

CITY OF COLUMBUS, OHIO

SUPPLEMENTAL SPECIFICATION 1100  
REVISIONS TO THE 2012 CONSTRUCTION  
& MATERIAL SPECIFICATIONS

DATED May 1, 2017

101.02 Abbreviations (New Abbreviation)

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101.02 Abbreviations.

AIA American Institute of Architects

101.03 Definitions (New Definition)

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101.03 Definitions.

Allowance. An amount of money established by the City and included in the contract, which is set aside for a specific purpose, when the exact quantity of work for that specific purpose is not known at the time of bid.

101.03 Definitions

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101.03 Definitions.

**Advertisement (~~or Invitation for Bids~~).** The public announcement, as required by law, inviting Proposals for Work to be performed or materials and equipment to be furnished. Such ~~Proposal~~Advertisement will indicate with reasonable accuracy the type, quantity and location of the Work to be done or the character and quality of the materials to be furnished and the time and place of the opening of Proposals.

**Bid Documents.** The Bid Documents include the Advertisement ~~for Bids~~, Invitation for Bid, Instructions to Bidders, Addenda, ~~Proposal~~, Electronic Bidding Software file(s), Contract, Contract forms and required ~~bonds~~Guarantees, Specifications, Supplemental Specifications, Supplements, Special Provisions, Plans, Plan Notes, Standard Drawings, Technical Specifications, and any other document specifically designated by the Department as a Bid Document, all of which constitute one instrument. Any other documents provided with the bid are for informational purposes only and are not part of the Bid Documents. The City may request

that the Bidder sign an acknowledgement that such informational documents are expressly excluded from the Contract.

**101.03 Definitions (New Definition)**

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**101.03 Definitions.**

**Business Day.** Wherever indicated inside these specifications, business days are defined as: Monday, Tuesday, Wednesday, Thursday, and Friday, excluding National Holidays and, if applicable, the day that a National Holiday is observed.

**101.03 Definitions**

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**101.03 Definitions.**

**Completion Date (Interim or Final).** The date ~~on~~by which the Work shall be completed (Final) or the date by which a portion of the Work defined by the contract shall be completed (Interim).

**101.03 Definitions**

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**101.03 Definitions.**

**Contract Documents.** The Contract Documents include the Advertisement ~~for Bids~~, Invitation for Bid, Instructions to Bidders, Addenda, Proposal, Affidavits, Contract, Contract forms and required ~~bonds~~Guarantees, Specifications (CMSC), Supplemental Specifications, Supplements, Technical Specifications, Special Provisions, Plans, Plan Notes, Standard Drawings, Notice to Proceed, Notice of Commencement, and Auditor's Purchase Order as the same are published or may be published and amended by the ~~several Divisions of the~~ City, Change Orders, Contract Modifications, and any other document included by reference by the City as a Contract Document, all of which constitute one instrument.

**Contract Sum.** The Contract Sum is stated in the Contract and, including authorized adjustments thereto, is the ~~total~~maximum amount payable by the City to the Contractor for the performance of the Work under the Contract Documents. The Contract Sum may include a contingency amount; however, the contingency amount is not due to the Contractor unless approved by Change Order.

**101.03 Definitions (New Definition)**

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**101.03 Definitions.**

Invitation for Bid. A written invitation to contractors or equipment suppliers to submit a Proposal on a specific project to be realized or a product or service to be furnished.

### 101.03 Definitions

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#### 101.03 Definitions.

**National Holidays.** New Years Day, January 1; Martin Luther King's Birthday - the Third Monday in January; Presidents' Day, the Third Monday in February; Memorial Day, the last Monday in May; Independence Day, July 4; Labor Day, the First Monday in September; Columbus Day, the Second Monday in October; Thanksgiving Day, the fourth Thursday in November; Christmas Day, December 25.

### 101.03 Definitions

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#### 101.03 Definitions.

**Notice of Intent to Award.** Written notice by the City to the apparent successful bidder stating that upon compliance with the conditions enumerated therein, ~~within the time specified,~~ the City intends to enter into a Contract.

### 101.03 Definitions (New Definition)

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#### 101.03 Definitions.

**Registered Architect.** An Architect registered with the Ohio Architects Board to practice architecture in the State of Ohio.

### 101.03 Definitions (New Definition)

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#### 101.03 Definitions.

**Technical Specification.** Written depiction of design drawings and a detailed and exact statement of particulars, especially a statement prescribing materials, dimensions, and workmanship for something to be built or installed.

### 102.01 Pre-qualification of Bidders

Page 10-11

~~**102.01 Pre-qualification of Bidders.** Prior to the City awarding a Contract, the Bidder must have an active contract compliance number. If the Bidder does not have a contract compliance number (or if it has lapsed) at the time of Proposal submission, the Bidder must include a completed contract compliance certification application (or reactivation) with its Proposal under provisions of City Code, Title 39; Chapter 3907.~~

~~In addition, if any Work includes work on any water or sanitary main line or service, Bidders must have in effect at the time of Bid and at the time of Work, effective sewer or water tapper's license(s). Pursuant to Chapter 329 of the Columbus City Code, Bidders shall be prequalified.~~

## 102.02 Availability and Contents of Bid Documents

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**102.02 Availability and Contents of Bid Documents.** Bid Documents are available to prospective bidders at the location stated in the ~~advertisement~~Advertisement. The Bid Documents will state the location and description of the contemplated Work and will show the approximate estimate of the various quantities and kinds of work to be performed or materials to be furnished, and will have a schedule of items for which unit bid or lump sum prices are invited. The Bid Documents will state the Contract Time, the amount and type of the Proposal Guaranty, and the date, time and place of the opening of Proposals. The Plans, Specifications, Supplemental Specifications, Special Provisions, standard drawings or other documents designated in the Bid Documents, will be considered a part of the Proposal whether attached or not.

## 102.03 Preparation of Proposals

Page 11-13

**102.03 Preparation of Proposals.** Prepare a Proposal according to this subsection and the requirements found in the Bid Documents.

**A. General.** Provide prices for each item listed in the Proposal.

When an item in the Proposal contains a choice to be designated by the Bidder, the Bidder shall indicate that choice in accordance with the Specifications for that particular item, and thereafter no further choice will be permitted.

The Proposal shall include all documents, duly executed as applicable, that are required to be submitted as directed in the Advertisement and as described in Section 102.02.

### ENTITY SUBMITTING PROPOSAL REQUIRED SIGNATURE

Individual	The individual or a duly authorized agent.
Partnership	A partner or a duly authorized agent.
Joint Venture	A member or a duly authorized agent of at least one of the joint venture firms.
Corporation	An authorized officer or duly authorized agent of the corporation. Also, show the name of the state chartering the corporation and affix the corporate seal.
Limited Liability Company	A manager, a member, or a duly authorized agent.

Anyone signing a Proposal in a representative capacity must provide evidence of his or her authority to bind the bidder by Affidavit.

Before a contract will be awarded to a foreign corporation or an individual or partnership non-resident of the State of Ohio, such foreign corporation, individual, or

partnership non-resident shall ~~file~~ register with the Secretary of State's ~~office-a power-of attorney designating them or their agent or the Secretary of State, as agent,~~ for the purpose of accepting service of summons, in any action in law or equity, or both, brought in the State of Ohio.

**B. Submitting Bids Electronically.** When submitting a Bid electronically, properly complete the electronic file and submit it using the software specified in the Bid Documents rather than completing it by handwriting, typing, or using unauthorized computer-generated forms. Properly execute the Proposal by completing all of the required fields and attaching the required signatures in the spaces provided in the electronic file.

**C. Submitting Paper Bids.** When submitting a paper Bid, submit the Proposal upon the forms furnished by the City ~~or on an acceptable form generated by a computer.~~

Specify a unit price in figures for each proposal item for which a quantity is given in the "Unit Price" column. Calculate and place the products for the respective unit prices and quantities in the "Bid Amount" column. For a lump sum item, place the same price in the "Unit Price" column and in the "Bid Amount" column pertaining to that item. Indicate the total Proposal amount by adding the values entered in the "Bid Amount" column for the listed items. All the words shall be in ink or typed.

Computer Generated Bid Sheet: If permitted in the Bid Documents, the Bidder may submit an 8 1/2 x 11 inches (216 x 279 mm) computerized bid sheet or sheets attached to the Proposal. The computerized bid sheet or sheets must meet the following requirements:

1. reference numbers, description, units and quantities included,
2. a unit price per/item,
3. an extension price per/item,
4. project name, number, and date on each sheet,
5. subtotals and totals clearly identified,
6. blanks where appropriate,
7. in the event of a deleted item - the word deleted inserted,
8. lines between columns and items,
9. each page numbered.
10. a general summary of subtotals must be shown on the last sheet,
11. the Contractor's contract compliance number must appear on each computerized sheet,
12. the following statement must appear on the last sheet of the computerized bid:

**"The Bidder's TOTAL is only for reference at the bid opening. The City will verify that the TOTAL price and the individual unit and/or lump sum prices correspond. If there is a discrepancy, the unit and/or lump sum prices shall govern."**

Be advised further that the Bidder is solely responsible to prepare its computerized bid sheets in accordance with the above requirements and the remaining requirements of this Section. Failure to fully comply with the designated format may result in the rejection of the Bidder's bid.

## 102.08 Non-Responsive Proposals

Page 14-15

**102.08 Non-Responsive Proposals.** The City reserves the right to disqualify or refuse to consider a Proposal for any of the following reasons:

- ~~1. More than one Proposal for the same work from an individual, firm, or corporation under the same or different name, or corporation under the same name or corporations with one or more of the same persons as officers or directors of such corporations, or corporations which are holding companies, parent companies or holding companies that are subsidiaries of such corporations.~~
- ~~2. Bid prices are materially unbalanced as defined by 102.09.~~
- ~~3. Bidder failed to comply with pre-qualification requirements of 102.01.~~
- ~~4. Proposal contains conditions or qualifications not provided in the Bid Documents.~~
- ~~5. Either the Bidder fails to acknowledge addenda or the Proposal does not contain completed forms required to be included in the Proposal and the City determines that the Bidder's Proposal does not respond to the Bid Documents in all material respects and contains irregularities or deviations which affects the amount of the bid or otherwise gives the bidder a competitive advantage.~~
- ~~6. Bidder adds any provision reserving the right to accept or reject an award.~~
- ~~7. Bidder fails to submit a unit price for each Contract item listed.~~
- ~~8. Bidder fails to submit lump sum price where required.~~
- ~~9. Bidder fails to furnish Proposal Guaranty or Bid Bond for the amount required.~~
- ~~10. Proposal contains other alteration, omission, or error that in the judgment of the City does not respond to the Bid Documents in all material respects and contains irregularities or deviations from the Bid Documents that affect the amount of the Bid or otherwise gives the Bidder a competitive advantage.~~
1. Whether bidder has submitted more than one bid for the same work from an individual or entity under the same or different name, or corporation under the same name, or corporations with one or more of the same persons as officers or directors of such corporations, or corporations which are holding companies, parent companies or holding companies that are subsidiaries of such corporations.
2. Whether bid prices are materially unbalanced as defined in the relevant sections of the technical specifications manual specified in the invitation for bid, where applicable.
3. Whether bidder has failed to comply with pre-qualification requirements as defined in the relevant sections of the technical specifications manual specified in the invitation for bid, where applicable.
4. Whether the bid contains conditions or qualifications not provided in the invitation for bid.

5. Whether the bidder failed to acknowledge addenda or the bid does not contain complete forms required to be included in the bid and the city determines that the bidder's bid does not respond to the invitation for bid in all material respects or contains irregularities or deviations which affects the amount of the bid or otherwise gives the bidder a competitive advantage.
6. Whether bidder adds a provision reserving the right to accept or reject an award.
7. Whether bidder fails to submit a unit price for each contract item listed, when required by the invitation for bid.
8. Whether bidder fails to submit a lump sum price where required.
9. Whether the bidder fails to submit the required bid guarantee or submits an irregular bid guarantee for the amount required.
10. Whether the bid contains other alterations, omissions, or errors such that, in the judgment of the city, the bid does not respond to the invitation for bid in all material respects, or contains irregularities or deviations from the invitation for bid that affect the amount of the bid or otherwise gives the bidder a competitive advantage.
11. Whether the bidder has complied with the requirements of Columbus City Code section 329.20(h) regarding subcontractors.

However, should the City accept a non-responsive Proposal, the Bidder must meet all remaining requirements set forth in the Bid Documents.

## 102.10 Proposal Guaranty

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**102.10 Proposal Guaranty.** ~~No Proposal will be considered unless accompanied by Proposal Guaranty comprised of a Bid Bond or a certified check drawn on a solvent bank made payable to the City of Columbus, Ohio, in an amount not less than 10 percent of the Bidder's Proposal, conditioned upon execution of the Contract and the furnishing of a performance and payment bond in the event the Contract is awarded to the Bidder. The amount of the Bid Bond shall be expressed either as a percentage of the total bid (10%) or numerically in dollars and cents. The amount indicated in the Proposal Guaranty shall include the total amount of the Bid including all alternates submitted which increase the Bid. The Proposal Guaranty amount shall be equal to or exceed 10 percent of this total amount. The required type of bid guarantee shall be identified in the invitation for bid and may take the form of a bid or proposal bond, a certified or cashier's check drawn on a solvent bank, or a letter of credit pursuant to Chapter 1305 of the Ohio Revised Code. If a bid or performance and payment bond is required, the bid or performance and payment bond shall be issued by a guaranty company authorized to do so under the Ohio Revised Code or by a surety who is: (1) a resident of this state; (2) worth, in the aggregate, double the sum to be secured, beyond the amount of their debts; and (3) have property liable to execution in the state equal to the sum to be secured. The bid guarantee shall be for a minimum ten (10) percent of the bid amount.~~

## 102.11 Delivery of Proposal

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**102.11 Delivery of Proposal.** Unless otherwise indicated in the Bid Documents, all Proposals must be submitted using the electronic Bid submission software specified in the Proposal. The City will accept Proposals until the time and date designated in the Advertisement and the Invitation for Bid. If a paper bid is provided, the City will return Proposals received after the designated time to the Bidders unopened, at the Bidder's expense.

