price for concrete per $yd^3 \times$ number of yds^3 the concrete represents] or \$500, whichever is greater.

C = pay reduction = $[(f'_c - f'_{cyl})/f'_c] \times 5 \times$ Contractor's invoice price for concrete per $yd^3 \times$ number of yds^3 the concrete represents] or \$500, whichever is greater.

D = The Contractor shall submit an investigative plan stamped by a Virginia-licensed Professional Engineer outlining how the Contractor shall demonstrate that the in-place concrete meets the structural strength requirements of the design. For barriers, parapets, railings, etc., no reduction in concrete strength below $0.9f'_c$ shall be allowed. For all other applications, the investigative plan must be approved by the Department's Engineer prior to the execution of the investigation. All costs associated with this investigation shall be borne by the Contractor. After the investigation is completed, a report shall be submitted to the Engineer showing the results of the analysis, testing and conclusions of the Virginia-licensed Professional Engineer and recommendations for action proposed by the Contractor to be taken with the concrete that did not meet the strength requirements. The Department retains all rights to determine if the action proposed with regard to the concrete in question is acceptable. If the Department concurs with the proposed action and the concrete meets the structural strength requirements of the design and remains in place, any price reduction will be taken by Method B if the concrete is a pay item or Method C if the concrete is not a pay item. If the concrete does not meet the structural requirements of the design, the concrete shall be removed and replaced at no cost to the Department. The maximum penalty assessed for low strength concrete left in place will be 10% as specified in Table II-17A not including the cost of the investigation and any corrective measures taken by the Contractor.

No calculated penalty less than \$500 will be assessed. The Contractor shall have the right to remove and replace concrete failing to meet specifications at the Contractor's cost.

Before concrete is placed, the Contractor shall provide a storage chamber at his expense for temporary storage of the Department's concrete cylinders. The contractor shall be responsible for maintaining the chamber such that the concrete test cylinders are kept in a continuously moist condition and within a temperature range of 60 degrees F to 80 degrees F. The chamber shall be equipped with a continuously recording thermometer accurate to ± 2 degrees F for the duration of concrete cylinder curing. The chamber shall be located in an area where the test cylinders will not be subject to vibration and shall be of sufficient size or number to store, without crowding or wedging, the required number of test cylinders as determined by the Contractor based on his plan of operations. Location of the chamber is subject to approval by the Engineer.

When use of high-early-strength hydraulic cement concrete is required, it shall conform to the requirements specified in Table II-17 except that the 28-day strength shall be obtained in 7 days. Up to 800 pounds per cubic yard of Type I, Type II or Type III cement may be used to produce high-early-strength concrete.

(c) **Concrete Temperature** shall be measured in accordance with the requirements of ASTM C1064.

(d) **Quality Assurance** for Low Permeability Concrete:

General:

At least two trial batches, using job materials, with permissible combination of cementitious materials shall be prepared, and test specimens shall be cast by the Contractor and tested by the Department for permeability and strength at least a month before the field application. The permeability samples shall be cylindrical specimens with a 4-inch diameter and at least 4-inches in length. Cylinders will be tested at 28 days in accordance with VTM 112. The test value shall be the result of the average values of tests on two specimens from each batch. Permeability values obtained from trial batches shall be 500 coulombs below the maximum values specified in Table II-17 of the Specifications to be acceptable.

Acceptance Tests:

For each set of cylinders made for compressive strength tests, two additional cylinders shall be made for the permeability test. The Department will be responsible for making and testing all permeability test specimens.

If the average permeability test result is equal to or less than the value for the specified class of concrete in Table II-17, then full payment will be made for the lot the average permeability test result represents. However, if the average permeability test result exceeds the coulomb value in Table II-17, payment for that lot of concrete shall be reduced by 0.005 percent for each coulomb above the coulomb value in Table II-17 multiplied by the bid item cost of the concrete times the number of cubic yards or cubic meters of concrete in the lot. The reduction in price will not exceed 5 percent of the bid price of the concrete. Any concrete with a coulomb value that exceeds the maximum required in Table II-17 by 1000 coulomb will be rejected. However, bridge deck concrete with any coulomb value exceeding the maximum required by over 1000 coulomb may be accepted by the Engineer at 95 percent of the bid price if the concrete in question has the required strength and meets other specification requirements, and the Contractor applies, at his own expense, an approved epoxy concrete overlay to the top of the entire deck. In such case deck grooving will not be required. Epoxy overlays over latex overlays will not be permitted. The adjustment to the roadway grade shall be made as required by the Engineer at the Contractor's expense.

Similarly, concrete in abutments and pier caps with coulomb value exceeding the maximum required in Table II-17, by more than 1000 coulomb may be accepted at 95 percent of the bid price if it has the required strength and meets other specification requirements, and the Contractor applies at his own expense, one coat of Type EP-3B and one coat of EP-3T in conformance with the requirements of Section 243.02 of the Specifications, on top of the pier cap or abutment seat.

Section 217.09(b) Ready Mixed Concrete is amended to replace the second paragraph with the following:

Each load of transit or shrink-mixed concrete shall be accompanied by Form TL-28 signed by the VDOT Certified Concrete Field Technician or a designated company representative working under the direction of the VDOT Certified Concrete Field Technician. The form shall be delivered to the Inspector at the site of the work. Loads that do not carry such information or that do not arrive in satisfactory condition shall not be used.

Section 217.09(b) Ready-Mixed Concrete is amended to replace the fourth paragraph and the table with the following:

Each batch of concrete shall be delivered to the site of work and discharged within 90 minutes of the time the cement is introduced into the mixture unless approved otherwise by the Engineer.

Section 217.09(b)1. Transit mixing is amended to replace the first paragraph with the following:

1. **Transit mixing:** Concrete shall be mixed in a truck mixer. Mixing shall begin immediately after all ingredients are in the mixer and shall continue for at least 70 revolutions of the drum or blades at the rate of at least 14 but no more than 20 revolutions per minute.

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SUPPLEMENTAL SECTION 226—STRUCTURAL STEEL

SECTION 226—STRUCTURAL STEEL of the Specifications is amended as follows:

Section 226.02.h.3 is replaced with the following:

3. High-strength fasteners (plain and coated) shall pass a rotational-capacity test as detailed in Virginia Test Method 135.
 - a. Bolts shall be proof-load tested in accordance with ASTM F606, Method I. Full-size bolts shall be wedge tested in accordance with ASTM F606. Nuts shall be proof-load tested in accordance with ASTM F606. Galvanized bolts shall be wedge tested after galvanizing. Galvanized nuts shall be proof-load tested in accordance with ASTM F606 only after overtapping, galvanizing, and lubricating operations are completed.
 - b. Galvanized bolts, nuts and washers shall be hot-dipped galvanized in accordance with ASTM A153. The Contractor may use mechanically galvanized bolts, nuts, and washers that conform to ASTM B695, Class 50 if the bolts are to be topcoated with paint.

When galvanized nuts conforming to ASTM A563 are specified, the amount of overtapping may be less than specified; however, all nuts in each lot shall be overtapped by the same amount. Galvanized nuts shall be lubricated in accordance with ASTM A563 using a lubricant sufficiently tinted so as to be readily visible.

Galvanized bolts, nuts, and washers shall have the galvanization measured for thickness. Measurements for bolts shall be taken on the wrench flats or top of the bolt head. Measurements for nuts shall be taken on the wrench flats.

When galvanized washers are specified, hardness testing shall be performed after galvanizing. The coating shall be removed prior to testing.

- c. All bolts, nuts, and washers shall be furnished with a marking that readily identifies their manufacturer. The Contractor shall provide the Engineer with an example of such marking and the manufacturer's certification for each bolt, nut, and washer supplied to the project. The Contractor shall ensure that two samples from each rotational capacity lot, each sample consisting of one bolt, nut, washer, and DTI (if used on the project), are submitted to the Department for testing, and are accompanied by all documentation.

Documentation shall indicate the results of all tests and processes performed on the hardware, the name of the testing facility, address where the tests were performed and the date of testing. Test results of bolts and nuts shall also indicate the lot number of the product. Bolts, nuts, and washers from different rotational-capacity lots shall not be shipped in the same container. In addition, shipping containers shall be marked with the rotational-capacity test lot number of the product supplied.

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SUPPLEMENTAL SECTION 238—ELECTRICAL AND SIGNAL COMPONENTS

SECTION 238 ELECTRICAL AND SIGNAL COMPONENTS of the Specifications is amended as follows:

Section 238.02(f) Electrical and Signal Junction Boxes is replaced with following:

(f) **Electrical and Signal Junction Boxes:**

Boxes, frames and covers shall be water resistant. Covers shall be secured with stainless steel bolts and fasteners. Covers shall be flush with surface of the junction box and not protrude above the top of the junction box flange.

Junction box bolt attachment holes shall be drilled through to prevent debris from collecting in the threaded bolt holes.

Junction boxes shall be tested and certified by an independent testing laboratory as meeting the requirements indicated herein for approval for use. Independent testing laboratory shall be approved by VDOT Materials Division prior to testing. The Contractor shall furnish the Engineer documentation of such test results.

Testing reports shall provide complete test results for the type of design testing indicated for the respective type of junction box.

Junction Boxes for deliberate traffic in the roadway applications:

- Concrete shall conform to the requirements of Section 217 of the Specifications and shall be designed to meet the provisions of AASHTO's *Standard Specifications for Highway Bridges* for HS20 loading. Concrete shall have a design minimum compressive strength of 4000 psi.
- Gray Iron frame and covers shall conform to the requirements of Section 224 of the Specifications.

Junction Boxes for off roadway applications:

- Shall conform to the requirements of ANSI/SCTE 77 2007 and tier 15 loading. Boxes shall be open bottom.
- Shall be Polymer concrete with straight sides or Polymer concrete with flared or straight fiberglass sides.
- Other materials may be submitted for the sidewalls provided they conform to the requirements of ANSI/SCTE 77 2007 and tier 15 loading.

Junction Boxes frames and covers for bridge structures encasements shall be one of the following types:

1. Steel castings conforming to the requirements of Section 224 of the Specifications, galvanized inside and out.

2. Welded sheet steel having a thickness of at least 3/16 inch or 7 gage, galvanized inside and out.
3. Polymer concrete with fiberglass sides or all polymer concrete.

Section 238.02(h)6.f. Light Emitting Diode (LED) traffic signal head sections is amended to replace the third paragraph with the following:

LED arrow traffic signal modules shall conform to the requirements of the *ITE Vehicle Traffic Control Signal Heads – Light Emitting Diode Vehicle Arrow Traffic* issued April 3, 2006 (inclusive of any ITE documents that amend, revise and/or supersede it).

And to replace the seventh paragraph with the following:

The LED's shall be mounted and soldered to a printed circuit board. Modules shall be provided with an external in-line fuse or internal fusing of the 120 VAC (+) input. The fuse shall be rated in accordance with the LED module manufacturer. The LED signal module shall utilize the same mounting hardware used to secure the incandescent lens and gasket assembly and shall only require a screwdriver or standard installation tool to complete the mounting.

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SUPPLEMENTAL SECTION 245—GEOSYNTHETICS

SECTION 245—GEOSYNTHETICS of the Specifications is amended as follows:

Section 245.03—Testing and Documentation is amended by replacing the first four paragraphs and subparagraph (a) with the following:

Each geosynthetic material provided to the project shall be tested to determine conformance with the material properties specified herein within 24 months of submission. Test results reported from AASHTO's National Transportation Product Evaluation Program—Laboratory Results of Evaluations on Geotextile and Geosynthetics may be used. The Contractor shall provide certification of the material in accordance with the requirements of AASHTO M288, Section 5, Certification, and copies of the test results. This testing, however, will not be the sole basis for acceptance.

The Contractor shall be responsible for ensuring that each roll of geosynthetic delivered to the project includes a certificate from the manufacturer showing manufacturer name, product name, style number or identifier, roll number, chemical composition of the filaments or yarns, any other pertinent information to fully describe the product, and a signature or attest of a person having legal authority to bind the manufacturer.

VDOT will sample and test the geosynthetics for acceptance to verify conformance with this specification. Sampling shall be performed in accordance with the requirements of ASTM D4354, Procedure C. For tests not conducted by VDOT, acceptance may be based on the manufacturer's certifications as a result of testing by the manufacturer of quality assurance samples obtained using the procedure for ASTM D4354 Procedure B Sampling for Manufacturer's Quality Assurance (MQA) Testing. A lot size shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller, but in no case shall lot size exceed 250,000 square feet.

Property values, with the exception of apparent opening size (AOS) and panel vertical strain, in these specifications represent minimum average roll values (MARV) in the weakest principal direction (i.e., average test results of any roll in a lot sampled for conformance or quality assurance testing shall meet or exceed the minimum values provided herein). Values for AOS and panel vertical strain represent maximum average roll values.

Tests shall be performed in accordance with the methods referenced in this specification for the indicated application. The number of specimens to test per sample is specified by each test method. Geotextile product acceptance shall be based on conformance to the requirements of ASTM D4759. Product acceptance is determined by comparing the average test results of specimens in a given sample to the specification MARV.