### **102.12 Withdrawal of Proposals Prior to Bid Opening**

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**102.12 Withdrawal of Proposals Prior to Bid Opening.** Prior to the opening of Proposals, a Bidder may withdraw its Proposal. If a paper bid ~~is provided~~ has been submitted, the Bidder must make a written request that is received by the Director prior to the time of Proposal opening. The Proposal will be returned to the Bidder unopened.

### **102.13 Withdrawal of Proposal after Bid Opening (Mistake in Bid)**

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**102.13 Withdrawal of Proposal after Bid Opening (Mistake in Bid).** The Director may permit a Bidder to withdraw the Bid from consideration without forfeiture of the Proposal Guaranty ~~or bid bond~~ provided that the Bidder identifies the mistake and provides a written request to the Director within ~~forty-eight hours of~~ two business days after the Bid opening. The written request must also include a sworn notarized statement specifying the grounds for withdrawal together with the original bid work sheets which document the mistake.

The following conditions must be met for Bid withdrawal after Bid opening:

1. The Bid was substantially lower than the other Bids;
2. The Bid was made in good faith;
3. The mistake was a non-judgmental, clerical or mathematical error or an unintentional omission of a substantial quantity of work, labor or material; and
4. The amount of the error must have a significant monetary effect on contract performance.

The City may require a meeting with the Bidder before a determination is reached. The City will notify the Bidder in writing of its determination.

If the Director determines that the conditions for withdrawal have not been met, he may award the Contract to such Bidder. If such Bidder does not enter into the Contract and/or furnish the required performance and payment bond, the Director may, as applicable, declare the Proposal Guaranty forfeit and deposit to the City's account the Bidder's check or file a claim with the Surety for the amount of the Bid Bond. In addition, the Director may award the Contract to the next lowest responsive and responsible Bidder or reject the remaining Bids and re-advertise the Project.

If the Bidder is permitted to withdraw its Bid, it will not be permitted to participate in the Project for which the Bid is withdrawn.



### 103.01 Consideration of Proposals

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**103.01 Consideration of Proposals.** After the Proposals are opened and read, as required by Columbus City Code, the City will compare the Bidders' proposed prices. The proposed price is the summation of the products of the estimated quantities shown in the Proposal and the unit prices and, if applicable, lump sum bid prices. In the event of a discrepancy between unit bid prices and extensions, the unit price shall govern.

The City reserves the right, without any liability, to reject any or all Proposals, to waive minor technicalities, or to advertise for new Proposals.

### 103.03 Cancellation of Award

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**103.03 Cancellation of Award.** The City reserves the right to rescind the award of any Contract at any time before the final execution of the Contract by the City without any liability.

### 103.04 Return of Proposal Guaranty

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**103.04 Return of Proposal Guaranty.** Within five business days after the opening of the Proposals, the City will return all Proposal Guaranties, except those of the three lowest bidders. The City will return the retained Proposal Guaranties of the two unsuccessful bidders of the three lowest Bidders within ten business days following the award of Contract, and the City will return the retained Proposal Guaranty to that of the successful Bidder after satisfactory contract performance and payment bond(s) have been furnished and the Contract has been executed by all parties.

### 103.06 Execution of Contract

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**103.06 Execution of Contract.** The successful Bidder shall sign and return the Contract, together with the contract performance and payment bond(s) and other required Contract Documents, within ten business days after receiving the Notice of Intent to Award and the Contract Documents for signature. No Proposal shall be considered binding upon the City until the Director receives approval from Columbus City Council to enter into said Contract, the Contract is executed, and a purchase order is approved by all required applicable City Agencies and City Council. If the Contract is not executed by the City within thirty days following the effective date of the authorizing legislation approved by City Council, the successful Bidder will have the right to withdraw its Bid without prejudice.

The Contractor must obtain one copy of the Specifications (CMSC) at its own cost and keep available one copy of the CMSC, and one set of the Contract Documents at the Project site at all times. The City will supply the Contractor with up to five sets of Plans.

Any extra sets of Contract Documents required by the Contractor may be purchased from the appropriate Owner ~~Division~~.

### **103.08 Responsibility to General Public**

Page 18-19

**103.08 Responsibility to General Public.** The Contractor shall defend, indemnify and hold harmless the City of Columbus and any of its agents or representatives, employees, assigns and successors in interest, from and against any lawsuits and causes of action, claims, losses, demands and expenses, including but not limited to reasonable attorney fees and the cost of litigation, damages or liability of any nature whatsoever, for death or injury to any person, including employees or agents of the Contractor, or for damage to or destruction of property of either party hereto or any third party, which arise in any manner from the negligent acts, errors, omissions or willful misconduct of the Contractor and any of its agents, employees or representatives, including any of its subcontractors, in the performance of the Contract for the City of Columbus.

The Contractor shall procure and maintain during the term of the Contract and any applicable warranty period insurance for the liability of damages, which are imposed by law or assumed under Contract with the City of Columbus, in the kind and minimum amounts as specified hereinafter, from insurance companies which are authorized to transact business under the laws of the State of Ohio. The insurance shall protect the Contractor and any Subcontractor performing work under the Contract with the City of Columbus from claims for damages which may arise from operations under the Contract, whether such operation is performed by the Contractor or by any Subcontractor or by anyone directly or indirectly employed by either of them. The cost of such insurance shall be incidental to all contract items. The City of Columbus shall be listed as an 'Additional Insured' on the Commercial General Liability and Comprehensive Automobile liability insurance policies.

Prior to the execution of the Contract, the Contractor shall provide the City of Columbus with a 'Certificate of Insurance', in a satisfactory form, which demonstrates compliance with the requirements of this subsection. The 'Certificate of Insurance' will also reference the Contract and ~~or~~ Project Number for which the work is being performed. The Contractor shall also be responsible for providing a 'Certificate of Insurance' within ten business days after the insurance is renewed. If the insurance is subject to cancellation, then the insurance company shall immediately notify the City of Columbus of such cancellation in accordance with the policy terms for affording such notice. Also, if the insurance is cancelled, then the Contractor will immediately cease all operations until the required kind and limits of insurance have been restored. Upon request, the Contractor shall furnish the City of Columbus with a certified complete copy of each policy of insurance.

### **103.09 Contractor's Insurance**

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**103.09 Contractor's Insurance.** For purposes of complying with 103.08, the Contractor shall furnish evidence of procuring the following types of insurance prior to the execution of the Contract:

**A. Commercial General Liability Insurance.** This policy shall provide coverage for bodily injury or property damage which may arise from the operations of the Contractor and any of its subcontractors. The policy shall include coverage for premises and operations; independent contractors; products and completed operations; broad form property damage; hazards of explosion, collapse, and underground damage; and contractual liability as applicable to any indemnification hold harmless agreements in the Contract. The minimum limits of liability shall be \$1,000,000 for each occurrence subject to an aggregate liability for products and completed operations of \$2,000,000 and a general aggregate liability of \$2,000,000.

**B. Comprehensive Automobile Liability Insurance.** This policy shall provide coverage for owned, non-owned, and hired automobiles for all damages arising from bodily injury and property damage with limits of liability of not less than \$1,000,000 per accident with respect to bodily injury, property damage, or death.

**C. Workers's Compensation Insurance.** The Contractor shall comply with all provisions set forth by the Ohio Bureau of Workers' Compensation during the term of the Contract for the benefit of all employees employed at the project site. If the Contractor shall engage the services of Subcontractors, then it shall require all such Subcontractors to also provide Worker's Compensation insurance for its employees who are employed at the project site. In order to comply with this requirement, the Contractor shall provide the City of Columbus with a copy of the Workers' Compensation Certificate as evidence that ~~it's~~ its insurance premium and that of any Subcontractor has been paid. In the event any class of employees engaged in hazardous work under the Contract at the site of the project is not protected under the Worker's Compensation statute, the Contractor shall provide and cause each Subcontractor to provide suitable insurance for the protection of their employees not otherwise protected.

**D. Employers Liability Insurance.** This policy shall provide coverage for accident or disease which is incurred by an employee of the Contractor in an amount of not less than \$100,000 for bodily injury by Accident for each accident, \$100,000 for bodily injury by Disease for each employee, and a policy limit of \$500,000 for bodily injury by disease.

**E. Builders Risk Insurance.** When required, the Contractor shall procure and maintain during the term of the Contract Builders Risk insurance to protect the work being performed under the Contract from loss as a result of fire, hail, lightning, theft, wind storm, and vandalism in the full amount of the Contract. The cost for this insurance shall be included in the unit price for 'Item Special – Builders Risk Insurance'. If the price is bid as a lump sum, Builders Risk Insurance shall be included in the lump sum price the same as other overhead costs.

**F. Railroad Protective Liability Insurance.** When required, the Contractor shall procure and maintain during the term of the Contract a Railroad Protective Liability insurance policy, for the benefit of the named railroad as respect the operations of the Contractor and its Subcontractors, with limits of liability as specified by the railroad, for damages arising from bodily injury, death, or property damages combined in any one occurrence. The cost for this insurance shall be included in the unit price for 'Item Special – Railroad Protective Insurance'.

**G. Professional Liability Insurance.** When required, the Contractor shall furnish evidence that it or any of its Sub-consultants maintain Professional Liability insurance, for liability which may arise from the negligent acts, errors, or omissions of operations performed under the Contract, in an amount not less than \$1,000,000 for each claim. If such policy is written on a 'claims-made' form, then it shall have a retroactive date of no later than the effective date of the Contract, and such policy shall be maintained for a period of not less than two years after the project has been accepted by the City of Columbus. If the price is bid as a lump sum, Professional Liability Insurance shall be included in the lump sum price the same as other overhead costs.

An excess liability insurance policy may be utilized to satisfy the requirements of insurance for Commercial General Liability and Comprehensive Automobile Liability insurance. If such a policy is utilized, then the City of Columbus shall be listed as an 'Additional Insured'. If the insurance required of this Section is not renewed or if the available insurance is less than the required minimum amounts specified herein as a result of a change or modification in coverage or if the limits of liability are impaired by claims so as to reduce the amount of available insurance, then the Contractor shall so notify the City of Columbus in which case the City of Columbus may at its sole discretion consider the Contractor in default of its Contract, refuse to make any further payment to the Contractor until such time the deficiency in insurance is satisfactorily resolved, or use any retained funds which are due the Contractor in order to remedy the deficiency. If any part of the Contract is let to a Subcontractor, then the Contractor is responsible for the part subcontracted work being adequately covered by insurance herein-above described.

#### **104.02 Modifications of the Contract Documents**

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##### **104.02 Modifications of the Contract Documents.**

**A. General.** The City may at any time, without invalidating the Contract and without notice to or release of the sureties, by written Change Order or Contract Modification, as applicable, make any change or modification in the Work or add to the Work within the general scope of the Contract, including, but not limited to, changes in the Contract Documents; in the sequence of the Work; or in the City-furnished facilities, equipment, materials, services, or site. The Contractor shall ensure that the amount of the surety bonds is modified as necessary from time to time to be consistent with any changed Contract scope, Sum or Time in accordance with any Change Order(s) or Contract Modification(s).

The Contractor shall have no right to compensation above the ~~original~~ Contract Sum until the extra work is included in a written Contract Modification approved by the City Council and executed by all required City Agencies.

#### **105.04 Coordination of the Contract Documents**

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**105.04 Coordination of the Contract Documents.** In case of discrepancy, the Engineer will resolve any discrepancies using the following descending order of precedence:

- A. ~~Contract Form Addenda~~
- B. ~~Addenda Special Provisions~~
- C. ~~Proposal Plans (Calculated dimensions on the Plans will govern over scaled dimensions.)~~
- D. ~~General Provisions (Section 100) Technical Specifications~~
- E. ~~Special Provisions Supplemental Specifications and Supplements~~
- F. ~~Plan Notes Standard Drawings~~
- G. ~~Plans (calculated dimensions will govern over scaled dimensions) Specifications (CMSC)~~
- H. ~~Supplemental Specifications~~
- I. ~~Standard Drawings~~
- J. ~~Standard Specifications (Sections 200 through 1000)~~

### **105.10 Photographs and Videos**

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**105.10 Photographs and Videos.** The Engineer, Inspectors or other duly authorized City personnel or agents, ~~from time to time~~ during the progress of the Work, may take photographs or videos of the Work. The Contractor shall furnish access to the Work at all times for this purpose and shall furnish such assistance as may be required. The photographs or videos thus taken shall be the property of the City. Nothing herein contained shall be construed as prohibiting the taking of photographs or videos by the Contractor or its agents, provided, however, that it is done at no cost or expense to the City.

### **105.11 Inspection of Work**

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**105.11 Inspection of Work.** All materials and each part or detail of the Work shall be subject to inspection by the Engineer, Inspector or duly authorized City representative. The Engineer, Inspector or duly authorized City representative shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection. Notify the Engineer at least twenty four hours prior to all required special inspections and testing as specified in the Contract Documents or as required by the Engineer.

If the Engineer requests it, the Contractor, at any time before acceptance of the Work or any portion thereof, shall remove or uncover such portions of the finished Work as may be directed. After examination, the Contractor shall restore said portions of the Work to the standard required by the Contract Documents. Should the Work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as Extra Work; but should the Work so exposed or examined prove unacceptable, the uncovering or removing and

the replacing of the covering or making good of the parts removed, shall be at the Contractor's expense.

The Contractor shall notify the Engineer at least forty eight hours in advance of any changes in the work schedule. This notification is required to accommodate construction inspection scheduling. The notification shall include the beginning date and time of the work, and the duration of the work. The notification shall be submitted to the Engineer in writing. In the absence of such notification, and if the work is performed without inspection, the Engineer may require the work to be removed and redone.

If the City assigns an inspector(s) to the project and the Contractor does not notify the City of its intent not to work, charges incurred by the City for inspection services will be deducted from monies owed to the Contractor/Developer, unless such charges are waived by the Director.

Any Work done or materials used without supervision or inspection by an authorized City representative may be ordered removed and replaced at the Contractor's expense. Failure to reject any defective Work or materials shall not in any way prevent later rejection when such defects are discovered, or obligate the City to final acceptance of the Work.

When any unit of government or political subdivision or railroad or any corporation is to pay a portion of the cost of the Work covered by this Contract, its respective representatives shall have the right to inspect the Work. Such inspection shall not make any unit of government or political subdivision or railroad or any corporation a party to this Contract, and shall in no way interfere with the rights of the Contractor or City hereunder.

#### **105.14 Maintenance during Construction**

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**105.14 Maintenance during Construction.** The Contractor shall maintain the Work in a presentable and safe condition during construction and until the Project is accepted. Maintenance of the Work shall include continuous and effective work prosecuted day by day, with adequate equipment and forces so that the roadway, conduits or structures are kept in satisfactory condition at all times. The Contractor shall be responsible for damage done by its equipment and the Contractor shall defend, indemnify, and hold harmless the City as provided in 107.24 relating to damage caused by the Contractor's or its subcontractors' or suppliers' equipment.

The Contractor shall maintain the previous courses or subgrade during all construction operations, when placing a course upon other courses of embankment, base, subgrade, concrete or asphalt pavement, or other similar items previously constructed. This maintenance includes, but is not limited to draining, re-compacting, re-grading, or if destroyed, the removal of Work previously accepted by the City.

Maintain Stormwater Best Management Practice (BMP) features. Prevent sediment laden surface water from coming in contact with BMP features during construction.

Temporary restoration of street surfaces shall be made on installation of underground lines and structures, surplus excavation shall be removed, and the street graded and put in a safe and passable condition. Settlements occurring in or adjacent to trenches shall be immediately refilled to a proper grade. Failure on the part of the Contractor to restore the street surface to the satisfaction of the Engineer may be considered a cause sufficient for suspending the applicable work until such restoration. In the event the Engineer orders the Work suspended for conditions under this Section, the expense and time, whether direct or indirect, for such suspension shall be borne solely by the Contractor and shall not be considered a suspension of work under 104.02.C.

The Contractor shall repair, restore and clean streets and other public facilities outside the Construction Limits that are affected by its operations, including hauling and delivery of materials.

If the Contract does not contain an Item 616 – Dust Control, all costs of maintenance work and dust control during construction and before the Project is accepted shall be included in the ~~unit prices bid of the various pay items~~Contract Sum.

All costs of maintenance work during construction and before the Project is accepted shall be included in the ~~unit prices bid of the various pay items~~Contract Sum and the Contractor shall not be paid an additional amount for such work.

### **105.17 Use of Fire Hydrants**

Page 41-42

**105.17 Use of Fire Hydrants.** In accordance with City Code and the Division of Power and Water rules and regulations, the Contractor shall obtain the proper hydrant permits(s), and pay any applicable fees, for the use of hydrants(s) deemed necessary for work performed under this Contract. Permit(s) must be obtained from the jurisdiction owning and maintaining the hydrant (for areas outside Columbus corporation limit) and from the Division of Power & Water (Water) Permit Office. The Contractor shall adhere to all rules and regulations governing said permit and must have the original permit on site anytime in which the hydrant is in use.

Cost of the permit and application fees shall be included in the ~~various bid items~~Contract Sum.

### **105.19 Construction and Demolition Debris, Vegetative Debris, and Clean Soil.**

Page 42

#### **105.19 Construction and Demolition Debris, Vegetative Debris, and Clean Soil.**

A. Construction ~~and~~ Demolition ~~and~~ Debris. The Contractor shall manage Construction and Demolition Debris generated in carrying out the Work in compliance with the requirements of ORC Chapter 3714, OAC Chapter 3745-400, the regulations of the

Franklin County Board of Health, and the City of Columbus Health Code. The Contractor shall dispose of Construction and Demolition Debris at a licensed Construction and Demolition Debris facility or as otherwise authorized in OAC 3745-400-04.

### **107.01 Laws to be Observed**

Page 47-48

**107.01 Laws to be Observed.** The Contractor shall keep fully informed of all Federal, State and local laws, ordinances, codes and regulations and all orders and decrees of authorities having any jurisdiction or authority, which in any manner affect those engaged or employed on the Work, or which in any way affect the conduct of the Work. The Contractor shall at all times observe and comply with all such laws, ordinances, codes, regulations, orders, and decrees; and shall protect and defend, indemnify and hold harmless the City as provided in 107.24 relating to violation of any such law, ordinance, code, regulation, order, or decree, whether by the Contractor or its employees or agents, or the Contractor's subcontractors or suppliers.

The Contractor agrees that in the hiring of employees for the performance of work under this Contract or any subcontract hereunder, no Contractor or subcontractor, nor any person acting on behalf of such Contractor or subcontractor, shall, by reason of race, sex,  ~~creed or~~ sexual orientation, gender identity or expression, color, religion, ancestry, national origin, age, disability, family status, or military status discriminate against any citizen of the United States in the employment of labor or workers, who is qualified and available to perform the work to which the employment relates. ~~That no~~ No Contractor, subcontractor, nor any of their employees or agents shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this Contract on account of race, sex,  ~~creed or~~ sexual orientation, gender identity or expression, color, religion, ancestry, national origin, age, disability, family status, or military status.

### **107.02 Permits, Licenses and Taxes**

Page 48

**107.02 Permits, Licenses and Taxes.** The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the Work.

Prior to the closure of or working in or on any portion of a street the Contractor shall obtain a permit from the Department of Public Service, ~~Division of Planning and~~ Operations.

The Contractor shall include and pay all state and local sales, consumer and use taxes. Materials purchased for incorporation into the work will be exempt from state and local sales tax. A sales tax exemption certificate will be issued by the City at the request of the Contractor.

A. Licensed Water Contractor Requirement. It shall be unlawful for any person to perform any work on City of Columbus water line systems without first securing license



to engage in such work, as indicated in Columbus City Code Section 1103.06. This work includes any attachments, additions, alterations, or rehabilitation of any city service pipe or appurtenances (including water service lines and taps). This requirement may be met by utilization of a subcontractor who holds a City of Columbus Water Contractor License or a Combined Water/Sewer Contractor License to perform this work. Utilization of a subcontractor must meet the licensing requirements of City of Columbus Building Code, in particular Section 4114.119 and 4114.529. The License must be in effect the day of the bid opening and at the time of Work.

B. Licensed Sewer Tapper Requirement. It shall be unlawful for any person to engage in the business of sewer tapping and sewer building, or to open or tap any sewer in any street, alley or any public or private place or rehabilitation of any sewer or appurtenances (including manholes, inlets, and service laterals) in the City of Columbus without first securing license to engage in such business, as indicated in Columbus City Code Section 1131.01. Utilization of subcontractor must meet the licensing requirements of City of Columbus Building Code, in particular Section 4114.119 and 4114.529. The License must be in effect the day of the bid opening and at the time of Work.

#### **107.05 Federal-Aid Provisions**

Page 49

**107.05 ~~Federal~~Governmental-Aid Provisions.** When the United States Government or the State of Ohio Government pays for all or any portion of the Project's cost, the federal or State laws and the rules and regulations made pursuant to such laws must be observed and the Work is subject to the inspection of the appropriate Federal and/or State agency.

Such inspections shall not make the Federal or State Government a party to this Contract and such inspections will in no way interfere with the rights of the Contractor or the City under the Contract.

#### **108.01 Subletting of Contract**

Page 60

**108.01 Subletting of Contract.** ~~The Contractor must obtain the Director's written consent to sublet, sell, transfer, assign, or otherwise relinquish any rights, title, or interest in the Work. Upon the Engineer's request, the Contractor shall also promptly furnish copies of subcontracts and supply agreements.~~ A Contractor must obtain written consent from the director or designee of the Department prior to subletting, selling, transferring, assigning, or otherwise relinquishing any rights, title, or interest in the work to any subcontractor not listed in the bid submittal or contract. The director or designee must, within a reasonable time, approve or disapprove a contractor's request. The decision shall be final. The contractor may seek the aforementioned written consent for reasons including, but not limited to, the following:

1. After reasonable opportunity to do so, the subcontractor fails or refuses to execute a written contract for the scope of work specified in the bid and at the price specified in the bid;

2. The subcontractor becomes insolvent or the subject of an order for relief in bankruptcy;
3. The subcontractor fails or refuses to meet the requisite licensing or bonding set before bid submittal;
4. The contractor demonstrates to the contracting agency that the name of the subcontractor was listed as the result of an inadvertent clerical error;
5. The subcontractor fails or refuses to perform its subcontract after reasonable opportunity to do so; or
6. The contractor determines that additional specialty work not reasonably anticipated in the bid must be performed by subcontract.

Upon request, the contractor and its subcontractors shall promptly furnish copies of all subcontracts and supply agreements.

The Contractor must perform Work amounting to not less than 50 percent of the Contract Sum with its own organization, unless otherwise approved by Director. Any items set forth in the Proposal to be "specialty items" may be performed by subcontract and the cost of any such specialty items so performed by sub-contract may be deducted from the Contract Sum before computing the amount of work required to be performed by the Contractor's own organization. The Contractor's percentage of the Contract Sum includes the cost of materials and manufactured products purchased by Contractor, but not the cost of materials and manufactured products purchased by subcontractors. The Engineer will calculate Contractor's percentage based on the quantities shown in the Proposal and the unit prices of the Contract items to be performed by the Contractor's organization.

All subcontractors must hold a valid contract compliance certification number before the City will approve the subcontractor pursuant to this Section.

## **108.02 Preconstruction Conference**

Page 60-61

**108.02 Preconstruction Conference.** Unless otherwise provided for in the Contract Documents, no Work shall be commenced under this Contract until the Contract is fully executed and a Notice to Proceed has been issued.

The Preconstruction Conference shall not occur until after the Contract is fully executed. In general, fourteen days are required to notify all interested parties of a Preconstruction Conference. The Contractor shall take due note of this requirement and aid in the timely scheduling of the Preconstruction Conference to avoid unnecessary delays in the commencement of the Work.

At or before the Preconstruction Conference, the Contractor shall submit, to the Engineer, the baseline construction schedule prepared according to 108.03. The Contractor shall furnish a list of proposed subcontractors and material suppliers at or before the Preconstruction Conference. If the Contractor fails to provide the required submissions at or before the Preconstruction Conference, the Engineer may order the Preconstruction Conference suspended until they are furnished.

~~Unless otherwise provided for in the Contract Documents, no Work shall be commenced under this Contract until a Preconstruction Conference has been held.~~

~~After the Contract is fully executed, the City will send Preconstruction Conference notices to all parties. In general, fourteen days are required to notify all interested parties of a Preconstruction Conference. The Contractor shall take due note of this requirement and aid in the timely scheduling of the Preconstruction Conference to avoid unnecessary delays in the commencement of the Work.~~

~~At or before the Preconstruction Conference, the Contractor shall submit to the Engineer the baseline construction schedule prepared according to 108.03. Furnish a list of proposed subcontractors and material suppliers at or before the Preconstruction Conference. If the Contractor fails to provide the required submissions at or before the Preconstruction Conference, the Engineer may order the Preconstruction Conference suspended until they are furnished.~~

## 108.03 Prosecution and Progress

Page 63

### 108.03 Prosecution and Progress.

**c. Delay and Analysis of the Construction Schedule.** The Contractor shall not be entitled to and hereby waives any extension of time resulting from any event, circumstance, condition or cause unless a Claim for an extension of time is made in accordance with the requirements of 104.03. In the event the Contractor requests an extension of the Contract Time, it shall furnish such justification and supporting evidence as the Engineer may deem necessary for a determination of whether or not the Contractor is entitled to an extension of time under the provisions of the Contract.

The written claim seeking an extension of time must include the following information:

- i. Nature of the delay.
- ii. Date (or anticipated date) of commencement of delay.
- iii. Identification of person(s) or organization(s) or events affected by delay.
- ~~vi~~iv. Activities on the Construction Schedule affected by the delay, or new activities created by the delay and their relationship with existing activities.
- v. Identification of person(s) or organization(s) or event(s) the Contractor believes responsible for the delay.

- vi. Anticipated extent of the delay.
- vii. Recommended action to avoid or minimize the delay.
- viii. Identification of the pertinent contract provisions and supporting documents or project records.

**108.03 Prosecution and Progress**

Page 71

**108.03 Prosecution and Progress.**

**b. Recovery Schedules.** If the Monthly Update Schedule or Revised Monthly Update Schedule projects a finish date ~~for the Project more than fourteen calendar days later than the current Completion Date~~ beyond the Completion Date, submit a recovery schedule showing a plan to finish by the current Completion Date if requested by the Engineer, at no additional cost to the City. The recovery schedule shall also include a written plan detailing how the Contractor proposes to recover the lost time and meet the Completion Date. Such measures may include, but are not limited to, increasing the size of the workforce; increasing the number of working hours per shift, shifts per work day, work days per week, the amount of equipment or combination thereof; or rescheduling of work activities to achieve maximum concurrence of work efforts, all at no additional cost to the City. The Contractor shall submit the recovery schedule within ten days after the request is made by the Engineer.

**108.07 Failure to Complete on Time**

Page 78 - 79

**108.07 Failure to Complete on Time.** If the Contractor fails to complete the Work by the Final Completion Date, then the Engineer, if satisfied that the Contractor is making reasonable progress, and deems it in the best interest of the City, may allow Contractor to continue in control of the Work. If the Contractor is permitted to continue, Contractor must provide for the Engineer’s approval a written work plan and schedule for completion of the Project and shall diligently prosecute the Work in such a manner as required by the Contractor’s approved work plan.

If the Contractor fails to complete the contract specified Work by the Interim Completion Date, the City will deduct Liquidated damages according to Table 108.07-1. The amount of Liquidated Damage will be based on the Total Amount of the Bid of the Original Contract.