- (a) **Geotextile Fabric for Use in Silt Fences, Silt Barriers, or Filter Barriers:** Geotextile shall function as a vertical, permeable interceptor designed to remove suspended soil from overland water flow. Fabric shall filter and retain soil particles from sediment-laden water to prevent eroding soil from being transported off the construction site by water runoff. Fabric shall contain ultraviolet inhibitors and stabilizers to provide at least 6 months of expected, usable construction life at a temperature of 0 degrees F to 125 degrees F. The tensile strength of the material after 6 months of installation shall be at least 50 percent of the initial strength.

Physical Property	Test Method	Requirements
Filtering efficiency	VTM-51 or ASTM D5141-11	Min. 75%
Flow rate	VTM-51 or ASTM D5141-11	Min. 0.2 gal/ft ² /min

In addition to these requirements, the geotextile shall comply with the requirements of AASHTO M288 for temporary silt fence property requirements, Table 7, Temporary Silt Fence Property Requirements, for grab strength and ultraviolet stability.

The Contractor shall be responsible for supplying test results on each lot of silt fence geotextile for filtering efficiency, flow rate, and grab strength. These results shall be from a GAI-accredited laboratory, which also is specifically accredited by GAI in tests ASTM D5141 and ASTM D4632. Passing test results submitted by the Contractor are not sufficient for acceptance, as VDOT shall also conduct verification testing.

Section 245.03(f) Geocomposite Wall Drain is amended to delete the first paragraph.

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SUPPLEMENTAL SECTION 247—REFLECTIVE SHEETING

SECTION 247—REFLECTIVE SHEETING of the Specifications is completely replaced with the following:

247.01—Description

This specification covers reflective sheeting used on traffic control devices to provide a retroreflective surface or message. The color of the reflective sheeting shall be as specified in the Contract Documents. Reflective sheeting shall be certified in accordance with the requirements of Section 106.06 of the Specifications.

247.02—Detail Requirements

Reflective sheeting shall be selected from the Department's Approved Products list. Reflective sheeting products are included on the Approved Products List only after the Department determines conformance to the Specifications and the manufacturer has supplied written information indicating conformance to the warranty requirements of Section 247.03 of the Specifications where required. Determination of conformance will include, but not be limited to, the evaluation of test data from AASHTO's National Transportation Product Evaluation Program (NTPEP) or other Department-approved facilities except as noted. When color test data (Chromaticity and Luminance Factor - Y%) provided by NTPEP or other Department-approved facilities are evaluated, color must have been maintained within the color specification limits for the full duration of the outdoor weathering test. The sheeting and any applied coatings such as inks, overlay films, other coatings, shall be weather resistant in accordance with ASTM D4956 after being tested by AASHTO, NTPEP or other Department approved facilities except as noted.

- (a) **Reflective sheeting used on permanent signs (except those addressed in Section b), on object markers, nose of guardrails, permanent impact attenuators (except sand barrels), standard road edge delineators, special road edge delineators, barrier delineators, guardrail delineators, interstate road edge delineators, chevron panels, bridge end panel signs (VW-13), and railroad advance warning signs (including any supplemental plaques) vertical panels (Group 2 channelizing devices), traffic gates, Automatic Flagger Assistance Device (AFAD) gate arms, and the "STOP" side of sign paddles (hand signaling device)** shall conform to the requirements of ASTM D4956 for a Type IX material and, except for the "STOP" side of sign paddles, shall be warranted in accordance with Section 247.03 Sheeting Warranty Class I of the Specifications.

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 1 and 1A (non-fluorescent colors) and Tables 3 and 3A (fluorescent colors). In Table 1A, the values for daytime luminance factor (Y%) shall be based on the colors for a Type IV, VII, and VIII sheeting.

The minimum maintained coefficient of retroreflection of the sheeting after 3 years on the test deck shall conform to the requirements of ASTM D4956.

1. **Reflective sheeting used on the following signs** shall be Fluorescent Yellow-Green conforming to the requirements of ASTM D4956 for a Type IX material and shall be warranted in accordance with Section 247.03, Sheeting Warranty Class I of the Specifications.

- **Bicycle Crossing sign (W11-1) including supplemental plaques**
- **Pedestrian Crossing sign (W11-2) including supplemental plaques**
- **Playground sign (W15-1) including supplemental plaques**
- **DEAF CHILD AREA sign including supplemental plaques**
- **WATCH FOR CHILDREN sign including supplemental plaques**
- **School Signing consisting of the following:**
 - School Crossing sign (S1-1)**
 - School Bus Stop Ahead sign (S3-1)**
 - SCHOOL plaque (S4-3)**
 - School Portion of the School Speed Limit sign (S5-1)**
 - Supplemental plaques used with these signs**

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 3 and 3A.

The minimum maintained coefficient of retroreflection of the sheeting after 3 years on the test deck shall conform to the requirements of ASTM D4956.

- (b) **Reflective sheeting used on permanent recreational and cultural interest area guidance signs, and for the hand symbol/DON'T WALK and numerals on permanent educational pedestrian signal signs (R10-3b thru R10-3e)** shall conform to the requirements of ASTM D4956 for a Type III material and shall be warranted in accordance with Section 247.03, Sheeting Warranty Class I of the Specifications.

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 1 and 1A.

The minimum maintained coefficient of retroreflection of the sheeting after 3 years on the test deck shall conform to the requirements of ASTM D4956.

- (c) **Reflective sheeting used to delineate the trailer's back frame of Portable Changeable Message Signs (PCMS), Automatic Flagger Assistance Device (AFAD) gate arm, arrow boards and portable lights** shall conform to the requirements of 49 CFR 571.108 for a Grade DOT-C2 truck conspicuity marking. References to ASTM specifications therein shall be interpreted to mean the latest version of the specification at the time of advertisement regardless of the date indicated in the reference.

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 1 and 1A.

This reflective sheeting is not required to be tested by NTPEP.

- (d) **Reflective sheeting used on Type III barricades** shall conform to the following:

Minimum Coefficient of Retroreflection R_A (R_A =Candelas per foot-candle per square foot)			
Observation Angle (°)	Entrance Angle (°)	White	Orange
0.2	-4	400	200
0.2	+30	200	80
0.5	-4	300	100
0.5	+30	100	40
1.0	-4	50	25
1.0	+30	15	10

Color and Luminance Factor (Y%) shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 1 and 1A, for a Type IV Sheeting.

Impact Resistance shall conform to the requirements of ASTM D4956.

The minimum maintained coefficient of retroreflection of the sheeting after one year on the test deck shall be at least 50 percent of the minimum coefficient of retroreflection values specified.

- (e) **Reflective sheeting used on orange construction and maintenance activity signs, barrier vertical panels installed on concrete traffic barrier service, rear panel of truck-mounted attenuators, temporary impact attenuators (except temporary sand barrels), and the "SLOW" side of sign paddles** shall conform to the requirements of ASTM D4956 for a Type IX, Fluorescent Orange material (with the following retroreflection exception):

**Minimum Coefficient of Retroreflection R_A
(R_A =Candelas per foot-candle per square foot)**

Observation Angle (°)	Entrance Angle (°)	Fluorescent Orange
0.2	-4	140
0.2	+30	90
0.2	+40	24
0.5	-4	90
0.5	+30	50
0.5	+40	15
1.0	-4	10
1.0	+30	5
1.0	+40	3

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 3 and 3A.

The minimum maintained coefficient of retroreflection of the sheeting after one year on the test deck shall be at least 50 percent of the minimum coefficient of retroreflection values specified.

- (f) **Reflective sheeting used on tubular delineators, drums and temporary sand barrels** shall conform to the following:

1. **Reflective sheeting used on tubular delineators and drums** shall conform requirements of ASTM D4956 including supplementary requirement S2 for a Type III reboundable material. Color shall conform to the requirements of Tables 1 and 1A of the USDOT specification as contained in the Appendix to 23 CFR, Part 655, Subpart F except the minimum daytime luminance factor (Y%) for white shall be 25 when used on tubular delineators and drums. The following supplementary table shall apply for tubular delineators and drums:

**Minimum Coefficient of Retroreflection R_A
(Candelas per foot-candle per square foot)
(High Intensity)**

Observation Angle (°)	Entrance Angle (°)	White	Orange
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0.2	+50	75	25
0.5	+50	35	10

Reflective sheeting used on tubular delineators is not required to be tested by NTPEP.

2. **Reflective sheeting used on temporary sand barrels** shall be a fluorescent orange prismatic lens reboundable sheeting conforming to the following:

Color shall conform to the requirements of Tables 3 and 3A of the USDOT specification as contained in the Appendix to 23 CFR, Part 655, Subpart F.

**Minimum Coefficient of Retroreflection R_A
(Candelas per foot-candle per square foot)
(High Intensity)**

Observation Angle (°)	Entrance Angle (°)	Fluorescent Orange
0.2	-4	200
0.2	+30	120
0.2	+50	40
0.5	-4	80
0.5	+30	50
0.5	+50	30

Minimum maintained coefficient of retroreflection of the sheeting after one year on the test deck shall be at least 50 percent of the minimum coefficient of retroreflection values indicated above.

Reflective sheeting shall conform to the supplementary requirement S2 of ASTM D4956.

Please note: Beginning July 1, 2012 reflective sheeting used on Drums, Temporary Sand Barrels and Tubular delineators for all projects shall conform to the requirements of ASTM D4956 including supplementary requirement S2 for a Type III reboundable material with the following retroreflection exception as shown in the chart below:

**Minimum Coefficient of Retroreflection R_A
(R_A =Candelas per foot-candle per square foot)
(Prismatic Lens)**

Observation Angle (°)	Entrance Angle (°)	White	Fluorescent Orange
0.2	-4	400	175
0.2	+30	200	100
0.2	+40	135	60
0.2	+45	120	40
0.5	-4	150	70
0.5	+30	50	30
0.5	+40	45	25
0.5	+45	40	20

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 1 and 1A (non-fluorescent colors) and Table 3 and 3A (fluorescent colors).

The minimum maintained coefficient of retroreflection of the sheeting after one year on the test deck shall be at least 50 percent of the minimum coefficient of retroreflection specified.

- (g) **Reflective sheeting used on Permanent Sand Barrels and on Cones** shall conform to the requirements of ASTM D4956 including supplementary requirement S2 for a Type III reboundable material. The following supplementary table shall also apply for cones:

Minimum Coefficient of Retroreflection R_A
(R_A =Candelas per foot-candle per square foot)
(High Intensity)

Observation Angle (°)	Entrance Angle (°)	White
0.2	+50	60
0.5	+50	35

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 1 and 1A.

The maintained coefficient of retroreflection of the sheeting after one year on the test deck shall be at least 50 percent of the minimum coefficient of retroreflection specified for permanent sand barrel sheeting.

Reflective sheeting for cones is not required to be tested by NTPEP.

- (h) **Reflective sheeting used on Retroreflective Rollup Signs** shall conform to the following:

Minimum Coefficient of Retroreflection R_A
(R_A =Candelas per foot-candle per square foot)
(Prismatic Lens)

Observation Angle (°)	Entrance Angle (°)	White	Fluorescent Orange	Fluorescent Pink
0.2	-4	500	200	200
0.2	+30	200	80	100
0.5	-4	225	90	100
0.5	+30	85	35	35
1.0	-4	20	10	10
1.0	+30	15	8	10
1.5	-4	5	3	2
1.5	+30	4	1.5	2

Color shall conform to the requirements of 23 CFR, Part 655, Subpart F, Appendix Tables 1 and 1A for white, and Appendix Tables 3 and 3A for fluorescent colors.

Reflective sheeting for retroreflective rollup signs is not required to be tested by NTPEP.

247.03—Warranty Requirements

The reflective or retroreflective sheeting manufacturer shall provide the following warranty to the Department for the respective types of sheeting furnished as specified herein:

Class I Warranty: 10-year warranty with 7 years being 100 percent full replacement covering all material and labor costs associated with fabrication and installation of the sign or device and the final 3 years being 100 percent sheeting replacement cost.

The minimum values of retroreflectivity maintained during the warranty period shall be the same as those required for the maintained coefficient of retroreflection values as indicated herein, or where not indicated, shall be in accordance with those specified in ASTM D4956.

Loss of colorfastness is considered to have occurred if the color of the sheeting is not within the color specification limits in 23 CFR, Part 655, Subpart F, Appendix during the full duration of the warranty period.

Warranty period shall begin on the date of fabrication and shall be documented as follows:

For warranty requirements, each permanent sign shall be labeled on the reverse in a location not to be obscured by sign supports or backing hardware, showing 1.) Month and year the sign was fabricated, marked via punch-out numerals, 2.) Sheeting Manufacturer's name or logo and product designation or number, and 3.) Sign fabricator's name or logo. Labels shall be made of a self adhesive, permanent weather resistant material and shall be a minimum 4" by 4" in size. Label may be made from permanent sign material provided the finished label meets all other aspects required for warranty documentation.

Where the information required for the label is not furnished by punched-out numerals, it shall be supplied by permanent means, such as sign ink, capable of resisting weathering so as to be legible for the full duration of the warranty period.

Prior to applying the label, the area shall be thoroughly cleaned to ensure proper adhesion.