For each Calendar Day that Work remains uncompleted after the Completion Date, the City will deduct the sums specified herein from any money due Contractor, not as a penalty, but as liquidated damages based on the following schedule:

**TABLE 108.07-1 SCHEDULE OF LIQUIDATED DAMAGES**

<b>Original Contract Amount</b>	<b>Amount of Liquidated</b>
---------------------------------	-----------------------------

<b>(Total Amount of the Bid)</b>		<b>Damages to be Deducted for Each Calendar Day of Overrun in Time</b>
<b>From More Than</b>	<b>To and Including</b>	
\$0	\$50,000	\$150.00
\$50,001	\$150,000	\$250.00
\$150,001	\$500,000	\$500.00
\$500,001	\$2,000,000	\$1,000.00
\$2,000,001	\$5,000,000	\$2,000.00
\$5,000,001	\$10,000,000	\$2,500.00
	Over \$10,000,001	\$3,000.00

If the Contract Documents contain a special provision for liquidated damages, it shall be used in lieu of the schedule listed above.

In addition to the amounts specified above, for each Calendar Day after the Final Completion Date the Contractor will be charged for all City inspection and contract administration services. The Contractor acknowledges that these costs are in addition to the liquidated damages set forth above to compensate the City for its inability to use the Work as scheduled for its intended purpose and the Contractor expressly waives any right to assert or plead that such costs are duplicative of the liquidated damages set forth above.

The City will continue to pay the Contractor for Work performed on the Project less any liquidated damages set forth in this Section. The City may deduct the liquidated damages and inspection costs from all estimates due and payable to the Contractor after the Final Completion Date.

### **109.11 Final Inspection and Acceptance**

Page 93-95

#### **109.11 Final Inspection and Acceptance.**

**A. Partial Acceptance.** Upon completion of a portion of the Work, the Contractor may request acceptance of the completed portion of the Work.

1. An inspection may be performed on a completed portion of the project roadway section provided:
  - I. All safety items are in place, including permanent pavement markings.
  - II. Traffic is in its final pattern.
  - III. The completed portion of the project Work constitutes a completed geographic section of the project or a direction of traffic on a divided highway.
  - IV. The request is in accordance with all other contract provisions.

2. An inspection may be performed on a completed bridge provided:
  - I. All work on the bridge and approaches is complete, including all safety items and permanent pavement markings.
  - II. Traffic is in its final pattern.
  - III. The Contractor will not return to the bridge for any further work except as allowed for by item IV.
  - IV. Painting of structural steel is either completed or scheduled to be performed.
  - V. The request is in accordance with all other contract provisions.
  
3. An inspection may be performed on completed portions of the Work otherwise not listed above given:
  - I. The Work completed is of substantial completion as recognized by the Engineer.
  - II. Work is fully functioning as intended in the project.
  - III. If necessary, outside agencies have accepted the Work.
  - IV. The request is in accordance with all other contract provisions.

The Engineer shall grant written partial acceptance for the portion of the Work if accepted. The Engineer will have exclusive rights to reject the Contractor's request for the convenience of administering the contract. The written partial acceptance will identify what portion of the Work is being accepted, the date of acceptance, and the warranty provisions initiated by the partial acceptance.

Partial acceptance shall relieve the Contractor of maintenance responsibility for the accepted portion of the Work. Partial acceptance shall not relieve the Contractor of the responsibility to correct defective Work or repair damage caused by the Contractor, nor shall it waive the right to any other remedy to which the City is entitled by law or in equity.

**AB. Final Inspection.** The Final Inspection shall be a limited visual review of the Work and shall only serve as the City's verification that the Work appears substantially complete. Final Inspection does not waive any available rights or remedies of the City, nor divest the Contractor of any responsibility for compliance with the Contract Documents or liability for damages.

When the Contractor completes all or portions of the Work to be accepted by the City, a request by the Contractor for a Final Inspection shall be made. If the Engineer agrees the Work is complete, then within ten business days the Inspector will inspect the Work and categorize it as one of the following:

1. Unacceptable or not complete.
2. Substantially complete with punch list items found by the Inspector.
3. Substantially complete.

If the Inspector finds the Work substantially complete or substantially complete with punch list items, then the Contractor's maintenance responsibilities end on the day of the Final Inspection, except for any maintenance related to unfinished punch list items. This shall not relieve the Contractor of responsibility to correct defective Work or repair damage caused by the Contractor or waive any other remedy to which the City is entitled under the Contract, applicable law, in

equity, or otherwise. The Inspector will issue a Final Inspection Report that will document the findings of the inspection and start any guarantee and warranty period(s).

**BC. Punch List.** As provided in this Section, the Inspector will issue to the Contractor a written punch list of work required as a condition of acceptance. The Inspector's punch list will stipulate a reasonable time to complete the required work unless the Contractor can demonstrate to the Inspector that completion of the punch list work within the Inspector's time frame is unreasonable.

Notify the Engineer in writing when all of the punch list items are complete.

**CD. Finalization.** The Contractor will receive the Engineer's list of final quantities within forty-five Calendar Days from the date that the Work is determined to be substantially complete by the Inspector. The Contractor shall accept the final quantities as determined by the Engineer or provide a written notice indicating the reason for disagreement within thirty Calendar Days of receiving the Engineer's list of final quantities. The prescribed 30 Calendar Day period can be modified by mutual agreement of the Contractor and the Engineer. If no notice of disagreement is received, then the final estimate shall be based on the Engineer's list of final quantities.

Within sixty Calendar Days from receipt of the Engineer's list of final quantities, the Contractor shall supply Final Project Documents for Project closeout, to include, but not be limited to:

1. Material certificates
2. Payrolls
3. Wage affidavits
4. DBE/MBE/WBE affidavits, if applicable
5. As-built drawings as required
6. Warranties
7. O&M Manuals
8. Lien Waivers
9. Final Force Account Statement(s)
10. Surety Consent for Final Payment
11. Spare Parts List
12. Certificate of Completion
13. Bond Rider (Check with the bond form)
14. Affidavit of Final Payment

Failure to submit these acceptably completed documents will result in an administrative fee of \$100.00 per Calendar Day deducted from the Final Pay Estimate for every day that any of the required documents remain delinquent, starting with thirty Calendar Days after receipt of written notification from the Engineer of a document deficiency.

**DE. Final Acceptance/Project Closeout Process.** After the Final Inspection and the issuance of the Punch List, the Contractor must complete the items on the Punch List in the stipulated time frame. After completing the items on the punch list, the Contractor shall notify the Engineer to confirm that the items have been completed. When the work noted on the Punch List has been confirmed to be complete, the Engineer will issue a Notice of Final Acceptance.

Final Acceptance of the Work does not waive any available rights or remedies of the City under the Contract, applicable law, in equity, or otherwise, and shall not discharge the Contractor from any obligations it has under the Contract, including, but not limited to: unsettled liens and

claims against the City; faulty, defective, or nonconforming work discovered or appearing after Final Acceptance; failure of the Work to comply with the requirements of the Contract Documents; the terms of any warranties or guarantees contained in or required by the Contract Documents; any indemnification rights including damages or costs incurred by the City resulting claims or lawsuits brought against the City based on actions on the part of the Contractor, its subcontractors, sub-subcontractors, suppliers, or any of their employees, representatives or agents; fraud or bad faith committed by the Contractor or any subcontractor or supplier during performance of Work, but discovered by the City after Final Payment; and the City's audit and adjustment rights under the Contract.

**EF. Final Estimate.** Final payment to the Contractor is based on:

1. The agreed final quantities or as determined by the Engineer;
2. Finding of Final Acceptance by the Engineer;
3. Receipt of acceptable Final Project Documents; and
4. Contractor certification that the Work was performed in accordance with the Contract Documents.

As soon as practical after the Final Acceptance of the Work by the City and after approval of the final Change Order, or the final Contract Modification if the final Contract Amount exceeds the amount authorized by City Council, there shall be issued a final estimate for payment based upon the actual quantities of completed and accepted Work performed under the Contract. Compensation will not be made for any Work that was not authorized.

Final Estimates shall be approved by the City, after which the City shall pay the entire sum found to be due, after deducting all previous payments under 109.07. All prior estimates are subject to correction in the Final Estimate.

**FG. Completion of Contract and Continuation of Contractor's Responsibility.** The Engineer will issue a letter confirming completion of the Contract, noting any exception as provided in Items 659 and 661 and any guarantee or warranty.

The Contract is complete, except for items covered by any required bonds, when the Contractor receives final payment.

Neither Substantial Completion, Partial Acceptance, Final Acceptance nor Completion of the Contract relieves the Contractor of any responsibilities to properly perform or correct the Work or to repair damage or waives any remedies to which the City is entitled under the Contract, at law, in equity, or otherwise.

### **109.13 Guarantee**

Page 96

**109.13 Guarantee.** Unless otherwise noted in the Contract Documents, the guarantee period begins upon Final Acceptance of the Work by the City. The guarantee period extends for one year from the date of Final Acceptance.

Under the Contractor's guarantee the Contractor warrants to the City that materials and equipment furnished under the Contract are of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work is free from defects not inherent in the quality required or permitted; that the Work conforms to all these



requirements or the occurrence of any defects or failures in the Work shall be remedied by the Contractor promptly and at no cost to the City.

In addition to the Contractor's guarantee and without in any way diminishing or changing it, the Contract Documents may also specify other express Contractor warranties or subcontractor, manufacturer or supplier warranties that apply during, or after, the Contractor's guarantee period. Notwithstanding the existence of other warranties, the Contractor shall remain as the responsible party to the City under the Contractor's guarantee for purposes of the City exercising its rights under this Section during the one-year guarantee period.

The guarantee provisions do not relieve the Contractor from completing the Work in accordance with the Contract and do not diminish any rights or remedies the City may have under the Contract, applicable law, in equity, or otherwise.

At any time during the guarantee period, the City may notify the Contractor that certain repairs or other actions are necessary. Within ten days after being so notified, the Contractor shall make such repairs or take such other actions as are declared necessary to restore the Work to a good and serviceable condition consistent with the requirements of the Contract Documents. In the event that the Contractor fails to comply with the order to repair or take other actions, such repairs may be made or other actions undertaken by the City and the Contractor agrees that it shall reimburse the City for any such expenses it incurs within ten days following the receipt of a statement rendered to the Contractor by the City for such expenses. Specifications for the Work performed under this Contract shall govern in the making of repairs or taking other action pursuant to this Section.

Upon the expiration of the one-year guarantee period, the Contractor shall take all steps necessary to transfer to the City all remaining rights and obligations that may exist under any other warranties from the Contractor, subcontractors, manufacturers or suppliers and shall continue to assist the City, as needed, to enforce such warranties.

If the cost of providing security to the City of Columbus for the one year guarantee period is prohibitive, the Contractor may, with approval of the Director, make an assignment of bonds or other form of acceptable security to the City in the amount of 5 percent of the contract cost for the duration of the guarantee period.

## **207.02 Materials**

Page 131

**207.02 Materials.** Furnish commercial fertilizer, seed, and mulch materials conforming to Item 659. Furnish stabilized construction entrances, filter fabric ditch checks, rock checks, inlet protection, perimeter filter fabric fence, straw wattles, bale filter dikes, sediment basins and dams, dikes, slope drains, and rock channel protection materials as specified on the standard construction drawings.

## **207.03.B.1 Construction Requirements**

Page 132 - 133

**1. Perimeter Controls.** Use perimeter filter fabric fence to protect the project

from sheet flow runoff from off Right-of-Way and off construction limit locations. Use perimeter filter fabric fence to protect the following project items from sheet flow runoff: water bodies, wetlands, or other significant items shown on the plans.

Use dikes to prevent sediment flow from coming on to the project and to non-vegetated barren areas on the project.

Install perimeter filter fabric fence, stabilized construction entrances, and dikes concurrent with clearing and grubbing operations.

## **207.06 Method of Measurement**

Page 136 - 137

**207.06 Method of Measurement.** The City will measure fertilizer by the number of tons (metric tons) under 659 Commercial Fertilizer.

The City will measure Construction Seeding and Mulching by the number of square yards (square meters).

The City will measure Slope Drains by the number of feet (meters).

The City will measure Sediment Basins and Dams by the number of cubic yards (cubic meters) of excavation and embankment.

The City will measure Perimeter Filter Fabric Fence, Bale Filter Dike and Construction Fence by the number of feet (meters).

The City will measure Filter Fabric Ditch Check by the number of feet (meters).

The City will measure Inlet Protection by the number of inlets protected (each).

The City will measure Dikes by the number of cubic yards (cubic meters) of excavation and embankment.

The City will measure Construction Ditch Protection and Construction Slope Protection by the number of square yards (square meters).

The City will measure Rock Channel Protection, Type C or D (with or without) filter by the number of cubic yards (cubic meters).

The City will measure Sediment Removal by the cubic yards (cubic meters).

The City will measure Stabilized Construction Entrances by the Cubic Yard (Cubic Meter).

## **207.07 Basis of Payment**

Page 137

**207.06 Basis of Payment.** The City will not pay if temporary erosion and sediment control items are required due to the Contractor's negligence, carelessness, or failure

to install permanent controls as a part of the work as scheduled; install such temporary work at no expense to the City.

The City will not pay for stream crossing work specified in 207.03.B.8.b.

If erosion control items in the Contract are properly placed according to the Contract Documents, the City will pay to maintain or replace erosion control items at the unit bid prices or according to 109.05.

The City will pay for sediment removed from dams, basins, inlet protection, ditch checks, rock checks, perimeter filter fabric fence, bale filter dikes, and all other types of filter fabrics, straw or hay bales, or any other temporary sediment control items under 207 Sediment Removal.

The City will pay for accepted quantities at the contract prices as follows:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
207	Square Yard (Square Meter)	Construction Seeding and Mulching
207	Foot (Meter)	Slope Drains
207	Cubic Yard (Cubic Meter)	Sediment Basins and Dams
207	Foot (Meter)	Perimeter Filter Fabric Fence
207	Foot (Meter)	Bale Filter Dike
207	Foot (Meter)	Filter Fabric Ditch Check
207	Each	Inlet Protection
207	Cubic Yard (Cubic Meter)	Dikes
207	Square Yard (Square Meter)	Construction Ditch Protection
207	Square Yard (Square Meter)	Construction Slope Protection
207	Cubic Yard (Cubic Meter)	Rock Channel Protection Type C or D with Filter
207	Cubic Yard (Cubic Meter)	Rock Channel Protection Type C or D without Filter
207	Cubic Yard (Cubic Meter)	Sediment Removal
207	Foot (Meter)	Construction Fence
207	Square Yard (Square Meter)	Geo-textiles
<u>207</u>	<u>Cubic Yard</u> <u>(Cubic Meter)</u>	<u>Stabilized Construction Entrance</u>

**255.08 Opening to Traffic**

**255.08 Opening to Traffic.** Do not open the rigid replacement to traffic until the concrete attains a split tensile strength of ~~250~~ 350 pounds per square inch, as tested per ASTM C496 (1.7 MPa). If maintaining traffic in adjacent lanes, schedule work in order to place the concrete in the prepared repair area within 48 hours after removing the existing pavement. If unable to complete placement of the concrete in the exposed repair area by the end of the daily work shift, cover unfilled repair areas 10 feet (3 m) or less in length with a steel plate. Do not leave repair areas unfilled with concrete when work is suspended on weekends or holidays. If unable to complete placement of the concrete in the exposed repair area before suspending work for a weekend or holiday or within the time specified above, fill the excavation with an asphalt concrete mixture or other suitable temporary patch material with a durable surface as the Engineer directs. Maintain the temporary patches while they are in service.

### **259.03 Classification**

Page 154

**259.03 Classification.** Based upon the Engineer's selection as described in 259.02, furnish one of the following pavement types:

#### **Permanent Pavement Replacement (Standard Drawing No. 1441-~~Dr-A~~)**

Type I - Bituminous  
Type III- Brick  
Type V – Concrete

#### **Driveway Pavement Replacement (Standard Drawing No. 2160-~~Dr-A~~)**

Type IIIA - Asphalt Driveways  
Type IIIB - Concrete Driveways  
Type IIIC - Gravel Driveways

### **306.01 Description**

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**306.01 Description.** This work consists of constructing a PCC base on a prepared subgrade or base course. This work shall conform to the requirements of Items 305 and 451 except that:

1. For concrete proportioning, meet the requirements of Item 499, Concrete, Class F.
2. Conform to the opening-to-traffic requirements as specified in 451.16 except that the split tensile strength shall be ~~1.7~~ 2.4 MPa), as tested per ASTM C496.

3. Load transfer devices are not required.

### **401.20 Asphalt Binder Price Adjustment**

Page 181

**401.20 Asphalt Binder Price Adjustment.** A Contract Item is eligible for a price adjustment when the Contract's Proposal specifically includes an Asphalt Binder Price

Adjustment note ~~and the Contract Item meets the quantity limitations of the ODOT proposal note for Asphalt Binder Price Adjustments for Single Year or Multi Year, as applicable.~~

#### 407.06 Application of Asphalt Material

Page 199

**407.06 Application of Asphalt Material.** Uniformly apply the asphalt material with a distributor having clean nozzles functioning properly. Obtain the Engineer's approval for dilution with water, if desired to achieve a more uniform application. The City will not pay for diluted tack used without approval. Ensure any diluted asphalt material used for tack has a minimum viscosity of 20 seconds Saybolt Furol (702.04).

For irregular areas such as driveways and intersections, apply the asphalt material using a method the Engineer approves.

If paving asphalt concrete directly onto PCC, Roller Compacted Concrete, or brick pavement, tack the pavement with rubberized asphalt emulsion conforming to 702.13.

#### 423.09 Method of Measurement

Page 224

**423.09 Method of Measurement.** The City will measure Crack Sealing, of the type specified, either by the number of pounds (kilograms), the number of square yards (meters), or the number of linear feet (meters), of hot applied sealant in place, completed, and accepted.

~~The City will measure Crack Sealing, of the type specified, by the number of linear feet (meters) of sealant in place, completed and accepted.~~

#### 423.10 Basis of Payment

Page 224-225

**423.10 Basis of Payment.** The City will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
423	Pound (Kilogram), <u>Square Yard</u> <u>(Square Meter),</u> <u>or Linear Foot (Meter)</u>	Crack Sealing, Type I
423	Pound (Kilogram), <u>Square Yard</u> <u>(Square Meter),</u> <u>or Linear Foot (Meter)</u>	Crack Sealing with Routing, Type I
423	Pound (Kilogram), <u>Square Yard</u> <u>(Square Meter),</u>	Crack Sealing with Sawing, Type I

423	<u>or Linear Foot (Meter)</u> Pound (Kilogram), <u>Square Yard</u> <u>(Square Meter),</u> <u>or Linear Foot (Meter)</u>	Crack Sealing, Type II
423	Pound (Kilogram), <u>Square Yard</u> <u>(Square Meter),</u> <u>or Linear Foot (Meter)</u>	Crack Sealing, Type III
423	Pound (Kilogram), <u>Square Yard</u> <u>(Square Meter),</u> <u>or Linear Foot (Meter)</u>	Crack Sealing, Type II or III
423	Pound (Kilogram), <u>Square Yard</u> <u>(Square Meter),</u> <u>or Linear Foot (Meter)</u>	Crack Sealing, Type IV

**441.09 Quality Control Tests**

Page 232

**441.09 Quality Control Tests.** Perform quality control tests to control the asphalt concrete mix within the specifications. Ensure that these quality control tests measure the asphalt binder content, gradation, air voids, and Maximum Specific Gravity (MSG) according to the Contractor’s approved QCP. ~~Perform each quality control test a minimum of one time each half of a production day or night (two tests per production day or night), or one each 1400 tons (1300 metric tons), whichever is less. Perform quality control testing according to the following schedule of testing based on material loaded for delivery during each shift:~~

<u>0 to 100 tons</u>	<u>No testing required</u>
<u>101 to 200 tons</u>	<u>One “Basic” test per Item 403.05</u>
<u>201 to 500 tons</u>	<u>Complete set of QC tests per this section</u>
<u>501 to 1000 tons</u>	<u>Complete set of QC tests per this section</u>
<u>1001 to 1500 tons</u>	<u>Complete set of QC tests per this section</u>

All QC testing requirements will be based on delivery ticket load times for material delivered to City of Columbus projects during a shift. No QC testing is required for shift quantities of less than 100 tons unless visual observations indicate a potential issue may exist with the mix. A shift is defined as one twelve-hour period starting at either 6:00 am or 6:00 pm. The basic test and first complete set of tests may be combined to account for the first 500 tons produced and loaded for the shift.

**448.04 Small Quantity Asphalt Concrete Testing and Acceptance**

Page 241

~~**448.04 Small Quantity Asphalt Concrete Testing and Acceptance.** This procedure is intended for the use of the Contractor. However, small quantity acceptance is not permitted for JMF's that have not been verified by acceptable production under normal testing during the current construction season. The use of new JMF's for small quantities must be approved by the Engineer. The total seasonal production per project for each material type shall not exceed 1500 tons.~~

~~The City can sample, test and/or reject any material received under this procedure. Material may be rejected by visual inspection by the project or reject thru City comparison testing. Poor plant or mix control, poor mix performance, poor mix quality, failure to submit the required form as required or ongoing City sample failures can mean disallowing further use of this procedure on the project or future projects. This procedure may be disallowed by the City for any contractor when documented pre-mature small quantity mix failure in any application has occurred on the contractor's previous project(s).~~

~~When material is being produced under this procedure and has a quantity of less than 200 tons a day for each type, the acceptance is by contractor certification as outlined below. No quality control testing is required. A quick check plant calibration must have been performed in accordance with the contractor's QCP as outlined in 403. Computerized plant operation tickets, a copy of the dated and signed quick check calibration(s) and a TE-199-SMQ form must be submitted as outlined below.~~

~~If the daily production does not exceed 500 tons a day for each type, the acceptance shall be by contractor certification as outlined below. The contractor shall perform an asphalt binder content test for every two hours of production. The asphalt binder content shall be determined by a nuclear gauge that has been properly offset for the JMF being used. Computerized plant operation tickets and a TE-199-SMQ form must be submitted as outlined below. Contractor samples shall be held at the lab for three days.~~

~~The required certification (TE-199-SMQ form) and other required information must be submitted by the next working day to the Laboratory unless otherwise notified by the Engineer. The TE-199-SMQ form shall be signed by an employee of the contractor having authority to represent the contractor as outlined in the contractor's QCP. The TE-199-SMQ form shall be sent to the Engineer if requested.~~

## **451.061(2) Depositing and Curing Concrete During Cold Weather**

Page 247

### **451.061(2) Depositing and Curing Concrete During Cold Weather.**

2. Once placed, cover the entire surface of the top and the sides of the newly placed concrete and protect from freezing for seven days, unless split tensile-beam specimens have attained the required minimum strength specified. Accomplish protection as directed in Item 511.12 with insulated blankets or with a combination of loose straw 12 inches (0.3 m) thick covered with a securely fastened exterior cover of waterproof material.

## 451.07 Placing Reinforcement

Page 248

**451.07 Placing Reinforcement.** Place pavement mesh of the size and at the locations within the concrete slab shown on ~~the~~ ODOT standard construction drawings BP-1.1.

## 451.09 Finishing

Page 251

**451.09 Finishing.** Use 10-foot (3 m) straightedges to continually check the finished concrete surface for trueness. If the pavement surface is dragged with a diagonal pipe float machine, occasionally check the surface while the concrete is plastic. Do not add water or finishing agent to aid finishing.

Before the concrete initially sets, round the edges of the pavement along each side of each slab and on each side of transverse expansion joints to the radius specified using an approved edging tool. Before texturing the surface, eliminate tool marks left by the edging tool.

~~Texture the surface in the longitudinal or transverse direction using a broom or artificial turf drag to produce a uniform, gritty, texture.~~

The surface shall be textured by use of a broom or artificial turf drag in the longitudinal direction so as to produce a uniform, gritty, longitudinal texture. In addition to and immediately following the above specified longitudinal drag texture, the pavement shall be textured in the transverse direction by an approved device that will produce a relatively uniform pattern of grooves. The grooves shall be spaced at approximately 5/8 inch (16 mm) centers and shall be approximately 0.15 inches (3.8 mm) deep and 0.10 (2.5 mm) inches wide. Variation from the texturing requirements will be permitted only with the written permission of the Director.

Before the concrete finally sets, impress complete station numbers into the pavement every 100 feet (50 m), e.g., 1+00 (2+050). Mark station equations in the pavement as shown on the plans. Ensure that the numerals are 3 to 4 inches (75 to 100 mm) high and 1/4 inch (6 mm) deep. Place the station numbers parallel with and facing the right edge of the pavement, and centered 12 inches (0.30 m) in from the right edge. On divided highways, provide station numbers on both pavements. When placing concrete shoulders with the traveled lane, place station numbers 12 inches (0.30 m) in from the outside edge of the shoulder and facing the pavement.

## 499.04 Proportioning Options for Portland Cement Concrete

Page 264

**499.04 Proportioning Options for Portland Cement Concrete.** The Contractor may substitute one of the following options for each respective class of concrete given in Table 499.03-2 and Table 499.03-3. Use the same air content specified in Table 499.03-2 and Table 499.03-3. Comply with slump requirements of Table 499.03-1. Submit requests to use any of the following optional mix designs to the Engineer Laboratory for approval before use. The SSD weights specified in Table 499.04-1 through Table 499.04-3 were calculated using the specific gravities in 499.03.C. Make adjustments to the mix



design when specific gravities differ by more than  $\cdot 0.02$ . Make other adjustments allowed in 499.03.D and approved by the Engineer.

## **501.05 Submittal of Working Drawings and Calculations**

Page 275-276

**501.05 Submittal of Working Drawings and Calculations.** Design and perform all procedures as directed by the AASHTO STANDARD SPECIFICATIONS or the AASHTO LRFD BRIDGE except as modified below:

Perform daily inspections to ensure the work governed by the working drawing is functioning as designed. Report malfunctioning work to the Engineer immediately.

**A. Projects with Railroad Involvement.** Prepare and provide working drawings listed in this section as follows:

Have an Ohio Registered Engineer prepare, sign, seal and date each working drawing. Submit working drawings to all involved railway companies at least 50 days before construction begins. Obtain acceptance from all involved railroad companies. Furnish the Engineer copies of all correspondence with the railroad, documentation of railroad acceptance and the working drawings accepted by the railroad. City acceptance is not required.

Perform all work in accordance with the accepted working drawings. Immediately cease all operations that deviate from the accepted working drawings. If a deviation is necessary, furnish the Engineer a copy of a revised working drawing including documentation of acceptance from all involved railroad companies as least 24 hours before construction on deviated work begins. The revised working drawing shall be sealed and dated by an Ohio Registered Engineer. City acceptance of revised working drawings is not required. The City will consider delays resulting from working drawing deviations as non-excusable in accordance with 108.06.E.

This section applies to working drawings for the following:

1. Bracing adjacent to the railroad tracks. Perform work according to 501.05.B.1.
2. Demolition of structures over or within 14 feet of railroad tracks. Perform work according to 501.05.B.2.
3. Erection of structural members over or within 14 feet of railroad tracks. Perform work according to 501.05.B.4.

**B. Projects without Railroad Involvement.** Prepare and provide working drawings listed in this section as follows:

Have an Ohio Registered Engineer prepare, sign, seal and date each working drawing. ~~Have a second Ohio Registered Engineer check, sign, seal and date each working drawing. The preparer and checker shall be two different Engineers.~~

Submit the working drawing to the Engineer at least 7 days before construction begins. City acceptance is not required.