(c302h00-0708) **SECTION 302.03(b) PRECAST DRAINAGE STRUCTURES** of the Specifications is amended to include the following:

Precast units, excluding concrete pipe, prestressed concrete items and soundwalls, conforming to the requirements herein will only be accepted under a Quality Control/Quality Acceptance Program (QC/QA). The Contractor shall have the producer perform quality control functions in accordance with a Department approved QC/QA plan. Each piece, manufactured under the QC/QA program, in addition to the date and other required markings, shall be stamped with the letters (QC), as evidence that the required QC/QA procedures have been performed. Each shipping document shall be affixed with the following:

We certify that these materials have been tested and conform to VDOT Precast Concrete Products Quality Assurance Program

Signature and Title

1-14-08 (SPCN)

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 302—DRAINAGE STRUCTURES**

SECTION 302—DRAINAGE STRUCTURES of the Specifications is amended as follows:

Section 302.03(b) Precast Drainage Structures is amended to replace the second paragraph with the following:

Requests for approval of a precast design shall include detailed plans and supporting computations that have been reviewed by a registered Professional Engineer having at least 5 years experience in structural design of precast structures or components proposed and licensed in the Commonwealth. Unless otherwise specified, concrete exposed to freeze/thaw environments shall conform to Section 217.02 of the Specifications and shall have a design strength at 28 days of at least 4,000 pounds per square inch and an air content of 6 ± 2 percent. Concrete not exposed to freeze/thaw environments shall be exempt from the requirements of Section 217.02(a) of the Specifications. The design of the concrete mixture and the method of casting, curing handling and erecting of precast units shall be subject to review by the Engineer. Precast units may be shipped after reaching 85 percent of the design strength as determined by control cylinders. Sampling and testing concrete strength shall be performed using control cylinders in accordance with ASTM C31 and C39 at a rate of one set of cylinders per lot. A lot is defined as a maximum 250 cubic yards or a single weeks production (whichever quantity is less) of precast concrete from each batching operation, being of like material, strength and manufactured by the same process. Variations of lot definition will be governed by applicable specifications and approved by the Engineer. Control cylinders used for acceptance testing shall be cured under the same conditions as the concrete the cylinders represent. Units shall retain their structural integrity during shipment and shall be subject to inspection at the job site. Approval to use precast units shall not be construed as waiving the size and weight limitations specified in Section 107.21 of the Specifications.

Section 302.03(b)2. Precast arches is replaced with the following:

2. **Precast arches** shall conform to the applicable requirements of the current AASHTO's *LRFD Bridge Design Specifications* and VDOT modifications (current VDOT I&IM-S&B-80) and the following modifications:

a. **Protection against corrosion:** The concrete cover of reinforcement shall be at least 1 1/2 inches.

Reinforcing steel for arches in 0 to 2 foot fills, in corrosive or marine environments, or in other severe exposure conditions shall be corrosion resistant reinforcing steel, Class I. When corrosion resistant reinforcing steel is required, the minimum cover specified shall not be reduced.

Exposed reinforcing bars, inserts, and plates intended for bonding with future extensions shall be protected from corrosion as directed by the Engineer.

Reinforcement shall be designed and detailed in consideration of fabrication and construction tolerances so that the minimum required cover and proper positioning of reinforcement shall be maintained.

- b.—**Anchorage:** Sufficient anchorage shall be provided at the terminus of lines of precast units. Anchorage may consist of a cast-in-place end section at least 3 feet in length with a headwall or collar around the precast unit(s) provided adequate connection can be made between the collar and units.
- c.—**Joints:** Joints between units shall be sealed by preformed plastic or mastic gaskets or grout. When preformed gaskets are used, they shall be of a type listed on the Department's approved products list.
- d. **Pipe openings:** Pipe openings will not be allowed in the precast arch but may be provided through the wingwalls. When required, openings shall conform to the requirements of (b)1.b. herein.

Section 302.03(b)3. Precast box culverts is replaced with the following:

- 3. **Precast box culverts** shall conform to the applicable requirements of the current *AASHTO's LRFD Bridge Design Specifications* and VDOT modifications (current VDOT I&IM-S&B-80) and the following modifications:

- a. Precast Box Culverts shall conform to the applicable material requirements of ASTM C1577. The design shall be a Special Design which need not conform to the reinforcing steel and geometry shown in the design tables and the appendix in ASTM C1577.
- b. For protection against corrosion, the following minimum concrete cover shall be provided for reinforcement: For boxes with more than 2 feet of fill over the top slab: 1 1/2 inches. For boxes with less than 2 feet of fill over the top slab: top reinforcement of top slab: 2 1/2 inches; bottom reinforcement of top slab: 2 inches; all other reinforcement: 1 1/2 inches.

Reinforcing steel for arches in 0 to 2 foot fills, in corrosive or marine environments, or in other severe exposure conditions shall be corrosion resistant reinforcing steel, Class I. When corrosion resistant reinforcing steel is required, the minimum cover specified shall not be reduced.

- c. The type of sealant used in joints between units shall be from the Department's Approved List of Preformed Plastic or Mastic Gaskets.

Where double or greater lines of precast units are used, a buffer zone of 3 to 6 inches between lines shall be provided. This buffer zone shall be backfilled with porous backfill conforming to the requirements of Section 204. The porous backfill shall be drained by a 3-inch-diameter weep hole, formed by non-rigid tubing, located at the top of the bottom haunch, centered in the outlet end section and at approximately 50-foot intervals along the length of the box. Weep holes shall be covered with a 3-foot-square section of filter barrier cloth firmly attached to the outside of the box. A 3-foot width of filter barrier cloth shall also be centered over the buffer zone for the entire length of the structure after placement of the porous backfill material. Filter barrier cloth shall conform to the requirements of Section 245.

Forming weep holes and furnishing and placing of the filter barrier cloth shall be included in the price bid per linear foot for the precast box culvert.

- d. At the terminus of precast units, sufficient anchorage shall be provided. This anchorage may consist of a cast-in-place end section at least 3 feet in length with a headwall and curtain wall or a collar cast-in-place around the units provided adequate connection can be made between the collar and units.

When the ends of precast units are skewed, the end section shall be cast monolithically. The skew may be provided by forming, saw cutting, or other methods approved by the Engineer.

Regardless of the method used, the variation in the precast unit from the exact skew shall be not greater than 1 1/2 inches at any point.

- e. Pipe openings shall conform to the requirements of 1.b. herein.
- f. Bedding and backfill shall be in accordance with Standard PB-1 for box culverts.

Section 302.03 Procedures is amended to add the following

(d) **Post Installation Inspection**

In addition to the visual inspection performed by the Department during the initial installation of storm sewer pipes and pipe culverts, a post installation visual/video camera inspection shall be conducted by the Contractor in accordance with the requirements of this specification and VTM 123 on all storm sewer pipe and a selected number of pipe culverts. For the purposes of this Section, a storm sewer pipe is defined as either a component of a storm sewer system as defined in Section 101.02 of the Specifications or any pipe identified on the plans as storm sewer pipe. All other pipe shall be considered pipe culverts. Post installation Inspections shall be performed on straight line and radial installations.

For pipe culverts, a minimum of one pipe installation for each size of each material type utilized on the project will be randomly selected by the Engineer for inspection, however, in no case will the amount of pipe subject to inspection be less than ten percent of the total contract amount for the size and material type indicated. Where possible, for all installations in which the pipe or culvert's size, orientation, or location permit deflection to be easily visually identified, (as verified with the Engineer) the Contractor may perform visual inspections in lieu of video inspections. If defects as described herein are noted during the inspection, the Engineer may require additional pipe installations of that size and/or material be inspected. The Contractor shall coordinate and schedule all post installation inspections so that these are made in the presence of the Engineer. The post installation inspection shall be performed no sooner than 30 days after completion of the pipe installation and placement of final cover (except for pavement structure). The Contractor shall issue a report detailing all issues or deficiencies noted during the inspection (including a remediation plan for each deficiency noted where applicable) no later than 5 days after completion of the inspection.

While the intent of this requirement is to perform the post installation inspection prior to paving, project scheduling may dictate that a particular site be paved before the end of the 30 day period. In such cases, a preliminary inspection of the pipe shall be made, prior to paving over it, to insure that the pipe has been properly installed and is performing well. Performing such a preliminary inspection prior to paving will not relieve the Contractor from the requirement to perform the post installation inspection after the 30 day period.

The Contractor's inspection report shall identify and address any of the following items observed during the post installation inspection including identifying any proposed remediation measures the Contractor plans to perform where applicable. Remediation measures may consist of repairing or replacing the defective pipe section(s) or a combination of the two where differing conditions exist within the same run of pipe. Where permitted as an option, remediation methods for the various installation defects shall be proposed by the Contractor, reviewed with the Engineer and must have the Engineer's approval prior to implementation of the corrective action. Remediation shall be the sole responsibility of the Contractor. Further, if remediation measures are shown to be necessary, any time associated with such measures shall be reflected in the impact to the Contractor's progress schedule (may take the form of a time impact analysis,

where required by the scheduling requirements) and will not relieve the Contractor of his responsibilities to finish the work required by the contract within the contract time limits or form the basis for any claim of delay where such remediation measures are determined to be a result of the Contractor's fault, omission or negligence.

Upon completion of any corrective remedial measures, the corrected installations are to be re-inspected prior to final acceptance of the project utilizing the test methods identified in VTM 123.

The following criteria shall form the basis for inspections for the respective pipe or culvert types listed:

1. **Concrete Pipe\Culverts:**

- a. **Misalignment:** Vertical and horizontal alignment of the pipe culvert or storm drain pipe barrel shall be checked by sighting along the crown, invert and sides of the pipe, and by checking for sagging, faulting and invert heaving. For the purposes of this provision faulting is defined as differential settlement between joints of the pipe, creating a non-uniform profile of the pipe. The person assigned by the Contractor to perform the inspection should take into account pipe or culvert laid with a designed camber or grade change in accordance with project or site requirements. Horizontal alignment shall be checked for straightness or smooth curvature. Any issues involving incorrect horizontal and/or vertical alignment shall be noted in the inspection report. If any vertical and/or horizontal misalignment problems are visually noted by the Engineer or in the inspection report, a further evaluation shall be conducted by the Engineer to determine the impact of the misalignment on the joints and wall of the pipe to ascertain what corrective actions are needed. All corrective actions determined necessary by the Engineer that are a result of the Contractor's negligence, omission or fault shall be the sole responsibility of the Contractor to remedy.
- b. **Joints:** Leaking joints may be detected during low flows by visual observation of the joints or checking around the ends of pipes or culverts for evidence of piping or seepage.

Differential movement, cracks, spalling, improper gasket placement, movement or settlement of pipe\culvert sections, and leakage shall be noted by the Contractor in the report. Joint separation greater than one inch shall be remediated by the Contractor at his expense to the satisfaction of the Engineer. . Evidence of soil migration through the joint will be further evaluated by the Engineer to determine the level of corrective action necessary. All corrective actions determined necessary by the Engineer that are a result of the Contractor's negligence, omission or fault shall be the sole responsibility of the Contractor to remedy.

- c. **Cracks:** Longitudinal cracks with a width less than one hundredth of an inch (0.01) are considered hairline and minor. They shall be noted in the inspection report; however, no remedial action is necessary.

Longitudinal cracks having a width equal to or greater than one hundredth of an inch (0.01 but equal to or less than one tenth of an inch (0.1) and determined by the Engineer to be detrimental to the structure shall be sealed by a method proposed by the pipe\culvert manufacturer and approved by the Engineer. Pipes or culverts having longitudinal

cracks with widths greater than one tenth of an inch (0.1) and determined to be beyond the limits of a satisfactory structural repair shall be replaced by the Contractor at his expense to the satisfaction of the Engineer.

Pipes or culverts having displacement across the crack greater than 0.1 inch but less than 0.3 inch shall be remediated. Remediation methods shall be in accordance with recommendations of the pipe or culvert manufacturer, be acceptable to and authorized by the Engineer before implementation and shall be the sole responsibility of the Contractor. Pipes\culverts having displacement across the crack greater than 0.3 inch shall be replaced by the Contractor at his expense to the satisfaction of the Engineer.

Transverse cracks will be evaluated using the same criteria as indicated above for longitudinal cracks.

- d. **Spalls:** Spalling is defined as a localized pop-out of concrete along the wall of the pipe\culvert generally caused by corrosion of the steel reinforcement or at the edges of longitudinal or circumferential cracks. Spalling may be detected by visual examination of the concrete along the edges of the crack. The person conducting the inspection shall check for possible delamination. If delamination is noted or if a hollow sound is produced when the area is tapped with a device such as a hammer, the pipe\culvert shall be remediated. Remediation methods shall be in accordance with recommendations of the pipe\culvert manufacturer, be acceptable to and authorized by the Engineer before proceeding, and shall be the sole responsibility of the Contractor.
- e. **Slabbing:** Any pipe\culvert experiencing slabbing shall be remediated. Slabbing is a structural failure of the pipe\culvert that results from radial or diagonal tension forces in the pipe\culvert. These failures appear as a separation of the concrete from the reinforcing steel near the crown or invert of the pipe\culvert and may span the entire length of a pipe or culvert section (joint to joint). Remediation methods shall be in accordance with recommendations of the pipe or culvert manufacturer, be acceptable to and authorized by the Engineer before proceeding, and shall be the sole responsibility of the Contractor. Where slabbing is of such magnitude that, in the opinion of the Engineer the integrity or service life of the pipe or culvert is severely compromised, the section(s) of pipe or culvert exhibiting such deficiency shall be replaced at the Contractor's expense to the satisfaction of the Engineer.