Perform all work in accordance with the prepared working drawings. Immediately cease all operations that deviate from the prepared working drawings. If a deviation is necessary, furnish the Engineer a copy of a revised working drawing at least 24 hours before construction on the deviated work begins. The revised working drawing shall be signed, sealed and dated by an Ohio Registered Engineer ~~and checked, signed and sealed and dated by a Second Ohio Registered Engineer~~. City acceptance of revised working drawings is ~~not~~ required. The City will consider delays resulting from working drawings deviations as non-excusable in accordance with 108.06.E.

This section applies to working drawings for the following:

1. Excavation Bracing, adjacent to active traffic, except when a complete design is already shown in the plans. Perform all work as specified below:
  - a. Locate Excavation Bracing per contract, if shown.
  - b. Maintain temporary horizontal and vertical clearances per contract.
  - c. Include the effects of AASHTO live and dead load surcharges as necessary.
  - d. Design Excavation Bracing in accordance with the latest AASHTO Guide Design Specifications for Bridge Temporary Works, Section 4
  
2. Demolition of ~~structures over or adjacent to active traffic~~ the entire or portions of the following: Bridges, Culverts with 8 feet or more of fill, Walls with 8 feet or more of fill retained. Perform all work as specified below:
  - a. Provide temporary devices or structures necessary to protect traffic during all demolition activities. Provide traffic protection when demolition is located less than 12' horizontally from active traffic on structures of less than 25' vertical clearance. Increase the 12' minimum horizontal distance 1 foot for each 2 feet of additional height greater than 25'.

## **511.17 Curing and Loading**

Page 312

### **511.17-1 (Table).**

TABLE 511.17-1			
	Span <sup>[1]</sup>	Age of Concrete in Days	
		No <del>Beam</del> Split Tensile Test	<del>Beam</del> Split Tensile Test <sup>[2]</sup>
Removing Falsework	Over 10 feet (3 m)	14	5
	10 feet (3 m) or less and all pier caps	7	3
Traffic <sup>[3]</sup>	Any	14	7

[1] Span is defined as the horizontal distance between faces of the supporting elements when measured parallel to the primary reinforcement.

[2] Applicable only when the average ~~Split Tensile psi modulus of rupture~~ for two tests is not less than ~~400 650~~ psi (~~2.76 4.5~~ MPa).

[3] When placing Class HP concrete for a superstructure between October 15 and March 15, open the deck to traffic no sooner than 30 days after placement.

**514.13 Surface Preparation**

Page 364

**514.13 Surface Preparation.**

**2. Non-Hazardous Solid Waste.** For all waste that is determined to be a Non-Hazardous Solid Waste ~~by the DRWE~~, the Contractor is required to:

**603.02 Materials**

Page 420

**603.02 Materials.** Furnish materials conforming to:

- Soil and granular embankment ..... 203.02.R
- Structural backfill, Types 1 and 2 ..... 703.11

~~The Engineer will allow Type 3 structural backfill, conforming to 703.11, to be used as bedding below the pipe only when pumping operations do not control severe ground water problems. Place at least 12 inches (300 mm) of Type 1 structural backfill on top of the Type 3 structural backfill to prevent piping.~~

- Embankment ..... 203.02.R

**603.11 (D) Placement and Compaction Requirements.**

Page 431

~~(D) — Place Structural Backfill Type 3 in layers not to exceed 12 inches (300 mm) loose depth. Vibrate, tamp, or compact to approximately 85 percent of the original layer thickness.~~

**604.03 Construction Methods, General.**

Page 435

**604.03 Construction Methods, General.**

**B. Adjustment to Grade.**

1. Carefully remove and clean the existing frame, adjust the height of supporting walls, and reset the existing frame in a bed of concrete mortar or structure concrete to the new grade.
2. Carefully remove the existing cover or grate and install a casting or an adjusting device approved by the Engineer to the new grade and install per the manufacturer's recommendations.
3. Secure extension ring in place by applying mastic, conforming to 706.10, to the entire contact surface between the casting and extension.

#### **604.06 Precast Concrete Modular Construction.**

Page 436

**604.06 Precast Concrete Modular Construction.** Furnish precast bases on a compacted structural backfill bed having a minimum thickness of 3 inches (75 mm). Ensure that the structural backfill bed is level and uniformly support the entire area of the base.

Catch basins and inlets manufactured with knock-out panels will only be permitted where the construction drawings show a pipe entering the structure that will replace the panel.

~~After placing the pipe, grout all openings between the pipe and structure less than 4 inches (100 mm) with mortar and grout all openings between the pipe and structure greater than 4 inches (100 mm) with nonshrink mortar. Seal all joints between modules with materials specified in Item 603 for Type A, B, C, D, or F conduit.~~

All joints between modules shall be as follows:

Sanitary manholes shall conform to the requirements of ASTM C443 as it pertains to the use of a confined gasket.

Storm sewer applications shall be in conformance with ASTM C443, 706.10 or 706.11.

Pipe entrances to the precast modular sections for sanitary sewers 8 inches (203 mm) to 48 inches (1.2 m) in diameter shall be a flexible watertight joint in accordance with 706.16.

Pipe entrances to the precast modular sections for storm sewers shall be in accordance with 706.16, or neatly grouted in place.

All lift holes and other openings in the structure shall be thoroughly and neatly grouted with cement mortar or other suitable material approved by the Engineer, after all pipes are placed into the structure.

All sanitary manholes shall be watertight structures.

Cure median inlets with the same materials and methods specified in 622.07.

**609.02 Materials**

Page 449

**609.02 Materials.** Furnish materials conforming to:

Concrete, Class C.....	499
Expansion joint material .....	705.03
Aggregate base.....	304, 703.04
Preformed filler.....	705.03
Tie bar steel, epoxy coated .....	709.00, 709.01, 709.03, 709.05
Coated dowel bars.....	709.13

For 609.03 Stone Curb furnish the best quality of Berea or Amherst gray sandstone, or sandstone of equal quality.

Furnish asphalt concrete curb conforming to a 448 intermediate course, designed for medium traffic, using a PG 64-22. Set the fine aggregate content at the maximum allowed under 448 intermediate. Provided the Contractor meets the composition requirements, the Contractor may add mineral filler conforming to 703.07. Add the mineral filler using a method approved by the Laboratory. Provide asphalt concrete meeting the mix composition requirements of Item 448, with the fine aggregate content set at the maximum permitted under the applicable composition tables. Use the same type of mix as specified for the surface course on the project. Furnish Granite Curb with straight face per ~~Supplemental Specification 1552~~ the standard drawing to match existing granite curbs, produced in random lengths of not less than 36 inches (900mm) from granite complying with ASTM C615. Ensure the curb face is sawed and flamed, with a sawed and flamed top. Include all labor, materials, equipment and incidentals necessary for construction in the unit cost of Item 609 Granite Curb.

**630.02 Materials**

Page 513-514

**630.02 Materials.** The acceptance of materials and products is based on Certified Test Data, furnished in triplicate, or on test results of samples according to 106.02, as required by the Engineer.

Transfer manufacturers' guarantees or warranties on all traffic sign material to the City or other maintaining agency upon completion and acceptance of the project.

Furnish materials conforming to:

Concrete, Class C .....	499, 511
Steel:	
Structural steel.....	711.01
Reinforcing steel .....	509.02
U-channel posts.....	730.015
Square posts .....	730.016
<del>Wooden Box Beam .....</del>	<del>730.017</del>

Street name sign supports.....730.017

Tube and pipe.....	730.01
Anchor bolts and nuts .....	730.02
Poles and arms .....	730.03
Base and arm plates.....	730.04
Handhole covers.....	730.05
Pole caps .....	730.06
Arm caps .....	730.07
Hardware .....	730.08
Stainless steel .....	730.09
Stainless steel hardware .....	730.10
Messenger wire .....	732.18
Aluminum:	
Sheet and plate .....	730.11
Extrusions.....	730.12
Tube and pipe.....	730.13
Castings.....	730.14
Forgings .....	730.15
Welding rods .....	730.16
Hardware .....	730.17
Other materials:	
Decals .....	725.21
Reflective sheeting, Type F.....	730.18
Reflective sheeting, Type G.....	730.19
Reflective sheeting, Type H....	730.192
Reflective sheeting, Type J .....	730.193
Nonreflective sheeting .....	730.20
Silk screen inks .....	730.22
Transparent electronic cuttable films	730.23
<u>Cantilevered offset brackets.....</u>	<u>730.24</u>

## 630.04 Sign Fabrication

Page 514-516

**630.04 Sign Fabrication.** Sign types include flat sheet, double faced, extrusheet, and temporary overlay. Flat sheet signs consist of one-piece units made of aluminum. Double faced signs consist of flat sheet aluminum or extruded aluminum blanks with legend on both sides. Extrusheet signs consist of a number of horizontal panels assembled to form a complete sign. Temporary overlay signs consist of an aluminum sheet covering portions or entire surfaces of extrusheet signs.

Prior to reflective sheeting application, clean aluminum sign surfaces either by total immersion in a tank containing an alkaline solution of the manufacturer's specification or by steam cleaning with an alkaline solution of the manufacturer's specification, followed by a thorough rinsing with running water. After cleaning, etch the surface with an acid solution, and dry. Do not allow cleaned and etched surfaces to become contaminated by contact with oil or grease. Drill or punch bolt holes to finish size.

Use sign legends according to the (a) City Sign Design Manual, (b) OMUTCD and (c) the ODOT Sign Design Manual. In case of a conflicting specification statement, the specification document hierarchy shall be in the order listed from (a), highest, to (c) lowest. Use Clearview font for positive contrast legends on freeway and expressway guide signs and on all other guide signs when permitted in the ODOT Sign Design Manual and City Sign Design Manual, respectively. Use capital legends and upper/lower case legends in accordance with the City Sign Design Manual. When either is permitted in the City Sign Design Manual, use upper/lower case legends.

For flat sheet, double faced mile marker, double faced street name and ground mounted extrusheet signs, use Type G, H or J reflective sheeting for background and reflective legends. For overhead extrusheet signs, use Type H reflective sheeting for the background, and use Type H reflective sheeting for reflective legends, shields and symbols (including hazardous cargo plate, airport symbol, arrows and borders). Apply reflective sheeting to the surface according to the manufacturer's recommendations, with no blisters, wrinkles, tears, or blemishes. Do not use reboundable or damage control sheeting for permanent signs.

For reflective legends on flat sheet, double faced street name signs and double faced mile marker signs, use reverse silk screen transparent ink or electronic cuttable film. For nonreflective legends, use direct silk screen black ink or direct applied nonreflective black sheeting copy. For double faced mile marker signs, use flat sheet aluminum and apply reflective sheeting and legend to both sides.

Street Name Sign faces shall be bonded to 0.063 inch (1.6 mm) thick sign blanks according to the sheeting manufacturers' recommendation. There shall be 2 sign faces on each sign blank, 1 on each side, unless otherwise noted. Street name legends shall be printed in heights of 4" on 9" blade, 6" on 12" blade, and 8" on 18" blades (102, 152 and 203 mm) upper and lower case. Standard FHWA Series D 2000 EX lettering shall be used on all signs 9" and 18" blades and FHWA Series C 2000 EX lettering for all 12" sign blades. Prefixes and suffixes shall be printed in heights of 2, 3, and 4 inch (50, 76, and 102 mm) upper and lower case. All letters shall be centered on the vertical dimension and the legend will be centered on the various sign blades horizontally. Street name letter heights will be as follows: 4 inch (102 mm) legend with 2 inch (50 mm) prefix and suffix on a 9 inch (228mm) blade, 6 inch (152 mm) legend and 3 inch (76 mm) prefix and suffix on a 12 inch (305 mm) blade, and an 8 inch (203 mm) legend and 4 inch (102 mm) prefix and suffix on an 18 inch (457 mm) blade. The minimum distance between the edge of the sign and the first or last letter of the street name, prefix, or suffix shall be 4 inch (102 mm). See City of Columbus Standard Drawing(s) for fabrication of street name signs.

Extrusheet panels consist of flat sheet aluminum reinforced with aluminum extrusions attached by spot welding. The Contractor may use panels extruded in a single operation in lieu of extrusheet panels. Do not use extruded panels and extrusheet panels in the same sign. Bolt together the minimum number of full length, sheeted panels to achieve the sign height, using aluminum bolts, washers, lock washers and nuts. For reflective legends, shields and symbols (including hazardous cargo plate, airport symbol, arrows and borders) use direct applied reflective sheeting. Apply all reflective legend on a sign

with the same rotation angle orientation. For nonreflective legends, use direct applied nonreflective black sheeting copy.

For temporary overlay signs, use 0.063-inch thick flat sheet aluminum, with a maximum panel size of 8 × 4 feet. Apply sheeting and legend as described above for extrusheet signs. Attach temporary overlays to extrusheet signs in the shop or field using aluminum blind rivets at a maximum spacing of 18 inches on the peripheries of the temporary overlays and 24 inches within the interior. Position rivots so as not to disturb the legend on the underlying sign.

Use fluorescent yellow green reflective sheeting for the following signs: SCHOOL (S4-3), School Crossing (S1-1), yellow portions of school speed limit (S5-H3, S5-H4, S5- H5), SCHOOL ENTRANCE (S3-H3), SCHOOL BUS STOP AHEAD (S3-1), SCHOOL BUS TURN AHEAD (S3-H2), Bicycle Crossing (W11-1), Pedestrian Crossing (W11-2), Handicap Crossing (W11-9), SAFETY ZONE (W11-H15), and Playground (W15-1). Fabricate supplemental signs [such as SHARE THE ROAD (W16-1), Advisory Speed Plate (W13-1), Distance Plates (W16-2, W16-2a, W16-3, W16-3a), Supplemental Arrows (W16- 5p, W16-6p, W16-7p and AHEAD Plate (W16-9p)] from fluorescent yellow green sheeting when used with a sign above.

Use fluorescent yellow reflective sheeting for all yellow signs, yellow portions of multi-colored signs, and yellow sign post reflectors, except for signs and portions of signs required to be fabricated with fluorescent yellow green reflective sheeting.

For lighted signs, cover glare shield and rectangular luminaire support tube with nonreflective sheeting matching the predominant sign color.