2. Thermoplastic Pipe\Culvert:

- a. **Misalignment:** Vertical and horizontal alignment of the pipe culvert or storm drain pipe barrel(s) shall be checked by sighting along the crown, invert and sides of the pipe, and by checking for sagging, faulting and invert heaving. The person assigned by the Contractor to perform the inspection should take into account pipes\culverts laid with a designed camber or grade change. Horizontal alignment shall be checked for straightness or smooth curvature. Any issues with horizontal and/or vertical alignment shall be noted in the inspection report. If any vertical and/or horizontal misalignment problems are noted in the inspection, a further evaluation will be performed by the Engineer to determine the impact of the misalignment on the joints and wall of the pipe\culvert to ascertain what corrective actions are needed. All corrective actions

determined necessary by the Engineer that are a result of the Contractor's negligence, omission or fault shall be the sole responsibility of the Contractor to remedy.

- b. **Cracks:** Cracks or splits in the interior wall of the pipe shall be remediated. Remediation methods shall be in accordance with recommendations of the pipe manufacturer, be acceptable to and authorized by the Engineer before proceeding, and shall be the sole responsibility of the Contractor
- c. **Joints:** Pipes\culverts showing evidence of crushing at the joints shall be remediated. Differential movement, improper joint sealing, movement or settlement of pipe\culvert sections, and leakage shall be noted in the inspection report. Joint separation of greater than 1 inch shall be remediated. Evidence of soil migration through the joint will be further investigated by the Engineer to determine the level of remedial action required by the Contractor. Remediation methods shall be in accordance with recommendations of the pipe manufacturer, be acceptable to and authorized by the Engineer before proceeding. All corrective actions determined necessary by the Engineer that are a result of the Contractor's negligence, omission or fault shall be the sole responsibility of the Contractor to remedy.
- d. **Buckling, bulging, and racking:** Flat spots or dents at the crown, sides or flow line of the pipe due to racking shall be noted in the inspection report and will be evaluated by the Engineer. Areas of wall buckling and bulging shall also be noted in the inspection report and evaluated by the Engineer for corrective action if deemed necessary by the Engineer. All corrective actions determined necessary by the Engineer shall be the sole responsibility of the Contractor.
- e. **Deflection:** Any one of several methods may be used to measure deflection of thermoplastic pipe\culvert (laser profiler, mandrel, direct manual measure, etc.) If the initial inspection indicates the pipe\culvert has deflected 7.5 percent or more of its original diameter, and if the original inspection was performed using a video camera, then a mandrel test shall also be performed in accordance with VTM 123. All deflections shall be noted in the inspection report. Deflections of less than 5 percent of the original pipe\culvert's diameter shall not require remediation. Deflection of 5 percent up to 7.4 percent will be evaluated by the Engineer. If the pipe\culvert experiences additional defects along with deflection of 5 percent up to 7.4 percent of the original pipe\culvert's diameter, the pipe\culvert shall be remediated. Remediation methods shall be in accordance with recommendations of the pipe\culvert manufacturer, be acceptable to and authorized by the Engineer before proceeding, and shall be the sole responsibility of the Contractor.

If the pipe\culvert is deflected 7.5 percent or greater of the original diameter, the pipe\culvert shall be replaced by the Contractor at his expense to the satisfaction of the Engineer

In lieu of the options noted above for remediation of deflection in thermoplastic pipe\culvert installations, the Contractor may elect to follow the payment schedule below:

Amount of Deflection	Percent of Payment
0.0 % TO 5.0%	100% of Unit Bid Price
5.1% to 7.5%	75% of Unit Bid Price
Greater than 7.5%	Remove and Replace at Contractor's Expense

Remediation efforts and payment shall apply to the entire section(s) of the deflected pipe or culvert, joint to joint.

3. **Metal Pipe\Culvert:**

- a. **Misalignment:** Vertical and horizontal alignment of the pipe culvert or storm drain pipe barrel shall be checked by sighting along the crown, invert and sides of the pipe\culvert, and by checking for sagging, faulting and invert heaving. The person assigned by the Contractor to perform the inspection should take into account pipe laid with a designed camber or grade change. Horizontal alignment shall be checked for straightness or smooth curvature. Any issues with horizontal and/or vertical alignment shall be noted in the inspection report for evaluation by the Engineer. If any vertical and/or horizontal misalignment problems are noted in the inspection, further evaluation will be conducted by the Engineer to determine the impact of the misalignment on the joints and wall of the pipe\culvert to ascertain what corrective actions by the Contractor are needed. All corrective actions determined necessary by the Engineer that are a result of the Contractor's negligence, omission or fault shall be the sole responsibility of the Contractor to remedy.
- b. **Buckling, bulging, and racking:** Flat spots or dents at the crown, sides or flow line of the pipe due to racking shall be noted by the Contractor's inspector in the inspection report and will be evaluated by the Engineer for possible remediation by the Contractor. Areas of wall buckling and bulging shall also be noted in the inspection report and evaluated by the Engineer for possible remediation by the Contractor. If the Engineer determines corrective actions are necessary they shall be in accordance with the pipe\culvert manufacturer's recommendations, be acceptable to and authorized by the Engineer prior to implementation and be the sole responsibility of the Contractor.
- c. **Joints: Pipes showing evidence of** crushing at the joints shall be remediated. Differential movement, improper joint sealing, movement or settlement of pipe sections, and leakage shall be noted in the report. Joint separation of greater than 1.0 inch shall be remediated. Evidence of soil migration through the joint will be further investigated by the Engineer to determine the level of remedial action required by the Contractor. All corrective actions determined necessary by the Engineer that are a result of the Contractor's negligence, omission or fault shall be the sole responsibility of the Contractor to remedy.
- d. **Coating:** Areas of the pipe where the original coating has been scratched, scoured or peeled shall be noted in the inspection report and evaluated by the Engineer to determine the need for immediate repair. If repairs are required they shall be performed by and at the expense of the Contractor in accordance with the recommendations of the pipe\culvert coating manufacturer.

- e. **Deflection:** Any one of several methods may be used to measure deflection of metal pipe\culvert (laser profiler, mandrel, direct manual measure, etc.) If the initial inspection indicates the pipe\culvert has deflected 7.5 percent or more of its original diameter, and if the original inspection was performed using a video camera, then a mandrel test shall also be performed in accordance with VTM 123. All deflections shall be noted in the inspection report. Deflections of less than 5 percent of the original pipe\culvert's diameter shall not require remediation. Deflection of 5 percent up to 7.4 percent will be evaluated by the Engineer. If the pipe\culvert experiences additional defects along with deflection of 5 percent up to 7.4 percent of the original pipe\culvert's diameter, the pipe\culvert shall be remediated. Remediation methods shall be in accordance with recommendations of the pipe\culvert manufacturer, be acceptable to and authorized by the Engineer before proceeding, and shall be the sole responsibility of the Contractor.

If the pipe\culvert is deflected 7.5 percent or greater of the original diameter, the pipe shall be replaced by the Contractor at his expense to the satisfaction of the Engineer

In lieu of the options noted above for remediation of metal pipe\CULVERT, the Contractor may elect to follow the payment schedule below:

Amount of Deflection	Percent of Payment
0.0 % TO 5.0%	100% of Unit Bid Price
5.1% to 7.5%	75% of Unit Bid Price
Greater than 7.5%	Remove and Replace at Contractors Expense

Remediation efforts and percentage of payment shall apply to the entire section(s) of the deflected pipe or culvert, joint to joint.

Section 302.04 Measurement and Payment is amended to add the following:

Post installation inspection shall be measured and paid for at the contract unit price per linear foot. This price shall include performing visual and video camera inspection(s), preparing and furnishing documentation to include narratives and video media in accordance with the requirements herein and VTM 123.

The cost of the remedial measures (including removal and replacement of the pipe, if necessary) and the re-inspection of the remediated pipe necessitated as a result of the Contractor's negligence, omission or fault shall be the contractual and financial responsibility of the Contractor.

Payment will be made under:

Pay Item	Pay Unit
Post installation inspection	Linear Foot

Section 302.04 Measurement and Payment is amended to add the following:

Epoxy-coated reinforcing steel, when a pay item, will be measured in pounds of uncoated steel and will be paid for at the contract unit price per pound. The weight will be computed from the theoretical weights of the nominal sizes of steel specified and placed in the structure. Measurement will not be made for epoxy-coating material. This price shall include furnishing steel and epoxy-

coating material; applying coating material; fabricating, shipping, and placing epoxy-coated reinforcement in the structure; and necessary repairing of epoxy coatings.

Payment will be made under:

Pay Item	Pay Unit
Epoxy-coated reinforcing steel	Pound

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 401—STRUCTURE EXCAVATION

SECTION 401—STRUCTURE EXCAVATION of the Specifications is amended as follows:

Section 401.02(a) Backfill is replaced with the following:

- (a) **Earthen or other backfill** shall be approved by the Engineer and shall be free from large or frozen lumps, wood, or rocks more than 3 inches in their greatest dimension or other extraneous material. Porous backfill shall conform to the requirements of Section 204.02(c) or as specified herein.

Section 401.03(i) Backfilling is replaced with the following:

- (i) **Backfilling:** Excavated spaces that are not occupied by wingwalls, abutments, piers, or other permanent work not specifically addressed herein shall be backfilled with soil to the surface of the surrounding ground.

Select backfill material shall be used behind all abutments. A detail indicating the limits (zone) of the select backfill will be included in the plans on the abutment detail sheet(s). Select backfill material shall be No. 21A or 21 B stone conforming to Section 208 or Select Material Type I, Min. CBR 30 conforming to Section 207 and shall be compacted in accordance with Sections 305 and 303 respectively. The top surface of the backfill material shall be neatly graded.

The earthen fill around the perimeter of the select material zone in abutments, wingwalls, and retaining walls shall be placed in horizontal layers not more than 6 inches in loose thickness and compacted at ± 20 percent of optimum moisture to a density of at least 95 percent as compared to the theoretical maximum density as defined in Division I. Tests for compliance with density requirements will be performed in accordance with the requirements of VTM-12. As the work progresses, backfill in front of units shall be placed and compacted in horizontal layers to the same elevation as the layers behind units until the final elevation in front is reached. Backfill shall be placed in a manner to prevent wedging action against the concrete. Slopes bounding excavation for abutments, wingwalls, or retaining walls shall be modified to lock in adjacent backfill material by stepping or serrating the existing soils. Jetting of the fill behind abutments, wingwalls, or retaining walls will not be permitted.

Fills and backfills around piers not included in the roadway prism shall be constructed in uniformly compacted layers and placed alternately to maintain a uniform elevation on both sides of the structure. However, the density requirement will be waived.

Provisions shall be made for the draining of backfill material. Geocomposite Wall Drains shall be used to drain the select backfill material in all abutments. Porous backfill shall be used in to drain backfill material in retaining structures unless otherwise stated on the plans. In the event the Contractor requests to substitute geocomposite wall drain in lieu of porous backfill in retaining structure and the Engineer approves such a request, the geocomposite wall drain shall be provided at no additional cost.

Geocomposite Wall Drains shall meet the requirements of Section 245.03 (f) and shall be installed in accordance with the manufacturer's recommendations. A minimum three (3) inch joint overlap of geotextile fabric at the top, bottom, ends, and at adjoining panels

shall be provided. The geocomposite wall drain shall be connected to an outlet drain pipe or weephole of at least 6 inches in diameter. The outlet drain shall be completely wrapped by the bottom fabric flap of the geocomposite wall drain. The Contractor shall provide a detailed sketch of the outlet drain pipe connection as well as connections to any special drainage systems associated with the structure for the Engineer's approval prior to installation.

Porous backfill for draining backfill material behind retaining structures shall consist of crusher run aggregate, conforming to the requirements of Section 205 unless stated otherwise on the plans. Porous backfill shall be placed at the back of weep holes to extend 18 inches behind the entrance to the hole, 18 inches above the elevation of the bottom of the hole, and 18 inches laterally on each side of the centerline of the hole. Where crushed glass is used as porous backfill, No. 78 and/or No. 8 aggregate and an 18-inch by 18-inch swatch of drainage fabric meeting the requirements of Section 245.03(c) shall be used to cover the #4 mesh at each weep hole opening exposed directly to crushed glass, or as otherwise approved by the Engineer.

Backfill shall not be placed against abutments or wingwalls until concrete has been in place 14 days, exclusive of days on which the average high-low air temperature is below 40 degrees F in the shade or until test cylinders have attained a compressive strength equal to 93 percent of the required 28-day design compressive strength, except in cases where completion of grading in the area in front of an abutment is desired. In those circumstances, backfill and/or fill may be placed against abutments or wingwalls to a point no higher than the elevation necessary to complete grading in front of the abutment, provided:

1. The concrete has been in place 7 days, exclusive of days on which the average high-low air temperature is below 40 degrees F in the shade, or
2. Test cylinders have attained a compressive strength greater than or equal to 900 psi and the concrete has been in place a minimum of 2 days, exclusive of days on which the average high-low air temperature is below 40 degrees F in the shade. The Contractor shall take additional cylinders at the time of concrete placement and use a calibrated machine or an independent lab to test the cylinders and verify the compressive strength prior to backfilling.

Backfill shall be placed as soon as practicable following attainment of the required compressive strength but not later than 30 days after concrete placement. Excavation openings shall be maintained as dry as practicable at the time of backfilling. Backfill shall be placed in a manner to deter impoundment of water and facilitate existing drainage.

Section 401.04—Measurement and Payment is amended to add the following:

Select backfill will be measured in tons and paid for at the contract unit price per ton. This price shall include furnishing, placing, compacting and grading backfill material.

Payment will be made under:

Pay Item	Pay Unit
Select Backfill	Ton

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 404—HYDRAULIC CEMENT CONCRETE OPERATIONS**

SECTION 404—HYDRAULIC CEMENT CONCRETE OPERATIONS of the Specifications is amended as follows:

Section 404.02(e) Prestressed concrete deck panels is deleted.

Section 404.03(a) Forms is amended to replace the first paragraph with the following:

- (a) **Forms:** On concrete beam bridges, the Contractor shall have the option of using corrugated metal bridge deck forms or wood forms to form that portion of bridge decks between beams unless otherwise specified on the plans. On steel beam bridges, the Contractor shall have the option of using corrugated metal bridge deck forms or wood forms to form that portion of bridge decks between beams or girders unless otherwise specified on the plans. However, corrugated metal forms shall not be used to form overhangs or portions of slabs where a longitudinal joint occurs between beams or girders.

The Contractor shall submit calculations and layout details of the overhang supports and formwork, including fabrication and erection details, to the Engineer for review in accordance with the requirements of Section 105.10. Overhang formwork details shall be signed and sealed by a Professional Engineer, holding a valid license to practice engineering in the Commonwealth of Virginia.

Section 404.03(a)2 Prestressed deck panel forms is deleted.

Section 404.03(j) Removing Formwork and Forming for and Placing Superimposed Elements is amended to replace "1. **Formwork**" with the following:

1. **Formwork** may be removed as follows:
 - a. **Side forms or elements not immediately subjected to loading** (for example: footings and walls or columns with height to width ratios less than 10:1 [$h/w < 10:1$]): 48 hours or 30 percent concrete strength (f'_c). For the purposes herein, width will be considered the narrowest portion of the element measured horizontally across its surface.

The time period noted for form removal shall begin at the completion of the concrete placement and is exclusive of hours when any portion of the surface of the concrete element is below 40 degrees F.
 - b. **All other elements** (for example: soffits of pile caps, bent caps and pier caps): 60 percent concrete strength (f'_c).

Section 404.04—Bridge Deck Construction of the Specifications is amended to replace the first paragraph with the following:

Prior to the beginning of deck placement, screeds shall be approved by the Engineer. Fogging or misting to increase the relative humidity is recommended. Fogging or misting devices attached to the screed shall not be permitted. No fogging or misting above concrete shall be permitted prior to the screeding operation. Fogging or misting shall only be permitted immediately after the

screeding operation and any hand-finishing that has been completed to the concrete surface, and prior to applying the wet-curing mechanism.

Prior to placing the deck concrete, the Contractor shall move the screed over the deck surface with blocks attached to the bottom of the screed to identify any areas where the minimum concrete cover is not likely to be obtained. The Contractor shall make adjustments in the screed placement to insure the minimum concrete cover will be obtained when the concrete is placed.

If the areas of bridge decks not accessible by screed require alternate methods of finishing, the Contractor shall take care not to over finish the surface. The Contractor may float the surface to achieve the required grades, but shall not make excessive use of trowels.

The concrete in the deck of a continuous beam or girder span shall be placed in accordance with the Engineer approved placement schedule. Any deviation from the approved placement schedule must be approved in writing by the Engineer after consultation with the District Structure and Bridge Engineer.

Section 404.08—Measurement and Payment is amended to replace the second paragraph with the following:

The volume of bridge deck slab concrete allowed for payment will be computed using the actual thickness of the slab, not to exceed the plan thickness plus 1/2 inch, for the area between faces of sidewalks, curb lines, railings, or parapets. The area beneath sidewalks, curbs, railings, or parapets will be based on the plan thickness.

Section 404.08—Measurement and Payment is amended to replace the fourth paragraph with the following:

If corrugated metal bridge deck forms are used in lieu of removable forms, the price for concrete shall include furnishing and placing metal forms, additional concrete required to fill corrugations, work necessary to facilitate inspection of the underside of the deck, repairing deficiencies, and strengthening beams or girders to maintain the design live-load rating of the bridge.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 406—REINFORCING STEEL**

SECTION 406—REINFORCING STEEL is completely replaced by the following:

406.01—Description

This work shall consist of furnishing; coating, if required, and placing reinforcing steel or wire mesh used in concrete operations, except prestressed strands and wires, in accordance with these specifications and in conformity to the lines and details shown on the plans.

406.02—Materials

- (a) **Steel used for reinforcement** shall conform to the requirements of Section 223 of the Specifications. Except for spiral bars, bars more than 1/4 inch in diameter shall be deformed bars.
- (b) **Welded wire fabric** shall conform to the requirements of Section 223 of the Specifications.
- (c) **Bar mat reinforcement** shall conform to the requirements of Section 223 of the Specifications.
- (d) **Corrosion resistant steel used for reinforcement** shall conform to the requirements of Section 223 of the Specifications.

406.03—Procedures

- (a) **Order Lists and Bending Diagrams:** Copies of order lists and bending diagrams shall be furnished the Engineer when required.
- (b) **Protecting Material:** Reinforcing steel shall be stored on platforms, skids, or other supports that will keep the steel above ground, well drained, and protected against deformation.

When placed in the work, steel reinforcement shall be free from dirt, paint, oil, or other foreign substances. Steel reinforcement with rust or mill scale will be permitted provided samples wire brushed by hand conform to the requirements for weight and height of deformation.

- (c) **Fabrication:** Bent bar reinforcement shall be cold bent to the shape shown on the plans. Fabrication shall be in accordance with the requirements of the *Manual of Standard Practice for Detailing Reinforced Concrete Structures* (ACI 315).

Spiral bars shall be fabricated to have the proper diameter when placed in position at the pitch shown on the plans. Each end of a spiral bar shall have 1 1/2 finishing turns at each end in a plane perpendicular to the axis of the spiral.

- (d) **Placing and Fastening:** Steel reinforcement shall be firmly held during the placing and setting of concrete. Bars, except those to be placed in vertical mats, shall be tied at every intersection where the spacing is more than 12 inches in any direction. Bars in vertical mats and in other mats where the spacing is 12 inches or less in each direction shall be tied at every intersection or at alternate intersections provided such alternate ties accurately maintain the position of steel reinforcement during the placing and setting of concrete.

Tie wires used with corrosion resistant reinforcing steel shall be solid stainless or plastic coated.

The minimum clear distance from the face of the concrete to any reinforcing bar shall be maintained as specified herein. In superstructures, the cover shall be at least 2 1/2 inches except as follows:

1. **Bottom of slab:** 1 1/4 inches.
2. **Stirrups and ties in T-beams:** 1 1/2 inches.
3. **Rails, rail posts, curbs, and parapets:** 1 inch.

In substructures, the cover shall be at least 3 inches except as follows:

1. **Abutment neat work and pier caps:** 2 1/2 inches.
2. **Spirals and ties:** 2 inches.

In corrosive or marine environments or under other severe exposure conditions, the minimum cover shall be increased 1 inch. Bars that must be positioned by maintaining clearances from more than one face shall be centered so that clearances indicated by the plan dimension of bars are equalized.

Bars shall be placed so that the concrete cover as indicated on the plans will be maintained within a tolerance of 0 to +1/2 inch in the finally cast concrete.

Where anchor bolts interfere with reinforcing steel, the steel position shall be adjusted without cutting to permit placing anchors in their proper locations.

Reinforcement in bridge deck slabs and slab spans shall be supported by standard CRSI metal or precast concrete bar supports. Bar supports shall be spaced as recommended by CRSI but not more than 4 feet apart transversely or longitudinally. Precast concrete supports shall be less than 1 foot in length and staggered so as not to form a continuous line. The lower mat of steel reinforcement shall be supported by a bolster block or individual chair bar supports and the upper mat can be supported by individual high chair bar supports or continuous bar supports placed between the upper and lower mats. Bar supports shall be firmly stabilized so as not to displace under construction activities. Reinforcing bar supports (Standees) may be used for the top mat of steel of simple slab spans provided they hold the reinforcing steel to the requirements specified herein and are firmly tied to the lower mat to prevent slippage. The use of standees will not be permitted for the top mat of steel on any continuous slab spans.

Precast concrete bar supports shall have a 28-day design compressive strength of at least 4,500 pounds per square inch and shall be from the Department's list of approved products for the use specified. Supports shall be furnished with plastic ties or shaped to prevent slippage from beneath the reinforcing bar. Metal bar supports shall be fabricated from one of the following: (1) stainless steel wire conforming to the requirements of ASTM A493, or (2) cold-drawn wire protected by plastic coating conforming to CRSI standards, or other protective coating as approved by the Engineer.

In reinforced concrete sections other than bridge slabs, the specified clear distance from the face of concrete to any reinforcing bar and the specified spacing between bars shall be maintained by means of approved types of stays, ties, hangers, or other supports. The use of pieces of gravel, stone, brick, concrete, metal pipe, or wooden blocks will not be permitted as supports or spacers for reinforcing steel. The use of precast concrete block supports will be permitted provided blocks are furnished in correct thicknesses and are shaped or tied to prevent slippage from

beneath reinforcing bars. The clear distance between bars shall be at least 1 1/2 times the specified maximum size of coarse aggregate but not less than 1 1/2 inches. Before concrete is placed, reinforcing steel will be inspected and approved for proper position and the adequacy of the method for maintaining position.

- (e) **Splicing and Lapping:** Reinforcement shall be furnished in full lengths as indicated on the plans. Except where shown on the plans, splicing bars will not be permitted without the written approval of the Engineer. Splices shall be as far apart as possible.

In lapped splices, bars shall be placed in contact and wired together. Lap lengths shall be as indicated on the plans. When reinforcing bars cannot be fabricated with the lengths shown on the plans, the bars may be lapped at no additional cost to the Department. Lap lengths shall be in accordance with the AASHTO *LRFD Bridge Design Specifications*.

Mechanical butt splicing will be permitted at locations shown on the plans. The mechanical connection shall develop in tension or compression, as required, 125 percent of the specified yield strength of the bar. The total slip of the bar within the splice sleeve of the connector after loading in tension to 30.0 ksi and relaxing to 3.0 ksi shall not exceed the following measured displacements between the gage points clear of the splice sleeve:

For bar sizes up to No. 14: 0.01 inch
For No. 18 bars: 0.03 inch

For corrosion resistant reinforcing bars, mechanical butt splicers shall be of the same material as the bars being spliced except for stainless clad bars for which the splicers shall be stainless steel.

Reinforcing steel shall be welded only if specified on the plans. Welding shall be in accordance with the requirements of Section 407.04(a) of the Specifications. Reinforcing steel conforming to ASTM A615 Grade 60 shall not be welded. Corrosion resistant reinforcing steels shall not be welded.

Lap lengths for welded wire fabric or bar mat reinforcement shall be in accordance with the current AASHTO *LRFD Bridge Design Specifications*.

406.04—Measurement and Payment

Reinforcing steel will be measured in pounds of steel placed in the structure as shown on the plans. The weight of **welded wire fabric** will be computed from the theoretical weight per square yard placed, including allowance for laps not to exceed 8 percent of the net area. Reinforcing steel or welded wire fabric will be paid for at the contract unit price per pound. These prices shall include furnishing, fabricating, and placing reinforcement in the structure. In structures of reinforced concrete where there are no structural steel contract items, expansion joints, plates, rockers, bolts, and similar minor metal parts will be paid for at the contract unit price for reinforcement.

Corrosion resistant reinforcing steel, when a pay item, will be measured in pounds and paid for at the contract unit price per pound of the designated type of steel indicated and placed in the structure in the location(s) shown on the plans. This price shall include fabricating, shipping, furnishing and placement.

No payment will be made for fastening devices that may be used by the Contractor for keeping reinforcing bars in their correct position. When the substitution of larger bars than those specified is allowed, payment will be made for only the amount of metal that would have been required if the specified size of bar had been used. When full-length bars are shown on the plans and the Contractor obtains approval to use short bars for his convenience, the weight paid for will be based on the full-length dimensions with no allowance made for splices.

Payment will be made under:

Pay Item	Pay Unit
Reinforcing steel	Pound
Welded wire fabric	Pound
Corrosion resistant reinforcing steel, Class I	Pound
Corrosion resistant reinforcing steel, Class II	Pound
Corrosion resistant reinforcing steel, Class III	Pound

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 407—STEEL STRUCTURES**

SECTION 407—STEEL STRUCTURES of the Specifications is amended as follows:

Section 407.04(d) Bolt Holes is amended to replace the second paragraph with the following:

Finished holes shall be 1/16 inch larger than the nominal bolt size. Oversized holes will be permitted only with the permission of the Engineer or in accordance with the requirements of Section 407.06(b). Finished holes shall be within 1/16 inch of the plan gage and match-mating holes, with no offset greater than 1/16 inch. Holes varying more than 1/16 inch from the plan gage will be rejected.