Place identification decals of Type G silver white reflective sheeting with silk screened black numerals on signs in accordance with Figure 1. These sign identification decals shall be 6 inches by 3 inches in size and positioned so they can be read horizontally and are clearly visible, not near bolt holes or rivets. Place the decals on the back side of the sign in the lower right-hand corner of rectangular signs, or in an equivalent location of other sign shapes, approximately 3 inches from side and bottom sign edges (for smaller signs, these dimensions may be less).

The Engineer will reject signs delivered at the site without a properly applied decal. At the time of sign installation, indicate the installation data by scratching out the appropriate month and year. Do not allow the sign installation contractor to erect any such signs, or overlays, that do not have a properly completed and affixed sign decal.

## **630.06 Sign Supports**

Page 517-518

**630.06 Sign Supports.** Sign supports consist of ground mounted, rigid overhead, span wire, and overpass structure mounted types. Fabricate sign supports according to the applicable requirements of Item 513, and weld according to 513.21. The approval of fabricators according to 501.03 will not apply. Hot-dip galvanize steel structural members according to 711.02. Galvanize steel hardware according to 730.08.

Tighten threaded fasteners, except anchor bolt nuts, by the “turn of the nut” method according to 513.20.



Furnish anchor bolts with a leveling nut, plain washers, lock washer, and anchor nut conforming to 730.02. Use anchor nuts with a plain washer against the base plate upper surface and a lock washer between the plain washer and anchor nut.

Tighten anchor bolt nuts according to 513.20, except that under Table 513.20-3, use the “nut rotation from snug tight condition” from 1/12 to 1/6 turn instead of 1/3 turn.

Apply anaerobic adhesive complying with Federal Standard MIL S 46163, Type II, Grade N to anchor bolts and other threaded connections 1/2-inch (13 mm) diameter or larger, according to the manufacturer’s recommendations. Do not use anaerobic adhesive with torque-limiting nuts.

Submit alternate designs or materials for sign supports for acceptance at least 21 days in advance of a bid opening date. The Director will give notification of the acceptance or rejection of the alternate design to the bidder at least 7 days in advance of a bid opening date.

**A. Ground Mounted Supports.** Ground mounted supports consist of structural sections of the material and weights required. Drive the ground mounted supports into the earth or embed them in concrete, as specified. Install supports in exposed locations in accordance with the performance requirements of NCHRP 350. The support lengths shown on the plans are approximate. Determine the exact length of supports before fabrication.

**1. Post Supports.** Mark each driven post with a line of paint 6 inches above the specified driving depth. Drive posts to the specified depth without bending, distortion, or end mutilation. Do not splice posts. Do not place posts in drainage ditches. If unable to install the post at the specified location, relocate the post with the Engineer’s approval at no cost to the City.

Install posts located in paved areas through a hole provided by sleeving or core drilling. After the post is in position, patch the hole with a non-shrink grout; except when the hole is in asphalt, patch with bituminous material.

For groupings of flat sheet signs in multiple arrangements mounted on posts, provide sign backing assemblies.

For temporary sign supports and their placement, conform to the OMUTCD.

**2. Structural Beam Supports.** Furnish ground mounted structural beam supports from rolled steel sections. The alternate design shown on ODOT Standard Drawing TC-41.10 is not acceptable in the City of Columbus. Furnish slip base connections when specified. Bolt the pieces of each beam together, and preload the assembly bolts before delivery to the project. Carefully handle assembled breakaway beams during transportation and erection. Upon erection, perform the final specified torquing on all threaded fasteners.

At least 4 weeks after erecting signs on breakaway beams, inspect the breakaway feature for evidence of shifting or loose fasteners. Re-torque all loose fasteners to specified values. Loosen and re-torque slip base plate fasteners even if no shifting or looseness is detected. However, if the base plate connection was made with torque limiting nuts, re-torque only if looseness is detected. Apply anaerobic adhesive to the

re-torqued conventional nuts, or, as an alternate, use new torque limiting nuts with the proper range.

**3. Pipe Supports.** Furnish ground mounted pipe supports from structural steel pipe and tubing. Furnish bolt down anchor installations in existing concrete. Furnish triangular slip base connection when specified.

~~**4. Wooden Box Beam Supports.** Furnish wooden box beam supports from laminated veneers pressure treated with wood preservative. Install breakaway feature after installation when specified.~~

**4. Street Name Sign Supports.** Supports for double-faced street name signs shall be either 2.5 inch (63.5 mm) nominal post size (NPS) (2.875 O.D. x 0.203 inch wall) (73 mm O.D. x 5 mm) x 14 foot (4.3 m) long post, or 4 inch (102 mm) NPS (4.0 O.D. x 0.226 inch wall) (102 mm x 5.7 mm) x 21 foot (6.4 m) long post fabricated from new, hot dipped galvanized steel pipe in accordance with Section 711.02. All supports shall be embedded in concrete in accordance with 499 Class C, according to 511. The 2.5" (63.5mm) NPS supports shall be concreted in a hole with a minimum depth of 3 feet (0.91 m), and a diameter of 10 inches (254 mm). The post shall have a minimum of 11 feet (3.3 m) above ground level. 4.0 inches (102 mm) NPS supports shall be concreted in a hole with a minimum depth of 4 feet (1.2 m), and a diameter of 10 inches (254 mm). The post shall have a minimum of 14 feet (5.2 m) above ground level. All spoils from installation shall be removed from the worksite. The maximum allowable sign area for a 2 sign installation is 10 square feet (0.95 square meters). If the total street name sign area is greater than 10 square feet (0.9 m<sup>2</sup>), 1 sign support per sign shall be used. For street name sign support installation and locations see City of Columbus Standard Drawing(s).

## 630.14 Method of Measurement

Page 521-523

**630.14 Method of Measurement.** The City will measure Ground Mounted Post Support by the number of feet, and will include driving, hardware for anchor base installation, and furnishing and placing of patching materials for excavations in paved areas.

The City will measure Foundations for ground mounted pipe supports, ground mounted structural beam supports, rigid overhead sign supports and span wire sign supports by the number of each for one pipe, structural beam, pole, end frame or strain pole, and will include excavation, reinforcing steel, concrete, backfilling, and when required the 10 foot foundation section of concrete barrier, and the disposal of surplus excavation.

The City will measure Ground Mounted Structural Beam Support by the number of feet measured from the bottom of the foundation to the top of the sign, and will include furnishing and placing of patching materials for excavations in paved areas.

The City will measure Ground Mounted Pipe Support by the number of feet measured from the bottom of the foundation to the top of the sign and will include u-bracket,

tubing, posts and hardware for sign attachment, bolt-down anchor and furnishing and placing of patching materials for excavations in paved areas.

~~The City will measure Ground Mounted Wooden Box Beam Support by the number of feet, and will include excavation, backfilling, disposal of surplus material, and installation of breakaway feature.~~

The City will measure Street Name Sign Support as the size and number of pipe supports, including excavation and concrete embedment.

The City will measure Street Name Sign as square footage (square meters) of sign blank, including brackets assemblies, mounting fittings and hardware.

The City will measure One Way Support ~~and Street Name Sign Support~~ by the number of feet, and will include driving and furnishing and placing of patching materials for excavations in paved areas.

### 630.15 Basis of Payment

Page 523-524

**630.15 Basis of Payment.** The City will not pay for relocating posts from their planned location without prior approval by the Engineer.

The City will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
630	Each	Ground Mounted Structural Beam Support Foundation
630	Each	Ground Mounted Pipe Support Foundation
630	Each	Rigid Overhead Sign Support Foundation
630	Each	Span Wire Sign Support Foundation
630	Foot	Ground Mounted Support, ___ Post
630	Foot	Ground Mounted Structural Beam Support, ___ Beam
630	Foot	Ground Mounted Support, Pipe
630	Foot	Ground Mounted Wooden Box Beam Support, _____ Beam
630	Foot	One-Way Support, ___ Post
<del>630</del>	<del>Foot</del>	<del>Street Name Sign Support, _____ Post</del>
<u>630</u>	<u>Each</u>	<u>2.5 inch (63.5mm) Street Name Sign Support</u>
<u>630</u>	<u>Each</u>	<u>4.0 inch (102mm) Street Name Sign Support</u>
<u>630</u>	<u>Square Foot</u>	<u>Street Name Sign</u>
630	Foot	Temporary Sign Support, ___ Post
	or Each	
630	Each	Breakaway Structural Beam Connection
630	Each	Triangular Slip Base Connection
630	Each	Overhead Sign Support, Type TC-____, Design____
630	Each	Combination Overhead Sign Support, Type TC-____, Design____

630	Each	Sign Attachment Assembly
630	Each	Luminaire Support Assembly
630	Each	Span Wire Sign Support, Type TC-17.10, Design ____
630	Each	Overpass Structure Mounted Sign Support, Type TC-____, Design____
630	Each	Sign Hanger Assembly, (Span Wire, Mast Arm)
630	Each	Sign Support Assembly, (Pole or Bridge Mounted)
630	Square Foot	Sign, (Flat Sheet, Ground Mounted Extrusheet, Overhead Extrusheet, Temporary Overlay)
630	Each	Sign, Double-Faced, (Mile Marker)
630	Square Foot	Sign Erected, (Flat Sheet, Extrusheet, Temporary Overlay)
630	Each	Sign Backing Assembly
630	Each	Sign Post Reflector
630	Square Foot	Covering of Sign
630	Each	Removal of Ground Mounted(Major) Sign and (Storage, Reerection, or Disposal)
630	Each	Removal of Ground Mounted(Structural Beam, Post, Pipe, Wooden Box Beam) Support and (Storage or Disposal)
630	Each	Removal of Overhead Mounted Sign and (Storage, Reerection, or Disposal)
630	Each	Removal of Overhead Sign Support and (Storage, Reerection, or Disposal), Type TC-____
630	Each	Removal of Overlay Sign

## 632.02 Contractor Personnel Requirements

Page 530

**632.02 Contractor Personnel Requirements.** ~~Conform to the requirements of City Supplement 1063 for the installation or testing of traffic signal equipment. Assign a full time employee of the Contractor to act as the project supervisor. Do not change the project supervisor without giving the Engineer written notice. Provide International Municipal Signal Association (IMSA)-certified documentation for Contractor employees if requested by the City.~~

~~An IMSA level two-certified technician shall perform all of the following controller work:~~

- ~~1. Back panel wiring terminations~~
- ~~2. Programming~~
- ~~3. Testing or turn on~~

#### 4. Troubleshooting

~~Assign a foreman to each crew performing work for the project. A foreman shall be present at all times when work is performed by the crew. Each foreman shall be an IMSA level one certified technician. Provide prior verbal notice to the Engineer in order to replace a crew foreman.~~

~~In addition, any trade person performing the following work shall be an IMSA level one certified technician:~~

- ~~1. Cable splices~~
- ~~2. Signal head installation~~
- ~~3. Cable and wire installation~~
- ~~4. Power service installation~~
- ~~5. Ground rod testing~~
- ~~6. Cable insulation testing~~
- ~~7. Field wiring terminations~~

### 632.14 Foundations

Page 537 - 538

**632.14 Foundations.** Locate support foundations, and stake with the proper elevation. If underground or overhead obstacles are encountered during stakeout, or to correct slope and subsurface difficulties, change foundation location and orientation with the approval of the Engineer. Ensure that the approved location provides a safe clearance from overhead power lines for construction operations, in compliance with the National Electrical Safety Code. The Contractor is responsible for the correct location, elevation, and orientation for all poles and pedestals installed on the foundations.

Orient one side of the anchor base pole foundation cap parallel to the sidewalk, back of-curb or edge-of-pavement, edge of the curb ramp, as shown on the signal plans. Make the top of the foundation flush with any adjacent sidewalk or concrete area, except where the ground rises steeply behind the sidewalk or concrete area. In this case, match the back side of the foundation to the ground slope and set the street side of the foundation above the sidewalk or concrete area and completely out of the sidewalk or concrete area. Edge the pole foundation top using a 1/2-inch sidewalk edger and do not chamfer.

Install anchor bolts in the angular position shown in the plans. Install a minimum of two 2-inch conduit ells, used or unused, in each pole foundation.

Excavate for foundations using an earth auger to specified dimensions according to 503.04. Exercise caution when excavating in areas of underground installations to avoid their disturbance or damage. When a cave-in occurs or at the direction of the Engineer, excavate using casing, sleeving, or other methods, with the Engineer's approval according to 732.10. If subsurface obstructions are encountered, remove the obstructions, or replace the excavated material and relocate the foundation, with the Engineer's approval. If bedrock is encountered, the Contractor may reduce that portion of

the specified foundation depth within the bedrock up to 50 percent. Perform all necessary dewatering of the excavation.

Perform foundation concrete work according to Item 511, except that the loading restrictions in 511.17 are modified by this subsection. Place the concrete against undisturbed soil or compacted embankment. Form the top of the foundations to a nominal depth of 6 inches below the groundline. Place the concrete foundation, including formed top, in one continuous concrete pour.

For foundations for anchor base type supports, provide the required reinforcing rods, and have anchor bolts and conduit ells accurately held by a template.

Remove forms and templates once the concrete has hardened sufficiently so as not to be susceptible to damage. After 14 days, erect and load supports on anchor base foundations. The Contractor may erect and load supports after 7 days if the tests of two ~~split tensile beam~~ specimens of concrete yield an average ~~modulus of rupture~~ of not less than ~~400~~ 650 pounds per square inch.