Section 407.06(c)3.b. Direct tension indicators is amended to replace the first paragraph with the following:

- b. **Direct tension indicators:** When direct tension indicators are used, installation shall be in accordance with the requirements of Section 407.06(c)3 of the Specifications. However, the indicator washer shall not be considered a substitute for the required hardened washer under the turned element but may be considered a substitute for the hardened washer required under the unturned element when bolts conforming to the requirements of ASTM A 490 are used with steel conforming to the requirements of ASTM A 709, Grade 36. Direct tension-indicator washers shall not be painted or coated with any epoxy or similar material prior to installation. The normal installation shall consist of the load indicator being placed under the unturned bolt head or unturned nut. However, if conditions required installation under the turned bolt portion, a hardened flat washer or nut face washer shall be fitted against the tension-indicating protrusions. Tension-indicating washers shall not be substituted for the hardened washers required with short-slotted or oversized holes but may be used in conjunction with them.

Section 407.04(j) Stud Shear Connectors is replaced with the following:

- (j)**Stud Shear Connectors:** The diameter of the connectors shall be 7/8 inch, and the length shall be at least 4 inches. Heads shall project at least 2 inches above the plane of the bottom of the deck slab and shall be 3 inches below the plane of the top of the deck slab. In determining the required length, the computed dead-load deflection, vertical curve correction, and actual (measured) camber of the fabricated beam shall be taken into consideration. Studs 3/4 inch in diameter may be substituted for 7/8-inch studs, or vice versa, by making an adjustment in the pitch proportionally to the cross-sectional area of the studs with a spacing of not more than 24 inches. Studs shall be adjusted as necessary to provide clearance for bolts in bolted splices. The fabricator's shop plans shall show the location (spacing) and heights of the stud shear connectors regardless of whether they will be welded in the shop or in the field. Studs shall be end welded automatically or semi-automatically to the steel beams. The method and equipment used shall be as recommended by the manufacturer of the studs and shall be approved by the Engineer. Studs shall be field welded after structural steel is erected and metal decking or other walking or working surface is in place; however, structural steel with shop-applied studs may be erected provided erection is performed in accordance with the requirements of Section 107.17 of the Specifications.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 700—GENERAL**

SECTION 700—GENERAL of the Specifications is amended as follows:

Section 700.02(g) is replaced with the following:

- (g) **Steel for structural support of light poles and traffic control devices** shall conform to Section 226 and shall be fabricated, welded, and inspected in accordance with Section 407.

Section 700.02(i) is amended to replace “**Poles, posts, and overhead and bridge-mounted sign structures**” in the first sentence with “**Poles, posts, and overhead sign structures**”.

Section 700.02(i) is amended to replace 1, 2, 3, and 4 and the next three paragraphs including the bullets with the following:

1. **Conventional and offset lighting poles** shall be steel or aluminum.
2. **Overhead sign structures, signal poles (mast arm and strain), and high-mast lighting poles** shall be steel.
3. **Pedestal poles** with a nominal diameter of more than 2 inches shall be steel or aluminum. Pedestal poles 2 inches and less in nominal diameter shall conform to the requirements of Section 238 for metal conduit.
4. **Wood for wooden posts and poles** shall conform to Section 236 and shall be treated in accordance with Section 236. Wood items shall be cut to size or design before treatment.
5. **Ground Mounted Sign Structures** shall be fabricated from galvanized steel. Square tube posts shall conform to the requirements of ASTM A1011, Grade 50 except the yield strength after cold-forming shall be 60,000 psi minimum for 12 and 14 gage and 55,000 psi minimum for 10 gage posts. Posts (inside and outside) shall be galvanized in accordance with the requirements of ASTM A653, Coating Designation G-90. Square tube sign posts shall have 7/16-inch (+/- 1/64-inch) openings or knockouts spaced 1-inch on centers on all four sides.

The design of traffic control device structures and foundations shall conform to the requirements of the edition of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* specified in the Structure & Bridge Division S&B-IIM-90 Memorandum (VDOT Modifications to AASHTO's *Standard Specifications*) in effect at the time of advertisement.

Steel poles, posts, and overhead sign structures shall be hot-dip galvanized after fabrication. Except when shop painting is required, steel poles and posts shall be given one shop coat of primer and two field coats of paint and the galvanization finish of overhead sign structures shall be field treated for paint retention and two coats of paint applied.

Section 700.02(k) Breakaway Support Systems is replaced with the following:

Breakaway support systems shall be tested and certified to conform to the requirements of NCHRP Report 350, or be Manual for Assessing Safety Hardware (MASH) certified. The Contractor

shall provide a certification letter stating the brands and models of breakaway systems planned for use have been tested and are in conformance with this requirement. Breakaway couplers shall not be used. The following systems shall be used when breakaway supports are specified on the plans:

1. **Frangible bases** and skirt covers shall be aluminum.
2. **Slip bases** shall be galvanized steel or other approved noncorrosive metal.

Section 700.04(a)1. Grounding Electrodes is amended to replace the seventh paragraph with the following:

- The Contractor shall install a junction box at the primary grounding electrode location for access to the electrode for connection and testing. Grounding electrode conductors shall be installed under the bottom flange of the junction box. The grounding electrode shall be centered in the bottom of the junction box with a minimum of 6 inches exposed. The junction box cover shall have the letters "VDOT ELEC" cast in the depression on the top.

Section 700.04(a)2. Grounding electrode testing is replaced with the following

2. **Grounding electrode testing:** The Contractor shall test the primary grounding electrodes after each 10-foot grounding electrode and/or section thereof is installed using the fall of potential (three-point measurement) method. After the primary grounding electrode is installed and tested, the Contractor shall connect to the augmented electrode(s) to conduct a system test. The Contractor shall disconnect the grounding electrode conductor from the service equipment ground bus and bonding bushing before testing the grounding electrodes/system. The Contractor shall test the grounding electrode as required by the manufacturer's instructions for the type of earth testing equipment. The Contractor shall record the readings on a form provided by the VDOT Regional Traffic Engineering Office. The completed form shall be signed and submitted to the Engineer after installation of the electrical service grounding system.

Section 700.04(c) Concrete Foundations is amended to replace the third paragraph with the following:

The Contractor shall furnish the foundation designs for signal poles, high-mast lighting poles, and overhead sign structures to the Engineer for review and acceptance. Designs shall indicate the cubic yard quantity of concrete required for constructing the foundations. Foundations shall be designed for the structure it is supporting and the proposed loads shown on the plans.

The Contractor shall perform at least one test bore, as approved by the Engineer, at each foundation location to determine the subsurface conditions of the proposed site before designing the foundation. Test bores shall be performed in accordance with any of the following three referenced methods:

1. ASTM D 420, ASTM D 1452, and ASTM D 1586.
2. ASTM D 3441.
3. ASTM D 4719.

Section 700.04(g)1. Electrical service and lighting conductor identification is amended to replace the fifth paragraph with the following

2-wire circuits, 120 Volts; 3-wire circuits, 120/240 Volts; 3-phase, 4-wire wye circuits, 208/120 Volts and; 3-phase, 4-wire delta circuits, 240 Volts

Circuit Designation	Color Code
Phase A or Line A	Black
Phase B or Line B	Red or orange*
Phase C	Blue
Grounded Conductor (Neutral)	White or gray** (see exception above)
Equipment Grounding Conductor	Bare, green, or green with one/more yellow stripes

3-phase, 4-wire wye circuits, 480/277 Volts; 3-phase, 3-wire delta circuits, 480 volts

Circuit Designation	Color Code
Phase A	Brown
Phase B	Orange
Phase C	Yellow
Grounded Conductor (Neutral)	White or gray** (see exception above)
Equipment Grounding Conductor	Bare, green, or green with one/more yellow stripes

- * For 3-phase, 4-wire delta circuits, Phase B shall be the high leg and shall be orange.
- ** For outer covering of conductors of different systems that is contained within the same enclosure, refer to Article 200 of the NEC.

Section 700.04(h) Conduit Systems is amended to include the following:

The Contractor shall install a bushing to protect the conductor cable from abrasion when a conduit enters a junction box, fitting, or other enclosure, unless the design of the junction box, fitting, or enclosure is such as to afford equivalent protection of the conductor cable.

Section 700.04(h)2. Buried conduit systems is amended to replace the second paragraph with the following:

The Contractor shall install conduit by the use of an approved directional boring method when conduit is to be installed under an existing roadway, entrance, or fixed object and open cutting is not allowed. Conduit for the directional boring method shall be Polyvinylchloride (PVC) or High-Density Polyethylene (HDPE) designed specifically for the directional boring operation. When the plans show more than one conduit at a location to be installed by directional boring, with the Engineer's approval the Contractor may elect to install multiple conduits into a single bore at no additional cost to the Department.

MAXIMUM PILOT OR BACK REAMER BIT DIAMETER WHEN ROTATED 360°	
NOMINAL INSIDE PIPE DIAMETER INCHES	BIT (REAMER) DIAMETER INCHES
1 - 2"	4" BORE HOLE
2 - 2"	5" BORE HOLE
3 - 2"	8" BORE HOLE
1 - 3"	5" BORE HOLE
2 - 3"	6 ½ " BORE HOLE
3 - 3"	8" BORE HOLE
1 - 4"	6 ½ " BORE HOLE

The Contractor shall use an Engineer approved stabilizing agent mixed with potable water to create the drilling fluid (mud slurry) for lubrication and soil stabilization. The fluid viscosity may vary to best fit the soil conditions encountered. The Contractor shall not use any chemicals or polymer surfactants in the drilling fluid without written consent from the Engineer. The

Contractor shall certify to the Engineer in writing that any chemical added to the drilling fluid is environmentally safe and not harmful or corrosive to the conduit system.

The Contractor may elect to use the jacked method to install a pipe sleeve for installation of the required conduit at no additional cost to the Department.

If an obstruction is encountered during the directional boring or jacking operation that requires abandonment of the bore hole, the Contractor shall immediately backfill the hole with flowable fill for its full length at no additional cost to the Department.

Section 700.04(i) Junction Box Covers is replaced with the following:

(i) **Junction Boxes** shall be installed as follows:

The Contractor shall excavate the junction box site to a depth equal to the height of the junction box plus at least 12 inches to allow for the installation of aggregate bedding material. The width of the excavation shall be 6 to 8 inches wider than the junction box to allow proper aggregate backfill.

Bedding material shall conform to Section 203 and be No. 68, No. 78, or No. 8 aggregate or crushed glass conforming to No. 78, or No. 8 gradation requirements. Aggregate shall be at least 12 inches in depth and entirely cover the bottom of the excavated area for the junction box. The Contractor shall level and tamp the bedding aggregate to compact it prior to installing the junction box.

Junction boxes shall be installed and leveled to grade prior to backfilling.

Prior to backfilling the interior of polymer concrete junction boxes (JB-S1, JB-S2 and JB-S3) shall be braced with 2 inch by 4 inch lumber using two braces across the width and one brace across the length of the box or braced as required by the junction box manufacturer. Bracing shall be installed to facilitate removal once backfilling and compaction activities have been completed. The Contractor shall remove internal bracing after backfilling and compacting operations have been completed.

The cover of the junction box shall be installed prior to backfilling.

The junction box shall be backfilled and compacted around its perimeter utilizing six to eight inch horizontal lifts to the elevation where the concrete collar is to begin. Once the concrete collar has cured the remaining area around the collar shall be backfilled and compacted as stated above. Compaction density shall be to at least ninety percent of the theoretical maximum density as defined in Section 101.02 of the Specifications. The Contractor shall use a mechanical tamping device to compact the backfill material and soil, layer by layer around the perimeter of the junction box. The wheel of a backhoe or other type vehicle shall not be used for compaction of backfill and soil. The internal bracing shall be removed after backfilling and compaction have been completed. The area around the junction box shall be graded and restored according to the plans and as stated in the pertinent Specifications.

Junction boxes shall not be installed or backfilled where there is standing water. Backfill material shall be free of large stones, wood or other debris and shall not be saturated with water.

If a special tool or wrench is required to remove the junction box cover, the Contractor shall furnish the Engineer with five such tools.

Section 700.04—Procedures is amended to include the following:

(k) **Anchor Bolts**

Foundations for traffic control devices shall have a bolt template positioned for the correct orientation of the structure with respect to the structure's location and roadway alignment and to maintain the anchor bolts vertically (plumb) and level during construction.

Bolt and/or anchor nut covers shall not be installed on any traffic control device structures, unless otherwise specified on the plans.

Anchor bolts in double-nut connections shall extend a minimum of 1/4 inch past the second top nut.

The threaded portion of the anchor bolts shall be lubricated with beeswax, the bolt manufacturer's recommended lubricant, or other lubricant as approved by the Engineer to assist in proper tensioning before the structure is installed.

Double-nut connections installation procedure: A minimum of three nuts and two hardened washers shall be provided for each anchor bolt.

1. If anchor bolt(s) are not plumb (vertical), determine if beveled washer(s) may be required prior to erection of the structure. Beveled washers shall be used on top of the leveling nut and/or under the first top nut if any face of the base plate has a slope greater than 1:20 and/or if any nut could not be brought in firm contact with the base plate.
2. Clean and lubricate the exposed thread of all anchor bolts, nuts, and all bearing surfaces of all leveling nuts. Re-lubricate the exposed threads of the anchor bolts and the threads of the nuts if more than 24 hours has elapsed since earlier lubrication, or if the anchor bolts and nuts have become wet since they were first lubricated.
3. Verify that the nuts can be turned onto the bolts the full length of the threads by hand.
4. Turn the leveling nuts onto the anchor bolts and align the nuts to the required elevation shown on the shop drawings. The maximum distance between the bottom of the leveling nut and the top of the foundation shall be one inch (1").
5. Place structural hardened washers on top of the leveling nuts (one washer corresponding to each anchor bolt).
6. The post or end frame shall be plumbed or aligned as shown on the shop drawings. The maximum space between the bottom of the base plate and the top of the foundation shall be the diameter of the anchor bolt plus one (1) inch. Place structural hardened washers on top of the base plate (one washer corresponding to each anchor bolt), and turn the first top nuts onto the anchor bolts.
7. Tighten first top nuts to a snug-tight condition in a star pattern. Snug-tight is defined as the maximum nut rotation resulting from the full effort of one person using a 12-inch long wrench or equivalent. A star tightening pattern is one in which the nuts on opposite or near-opposite sides of the bolt circle are successively tightened in a pattern resembling a star.
8. Tighten bottom leveling nuts to a snug-tight condition in a star pattern.

9. At this point, verify again if beveled washers are necessary using the criteria from step 1. If a beveled washer is required, remove the structure if necessary, add the beveled washer(s) and retighten first top nuts and bottom leveling nuts (in a star pattern) to a snug-tight condition.
10. Mark the reference position of each first top nut in a snug-tight condition with a suitable method on one flat surface of the nut with a corresponding reference mark on the base plate at each bolt before final tightening of the first top nuts. Then rotate the first top nuts incrementally to one half the required nut rotation specified in Table 1 using a star pattern. Rotate the first top nuts again, using a star pattern, to the full required nut rotation specified in Table 1. For example, if total rotation from snug tight is 1/6 turn (60°), rotate 30° in each cycle.

Table 1

Anchor Bolt Diameter, (in.)	Nut Rotation beyond Snug - Tight	
	ASTM F 1554 Grade 36 (M314)	ASTM F 1554 Grade 55 (M 314)
≤1½	1/6 turn (60°)	1/3 turn (120°)
>1½	1/12 turn (30°)	1/6 turn (60°)

Nut rotation is relative to anchor bolt. Anchor bolt nut tensioning shall not exceed plus 20°.

Unified Thread Standard (UNC) tensioning is applicable.

The Engineer will not permit the use of lock nuts and/or split washers with anchor bolts.

11. The Contractor shall inspect tightened anchor bolt connections by the use of a calibrated torque wrench in the presence of the Engineer. The torque wrench shall be used to verify that a torque at least equal to the verification torque as provided in Table 2 has been achieved. A minimum of every other bolt shall be inspected.

Table 2

Anchor Bolt Diameter, (in.)	Verification Torque	
	ASTM F 1554 Grade 36 (M314) Tension/Torque kips/ft-lbs.	ASTM F 1554 Grade 55 (M 314) Tension/Torque kips/ft-lbs.
1	18 / 180	27 / 270
1 ¼	28 / 350	44 / 550
1 ½	41 / 615	63 / 945
1 ¾	55 / 962	86 / 1,505
2	73 / 1,460	113 / 2,260
2 ¼	94 / 2,115	146 / 3,285
2 ½	116 / 2,900	180 / 4,500

2 ³ / ₄	143 / 3,932	222 / 6,105
3	173 / 5,190	269 / 8,070
3 ¹ / ₄	206 / 6,695	320 / 10,400
3 ¹ / ₂	242 / 8,470	375 / 13,125
3 ³ / ₄	280 / 10,500	435 / 16,312
4	321 / 12,840	499 / 19,960

12. Install second top nut on each bolt to snug tight.

13. After all prior steps are completed and all elements of the structure are fully erected, the Contractor shall perform an ultrasonic test on all anchor bolts in accordance with ASTM E114 - Ultrasonic Pulse Echo Straight Beam Testing by the Contact Method. Ultrasonic testing personnel shall be qualified in accordance with ASNT SNT-TC-1A Level II and certified by the VDOT Materials Division. Equipment shall be qualified in accordance with AWS D1.5 Section 6, Part C. Anchor bolts shall have no indications that are above 10% Full Screen Height at the prescribed scanning level. All indications shall be noted on the test report and submitted to the Engineer and the VDOT Materials Division. A copy of the report for structures with and without indications shall be submitted to the District Bridge Office and the Engineer.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 701—TRAFFIC SIGNS

SECTION 701—TRAFFIC SIGNS of the Specifications is amended as follows:

Section 701.03—Procedures is amended as follows:

Section 701.03(a)2. Sign panels is replaced with the following:

Panels for permanent signs shall be fabricated of aluminum 0.100 inch in thickness and shall be smooth, flat, and free of metal burrs and splinters. Sign panels for overlays shall be aluminum alloy conforming to the Section 229.02(a), between 0.080 and 0.100 gage in thickness.

Extruded sign panels shall conform to the *VDOT Road and Bridge Standards* and Section 229.02(c).

Section 701.03(a)5. Joining sign base panels is amended to replace the first sentence with the following:

Horizontal joints shall be constructed according to *VDOT Standard Drawing SPD-1*.

Section 701.03(d) Erection is amended to replace the first sentence of the first paragraph with the following:

The Contractor shall install sign panels on overhead sign structures so that the vertical clearance is not less than 19 feet and not more than 21 feet from the bottom of the lowest mounted sign panel to the crown of the roadway, unless otherwise specified on the plans.

Section 701.03(d). Erection is amended to delete the last sentence of the first paragraph.

Section 701.03(d). Erection is amended to delete the last paragraph.

Section 701.03(d). Erection is amended to include the following:

Overlay panels shall be installed on a flat portion of the existing sign panel with no protruding bolts or bolt heads. Overlay of overhead sign panels shall be according to details shown on the plans.

Section 701.04 Erection is amended to replace the first paragraph with the following:

Sign panels will be measured in square feet and will be paid for at the contract unit price per square foot. This price shall include background sheeting, sign messages, finishing, framing units, hanger assemblies, bracing, stiffeners, splicing, backing strips, post clips/post clamps, warranty and labeling.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 703—TRAFFIC SIGNALS

SECTION 703—TRAFFIC SIGNALS of the Specifications is amended as follows:

Section 703.02—Equipment is amended as follows:

Section 703.02(g)—Detectors is amended to delete 1. Magnetic detectors and 2. Magnetic detector amplifiers.

Section 703.03—Procedures is amended as follows:

Section 703.03(e) Installing signal heads is amended to replace the last sentence of the second paragraph with the following:

Joints shall be rendered weatherproof by an approved method.

Section 703.03(g)1.—Magnetic Detectors is deleted.

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 704—PAVEMENT MARKINGS AND MARKERS**

SECTION 704—PAVEMENT MARKINGS AND MARKERS of the Specifications is amended as follows:

Section 704.02—Materials is amended to include the following:

All pavement markers and pavement marking materials shall be selected from the *VDOT Materials Division Approved Products List*

Section 704.03—Procedures is amended to replace the second sentence of the second paragraph with the following:

Pavement markings installations, including symbol/message markings, shall be completed within the time limits herein on roadways where the pavement markings have been removed or obscured and the roadway is reopened to traffic, unless otherwise directed by the Engineer.

Section 704.03—Procedures is amended to replace the third through fifth paragraphs with the following:

Pavement marking installation on interstates, and other freeways (fully limited-access divided roadways with two or more lanes per direction) with posted speed limit of 55 mph and greater, shall be completed within the workday during which the pavement markings were removed, eradicated, or obscured prior to reopening the lanes to traffic.

Pavement marking installation on non-freeway roads having traffic volumes of 10,000 ADT or more shall be completed within 24 hours after the end of the workday on which the existing pavement markings were removed, eradicated, or obscured.

Pavement marking installation on non-freeway roads having traffic volumes between 3,000 and 10,000 ADT shall be completed within 48 hours after the end of the workday on which the existing pavement markings were removed, eradicated, or obscured.

Pavement marking installation on non-freeway roads having traffic volumes of less than 3,000 ADT shall be completed within 72 hours after the end of the workday on which the existing pavement markings were removed, eradicated, or obscured.

Section 704.03(a) Pavement Markings is amended to replace the seventh through eleventh paragraphs with the following:

Pavement message/symbol markings shall be installed using Type B Class I, II, or IV markings unless indicated otherwise in the contract documents and shall include, but not be limited to school zone markings, railroad crossing markings, accessible (disabled) parking symbols, turn lane (elongated) arrows, word messages, etc.

The Contractor shall protect the public against potential damages that may result from pavement marking operations. The Contractor shall be responsible for the complete preparation of the pavement surface, including, but not limited to, removing dust, dirt, loose particles, oily residues, curing compounds, concrete laitance, residues from eradication, and other foreign matter immediately prior to installing pavement markings. The pavement surface shall be dry when tested in accordance with VTM-94 at the time of permanent pavement marking installation. The

Contractor shall be responsible for providing the apparatus indicated in VTM-94 that are needed to perform the moisture test.

Liquid markings shall be applied so as to prevent splattering and overspray, and shall be protected from traffic until track free by the use of traffic control guarding or warning devices as necessary. If a vehicle crosses a pavement marking and tracks it, or if splattering or overspray occurs, the affected marking and resultant tracking, overspray or splattering shall be immediately eradicated, the affected pavement and other surfaces cleaned and prepared, and new markings applied at the Contractor's expense.

Equipment shall be thoroughly cleaned between changes in colors or types of materials.

Pavement markings shall have clean and well-defined edges without running, bleeding or deformation. Markings shall be uniform in appearance, free of waviness; (the edge of the marking not varying more than 1/4 inch in three feet from a straight line or more than one inch in fifty feet for a maximum distance of 500 feet) shall be straight on tangent alignment; and shall be on a true arc on curved alignment.

The widths of pavement markings shall not deviate more than 1/4 inch on tangent sections, nor more than 1/2 inch on curves from the required width. The length of the gap and the length of the individual stripes that form skip lines shall not deviate more than two inches from their required lengths. The length of the gap and individual skip line shall be of such uniformity throughout the entire length of each that a normal striping machine shall be able to repeat the pattern and superimpose additional striping upon the existing marking.

Glass beads shall be applied at the rate specified herein and shall be evenly distributed over the entire surface of the marking. The Contractor shall apply beads to the surface of liquid markings with a bead dispenser attached to the applicator that shall uniformly dispense beads simultaneously on and into the just-applied marking. The bead dispenser shall be equipped with a cut-off control synchronized with the applied marking material cut off control so that the beads are applied totally on the marking. Beads shall be applied while the liquid marking is still fluid. Approximately 70 percent of the beads shall be buried in the marking, and the remaining 30 percent shall be 50 to 60 percent embedded in the marking's surface, unless otherwise specified by the pavement marking manufacturer. Beads installed on crosswalks and stop lines on roadways with curbs only (no gutter) may be hand applied for two feet at the end of each line next to the curb with 100 percent of the beads embedded 50 to 60 percent into the marking's surface.

The Contractor shall provide written certification that all preformed symbols/characters, or the templates used to create such symbols/characters for non-preformed markings, match the size and shape specified in the *VDOT Road And Bridge Standards* and the contract documents.

Section 704.03(a)2 Type B Markings is amended to replace the second paragraph with the following:

Non-truck mounted equipment for application of thermoplastic material shall be of the screed extrude type with a screw-drive or shall be self-propelled and regulated to allow for calibration of the amount of material applied. Non-truck mounted equipment for application of epoxy resin material shall also be self-propelled and regulated to allow for calibration of the amount of material applied.

Section 704.03(a)2a Thermoplastic (Class I) is replaced with the following:

Thermoplastic (Class I) material shall be applied by screed extrusion, ribbon gun, or spray equipment. Alkyd thermoplastic may be applied directly after the paving operations; however, hydrocarbon thermoplastic shall not be applied less than 30 days after the paving operations.

Alkyd and hydrocarbon materials shall not be mixed together. The Contractor shall ensure equipment is thoroughly cleaned when colors or types of material are changed.

Thermoplastic shall not be applied over existing pavement markings of other materials unless the existing marking is 90 percent worn away, obscured, or eradicated. Thermoplastic shall only be applied over existing thermoplastic markings if the existing thermoplastic markings are clean and not chalky, chipped or powdery in appearance or condition.

Section 704.03(a)2b Poleyester Resin (Class II) is replaced with the following:

Preformed Thermoplastic (Class II) material shall be installed per the manufacturer's recommendations. When markings are installed on hydraulic cement concrete pavement, primer shall be applied first in accordance with manufacturer's requirements.

Additional glass beads shall be applied evenly to the surface of the preformed thermoplastic material for messages and symbols immediately after installation at the rate of 7 pounds per 100 square feet to facilitate embedment while the material is in a softened state using manufacturer approved equipment, bead package, and methods.

Section 704.04—Measurement and Payment is amended to replace paragraphs two and three with the following:

Pavement message markings will be measured in units of each or linear feet and will be paid for at the contract unit price per each per location or linear foot as applicable for the size and/or type and class specified. This price shall include the pavement marking material, surface preparation, quality control tests, daily log, guarding devices, primer/adhesive, and glass beads.

Pavement markers will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include pavement cutting, surface preparation, primer if required, prismatic retroreflectors, adhesive, and castings.

Payment will be made under:

Pay Item	Pay Unit
Pavement message marking (Symbol or Text, Size, Type and Class)	Each or linear foot
(Type)Pavement marker (type pavement)	Each

Section 704—PAVEMENT MARKINGS AND MARKERS of the Specifications is amended as follows:

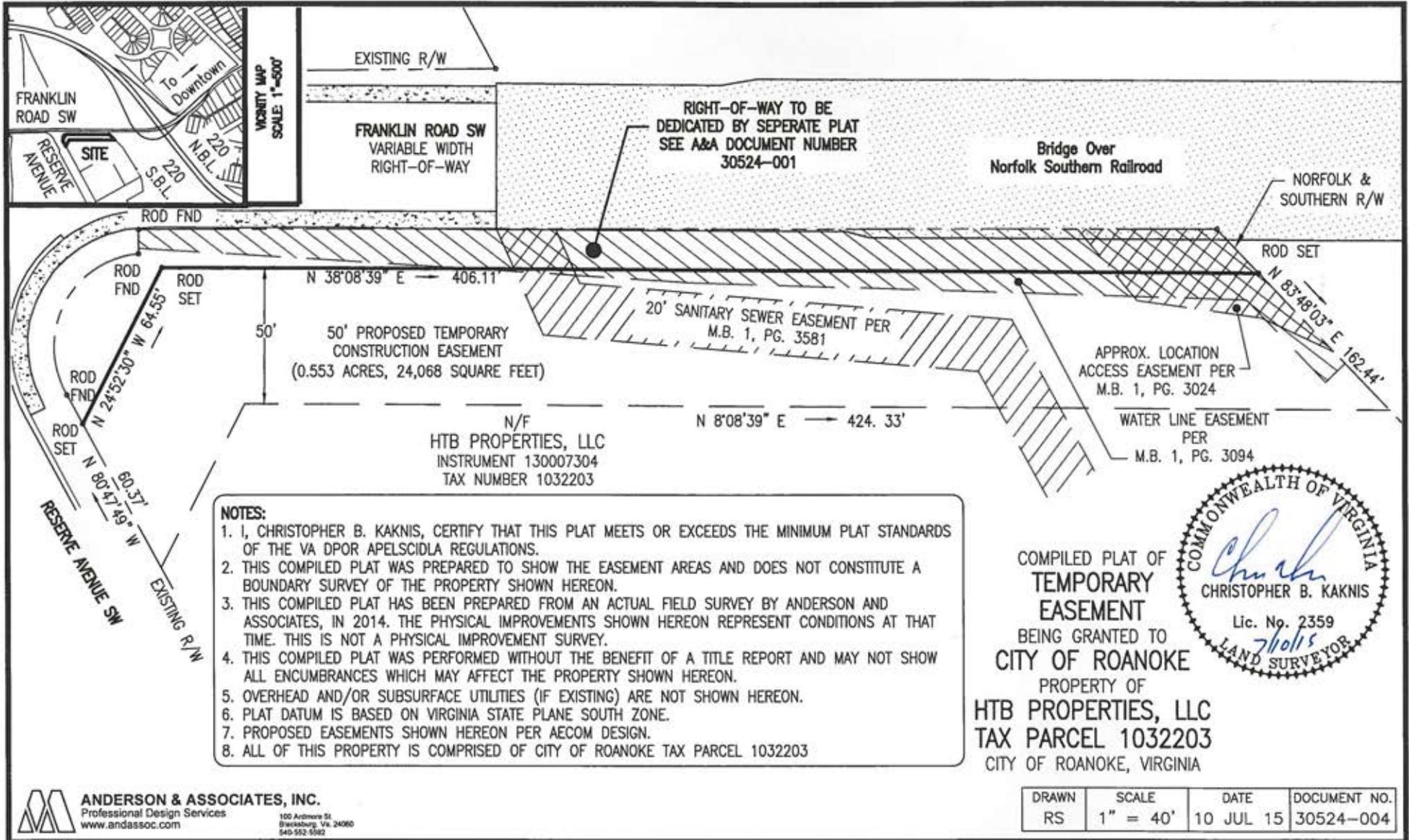
Table VII-1 Pavement Markings is replaced with the following:

**TABLE VII-1
Pavement Markings**

Type	Class	Name	Surface Temp. at Time of Application	Film Thickness (mils)	Pavement Surface	Application Limitations
A		Traffic paint	50°F+	15 ± 1 when wet	AC HCC	May be applied directly after paving operations
B	I	Thermoplastic Alkyd	50°F+	90 ± 5 when set	AC HCC	May be applied directly after paving operations
	I	Thermoplastic Hydrocarbon	50°F+	90 ± 5 when set	AC HCC	Do not apply less than 30 days after paving operations
	II	Preformed Thermoplastic	50°F+	120-130	AC HCC	Manufacturer's recommendations
	III	Epoxy resin	50°F+	20 ± 1 when wet	AC HCC	Pavement surface needs to be at least 1 day old
	IV	Plastic-backed preformed Tape	(Note 1)	60 - 90	AC HCC	Manufacturer's recommendations
	VI	Profiled preformed Tape	(Note 1)	(Note 1)	AC HCC	Manufacturer's recommendations
	VII	Polyurea	(Note 1)	20 ± 1 when wet	AC HCC	Manufacturer's recommendations
D	II	Removable tape	(Note 1)	(Note 1)	AC HCC	Temporary (Construction) pavement marking
E		Removable Black tape (Non-Reflective)	(Note 1)	(Note 1)	AC	Temporary (Construction) pavement marking for covering existing markings
F	I	Temporary paint	(Note 1)	40 max	AC HCC	Temporary (Construction) pavement marking

Note 1: In accordance with manufacturer's recommendation.

Appendix E



EXISTING R/W

FRANKLIN ROAD SW
VARIABLE WIDTH
RIGHT-OF-WAY

RIGHT-OF-WAY TO BE
DEDICATED BY SEPERATE PLAT
SEE A&A DOCUMENT NUMBER
30524-001

Bridge Over
Norfolk Southern Railroad

NORFOLK &
SOUTHERN R/W

50' PROPOSED TEMPORARY
CONSTRUCTION EASEMENT
(0.553 ACRES, 24,068 SQUARE FEET)

20' SANITARY SEWER EASEMENT PER
M.B. 1, PG. 3581

APPROX. LOCATION
ACCESS EASEMENT PER
M.B. 1, PG. 3024

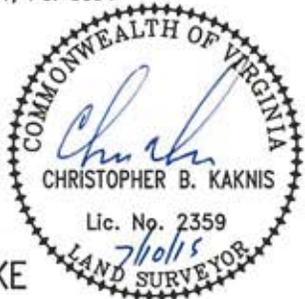
WATER LINE EASEMENT
PER
M.B. 1, PG. 3094

N/F
HTB PROPERTIES, LLC
INSTRUMENT 130007304
TAX NUMBER 1032203

NOTES:

1. I, CHRISTOPHER B. KAKNIS, CERTIFY THAT THIS PLAT MEETS OR EXCEEDS THE MINIMUM PLAT STANDARDS OF THE VA DPOR APPELSCIDLA REGULATIONS.
2. THIS COMPILED PLAT WAS PREPARED TO SHOW THE EASEMENT AREAS AND DOES NOT CONSTITUTE A BOUNDARY SURVEY OF THE PROPERTY SHOWN HEREON.
3. THIS COMPILED PLAT HAS BEEN PREPARED FROM AN ACTUAL FIELD SURVEY BY ANDERSON AND ASSOCIATES, IN 2014. THE PHYSICAL IMPROVEMENTS SHOWN HEREON REPRESENT CONDITIONS AT THAT TIME. THIS IS NOT A PHYSICAL IMPROVEMENT SURVEY.
4. THIS COMPILED PLAT WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT AND MAY NOT SHOW ALL ENCUMBRANCES WHICH MAY AFFECT THE PROPERTY SHOWN HEREON.
5. OVERHEAD AND/OR SUBSURFACE UTILITIES (IF EXISTING) ARE NOT SHOWN HEREON.
6. PLAT DATUM IS BASED ON VIRGINIA STATE PLANE SOUTH ZONE.
7. PROPOSED EASEMENTS SHOWN HEREON PER AECOM DESIGN.
8. ALL OF THIS PROPERTY IS COMPRISED OF CITY OF ROANOKE TAX PARCEL 1032203

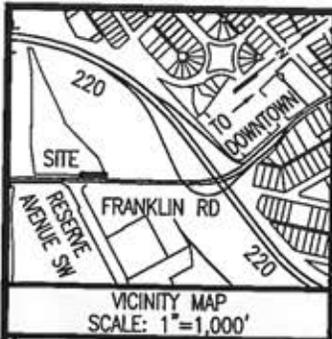
COMPILED PLAT OF
**TEMPORARY
EASEMENT**
BEING GRANTED TO
CITY OF ROANOKE
PROPERTY OF
HTB PROPERTIES, LLC
TAX PARCEL 1032203
CITY OF ROANOKE, VIRGINIA



ANDERSON & ASSOCIATES, INC.
Professional Design Services
www.andassoc.com
100 Ardmore St
Staunton, VA 24400
540-552-5582

DRAWN	SCALE	DATE	DOCUMENT NO.
RS	1" = 40'	10 JUL 15	30524-004

7/14/15 09:26:15

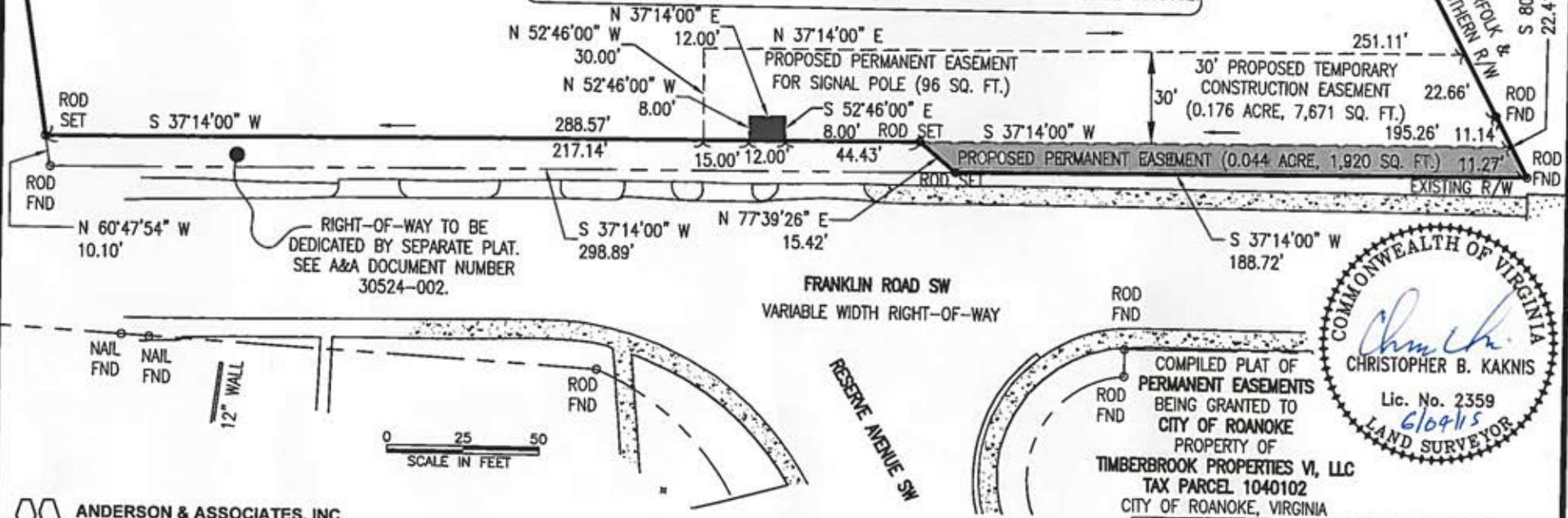


ABBREVIATIONS

FND FOUND
FT. FEET
N/F NOW OR FORMERLY
SQ. SQUARE

- NOTES:**
1. I, CHRISTOPHER B. KAKNIS, CERTIFY THAT THIS PLAT MEETS OR EXCEEDS THE MINIMUM PLAT STANDARDS OF THE VA DPOR APPELSCIDLA REGULATIONS.
 2. THIS COMPILED PLAT WAS PREPARED TO SHOW THE EASEMENT AREAS AND DOES NOT CONSTITUTE A BOUNDARY SURVEY OF THE PROPERTY SHOWN HEREON.
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 7. PROPOSED EASEMENTS SHOWN HEREON PER AECOM DESIGN.
 8. ALL OF THIS PROPERTY IS COMPRISED OF CITY OF ROANOKE TAX PARCEL 1040102.

N/F
**TIMBERBROOK
PROPERTIES VI, LLC**
INSTRUMENT 030022685
TAX NUMBER 1040102



COMMONWEALTH OF VIRGINIA

Christopher B. Kaknis

CHRISTOPHER B. KAKNIS
Lic. No. 2359
6/09/15
LAND SURVEYOR

COMPILED PLAT OF
PERMANENT EASEMENTS
BEING GRANTED TO
CITY OF ROANOKE
PROPERTY OF
TIMBERBROOK PROPERTIES VI, LLC
TAX PARCEL 1040102
CITY OF ROANOKE, VIRGINIA

DRAWN	SCALE	DATE	DOCUMENT NO.
TB	1" = 40'	4 JUN 15	30524-003

ANDERSON & ASSOCIATES, INC.
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PG 0367 NO 24 15

Appendix F