### **632.23 Cable and Wire**

Page 540

**Replace unreadable table 632.23-1 with the following:**

**TABLE 632.23-1 FIELD WIRING HOOKUP**

PED UNIT FIELD WIRING HOOKUP

PED UNIT LOCATION	CROSSWALK DISPLAY	WIRE COLOR
SOUTH CROSSWALK	WALK	BLACK
	DONT WALK	ORANGE
WEST CROSSWALK	WALK	GREEN
	DONT WALK	RED
NORTH CROSSWALK	WALK	BLUE
	DONT WALK	WHITE W/BLACK TRACER
EAST CROSSWALK	WALK	GREEN W/BLACK TRACER
	DONT WALK	RED W/BLACK TRACER

SIGNAL HEAD & CABINET FIELD WIRING HOOKUP

SIGNAL DISPLAY	WIRE COLOR PER APPROACH
THRU R	RED
THRU Y	ORANGE
THRU G	GREEN
L/T R	BLACK (FUTURE USE ONLY)
L/T ↗	WHITE W/BLACK TRACER
L/T ↖	BLUE
R/T R	NOT USED BY CITY
R/T ↗	RED W/BLACK TRACER
R/T ↖	GREEN W/BLACK TRACER

WHITE SHALL BE USED FOR THE COMMON. SPLICE ALL WIRES IN THE SIGNAL HEAD OR PED UNIT. USE A #14 AWG 2 WIRE SPADE TERMINAL FOR EVERY 2 WIRES PER CONNECTION AND A #14 AWG 1 WIRE SPADE TERMINAL FOR EACH SINGLE WIRE CONNECTION TO CONNECT ALL WIRES TO ALL FIELD TERMINALS. USE BUTT SPLICES ON ALL THROUGH WIRES. ALL UNUSED WIRES SHALL BE SPLICED THROUGH AND SHALL HAVE A DEAD-END TERMINAL AT THE END OF THE WIRE.

**632.28 (H) Cabinet Assembly Testing By the City of Columbus**

Page 544

**H. Cabinet Assembly Testing.** ~~By the City of Columbus. Perform all cabinet assembly and signal testing and installation following the requirements of Supplemental Specification 1611. The Division of Planning and Operations Electronic Systems Shop will bench test the intersection controller and its complete cabinet assembly prior to the equipment being installed in the field. Testing will not begin unless complete and correct cabinet assembly wiring schematics, loop detector units, and if specified, the intersection tranceiver unit are submitted with the cabinet. The test procedures will consist of operating the equipment for a minimum of forty eight (48) hours. Deliver the controller and complete cabinet assembly for testing to the Division of Planning and Operations Traffic Maintenance Shop at 1820 East 17<sup>th</sup> Avenue, Columbus, Ohio 43219. Load and unload all equipment and obtain a receipt from shop personnel that lists all delivered materials by manufacturer, model number, and serial number. The Division will complete testing on the controller and cabinet assembly within ten (10) City working days. Upon completion of the testing the Division will notify the Contractor that the equipment can~~

~~be picked up. Replace, repair or correct as necessary all devices found to be unsatisfactory and resubmit for testing. The Division will schedule testing of this returned equipment as quickly as possible but will only provide a forty five (45) day guarantee for the turn around time period. The Contractor shall be solely responsible for any delay caused by this testing. Do not install control equipment, which has not passed testing or which has not been tested by the Division, in the field to control traffic. The Contractor may have a representative in attendance during the testing process. There are no costs associated with the testing. Any cost associated with the delivery and pick up shall be incidental to the cost of the equipment. Contact the Division of Planning and Operations Electronic Systems Coordinator for equipment status.~~

### **661.21 Basis of Payment**

Page 606-607

~~**661.21 Basis of Payment.** The City will pay 50 percent of the bid price when delivered to the project site and the remaining 50 percent of the bid price when planted.~~

~~At the end of the establishment period, the City will make the final inspection and determine the actual number of living plants. The City will pay an additional 20 percent of the bid price for all plants living at the end of the establishment period. The City will not pay the additional 20 percent payment for plantings that did not survive the establishment period. Replace all plants not surviving the establishment period at no additional cost to the City. The City will extend the establishment period for all replacement plantings with no additional payment.~~

~~The City will pay 40 percent of the bid price for plant materials delivered and accepted at the project site. The City will pay 40 percent of the bid price when the plant materials have been installed. The City will pay the remaining 20 percent of the bid price at the end of the establishment period following final acceptance. Replace all plants not surviving the establishment period at no additional cost to the City.~~

### **703.01 General.**

Page 624

#### **703.01 General**

The following abbreviations apply:

CCS	Crushed Carbonate Stone.
ACBFS	Air Cooled Blast Furnace Slag
GS	Granulated Slag
RACP	Reclaimed Asphalt Concrete Pavement
RPCC	Recycled Portland Cement Concrete
OH	Open Hearth Slag
EAF	Electric Arc Furnace Slag
BOF	Basic Oxygen Furnace Slag
PCS	Petroleum Contaminated Soil

**Pre-qualified Aggregate Supplier Program (City Supplement 1069). Provide**



aggregate materials to the City of Columbus from pre-qualified suppliers.

**A. Soundness.** When the major portion of the unsound material in a coarse aggregate acquires a mud-like condition when tested for soundness, ensure a maximum loss of 5 percent for all uses.

### **703.08 Aggregate for Pipe Bedding and Initial Backfill (New Section)**

Page 632

#### **703.08 Aggregate for Pipe Bedding and Initial Backfill.**

1. Provide No. 57 coarse aggregate, as specified in 703.01, consisting of washed gravel, or CCS.

Do not use RPCC for any bedding or initial backfill materials.

Do not use reclaimed asphalt concrete for any bedding or initial backfill materials.

### **703.11 Structural Backfill for 603 Bedding and Backfill.**

Page 632 - 633

**703.11 Structural Backfill ~~for 603 Bedding and Backfill.~~** Furnish structural backfill ~~for 603 bedding and backfill~~ consisting of CCS, gravel, natural sand, sand manufactured from stone, ~~or~~ foundry sand, or RPCC (Type I only).

Do not use RPCC for any bedding or initial backfill materials.

Do not use RPCC as backfill material for any metallic pipe.

Do not use reclaimed asphalt concrete for any bedding or backfill materials.

Use foundry sand if the material meets these requirements and meets the requirements of the Ohio EPA, Division of Surface Water, Policy 400.007 “Beneficial use of Non-Toxic Bottom Ash, Fly Ash and Spent Foundry Sand and Other Exempt Waste,” and all other regulations. Ten days before using foundry sand on the project, from the Ohio EPA, the Contractor may elect to have an independent consultant pre-qualified by ODOT in remedial design environmental site assessment review the proposed usage. The consultant will provide all documentation utilized to usage according to all Ohio EPA regulations. Ensure that the consultant coordinates all EPA required meetings, documentation, and testing requirements. Ensure that the consultant certifies this to the City.

#### **A. Structural Backfill Type 1.**

1. Furnish Type 1 structural backfill that meets the gradations of Item 304, except 0 to 20 percent may pass the No. 200 sieve.

2. Physical properties.

Percent of wear, Los Angeles test, maximum (CCS or washed gravel)	50 %
Loss, sodium, sulfate soundness test, maximum	15 %
<del>Percent by weight of fractured pieces (one or more faces), minimum (Type 3 only)</del>	<del>90 %</del>

Do not exceed the following percentages of deleterious substances:

Material Type	Percent by weight
Shale and shaly material	5.0
Chert, that disintegrates in 5 cycles of the soundness test	5.0

Ensure that the portion of the material passing through the No. 40 (425 µm) sieve has a maximum liquid limit of 25 and a maximum plasticity index of 6.

When using RPCC, ensure that the maximum percentage passing the #200 sieve is 10%.

**B. Structural Backfill Type 2.**

1. Furnish Type 2 structural backfill that meets the gradation below:

Sieve Size	Total Percent Passing
2 1/2 inch (63 mm)	100
1 inch (25.0 mm)	70 to 100
3/4 inch (19.0 mm)	–
3/8 inch (9.5 mm)	–
No. 4 (4.75 mm)	25 to 100
No. 8 (2.36 mm)	–
No. 40 (425 µm)	10 to 50
No. 50 (300 µm)	–
No. 200 (75 µm)	5 to 15

2. Physical properties:

Percent of wear, Los Angeles test, maximum (CCS or gravel)	50 %
Loss, sodium sulfate soundness test, maximum	15 %

Ensure that the portion of the material passing through the No. 40 (425 mm) sieve has a maximum liquid limit of 25 and a maximum plastic index of 6.

**703.13 Coarse Aggregate for Items 305, 451 and 452.**

Page 633

**703.13 Coarse Aggregate for Items 305, 306, 451 and 452.**

**703.15 Suitable Materials for Embankment Construction.**

Page 636

**~~703.15~~ 703.16 Suitable Materials for Embankment Construction.**

**703.16 Aggregate Materials for 304.**

Page 638

**~~703.16~~ 703.17 Aggregate Materials for 304.**

**703.17 Materials for Items 410, 411, and 617.**

Page 639

**~~703.17~~ 703.18 Materials for Items 410, 411, and 617**

**703.18 Rock and Aggregate Materials for Item 601.**

Page 640

**~~703.18~~ 703.19 Rock and Aggregate Materials for Item 601.**

**706.05 Precast Reinforced Concrete Box Sections.**

Page 661

**706.05 Precast Reinforced Concrete Box Sections.** Provide precast reinforced concrete box section conforming to ASTM C 1577, with the following modifications:

Use precast concrete member manufacturers certified by the Laboratory according to City Supplement 1073.

Submit shop drawings according to 501.04 (A).

6.2.1 Provide cement according to 701, except 701.07.

6.2.2 Provide fly ash according to 701.

6.3 Provide aggregates conforming to the quality requirements of 703.02.

6.5 Provide reinforcement according to 709.10 or 709.12. Provide longitudinal distribution reinforcement according to 709.01, 709.10 or 709.12.

7.1 Use only the following box sizes with a span by rise of 8 x 4, 5, 6, 7; 10 x 5, 6, 7, 8, 9; and 12 x 4, 6, 8, 10 feet.

9.1 Provide hardened concrete that contains a minimum of 4 percent entrained air for wet-cast sections with spans less than 14 feet and for all sections with spans 14 feet and greater.

9.4 Do not use lift holes. Use handling devices that do not require a hole through the box.

10.1 Verify concrete strength using cylinders. Do not ship items before the concrete reaches its design strength.

11.5 Ensure a minimum cover of 1/2 inch over both circumferential and longitudinal reinforcement at the mating surfaces of joints.

15 In addition, mark the identification of the plant on each box section. For box sections 14 feet or greater, mark the reinforcing steel areas for the section on each box section. Place the manufacturers' name and required product information on the inside of the box section within the top one-half of the culvert.

#### **706.051 Precast Reinforced Concrete Three-Sided Flat Topped Culverts**

Page 662

**706.051 Precast Reinforced Concrete Three-Sided Flat Topped Culverts.** Provide precast concrete three-sided flat topped culverts according to ASTM C 1504, with the following modifications:

Provide flat deck culvert structures with a minimum clear span (measured normal to the structure at the bottom of the haunch) of 14 feet and a minimum opening rise (measured from bottom of leg to bottom of deck at the centerline of the structure) of 4 feet; and a maximum clear span of 34 feet and maximum opening rising of 10 feet. Ensure minimum wall and deck thicknesses of 10 inches and 12 inches respectively, measured under the haunch normal to the structure and at the centerline of the span measured perpendicular to the structure.

Use precast concrete member manufacturers certified according to City Supplement 1073.

Ensure that the manufacturer submits design calculations, a structural load rating and shop drawings according to 501.04 (A) for review and approval by the City. Do not produce any units until approved drawings have been submitted to the City receiving approval. Submit a minimum of five copies of the drawings. Allow a minimum of four weeks for approval. Ensure that the shop drawings include the following:

1. Load rate the structure according to the requirements of Section 900 of ODOT's Bridge Design Manual.
2. All material specifications.
3. All plan view.
4. All elevation view.

5. All headwall and wingwall attachment requirements.
6. All dimensions.
7. All maintenance of traffic phases.
8. All section sizes.
9. All design handling strength.

The manufacturer may modify an approved shop drawing and resubmit according to 501.04 (A) for approval to the City.

### **706.052 Precast Reinforced Concrete Arch Sections**

Page 666

**706.052 Precast Reinforced Concrete Arch Sections.** Provide precast reinforced concrete arch sections according to ASTM C 1504, with the following modifications:

This item shall consist of manufacturing precast reinforced concrete arch sections for culverts.

Use precast concrete member manufacturers certified according to City Supplement 1073.

~~5~~ Ensure the manufacturer submits design calculations, a structural load rating and shop drawings according to 501.04 (A) for review and approval by the City. Do not produce any units until approved drawings have been submitted to the City receiving approval. Submit a minimum of five copies of the drawings. Allow a minimum of 4 weeks for approval. Ensure the shop drawings include the following:

1. Load rate the structure according to the requirements of Section 900 of ODOT's Bridge Design Manual.
2. All material specifications.
3. All plan view.
4. All elevation view.
5. All headwall and wingwall attachment requirements.
6. All dimensions.
7. All maintenance of traffic phases.
8. All section sizes.
9. All design handling strength.

The Contractor may modify an approved shop drawing and resubmit according to 501.04 (A) for approval to the City.

### **706.053 Precast Reinforced Concrete Round Sections**

Page 670

**706.053 Precast Reinforced Concrete Round Sections.** Provide precast reinforced concrete elliptical and circular arch sections according to ASTM C 1504, with the following modifications:

This item consists of manufacturing precast reinforced concrete elliptical and circular arch sections for culverts.

Use precast concrete member manufacturers ~~of~~ certified according to City Supplement 1073.

~~5-~~ Ensure the manufacturer submits design calculations, a structural load rating and shop drawings according to 501.04 (A) for review and approval by the City. Do not produce any units until approved drawings have been submitted to the City, receiving approval. Submit a minimum of five copies of the drawings. Allow a minimum of 4 weeks for approval. Ensure the shop drawings include the following:

1. Load rate the structure according to the requirements of section 900 of ODOT's Bridge Design Manual.
2. All material specifications.
3. Plan view.
4. Elevation views.
5. Headwall and wingwall attachment requirements.
6. Dimensions.
7. All maintenance of traffic phases.
8. Section sizes.
9. Design handling strength.

The City will allow the Contractor to modify an approved shop drawing and resubmit according to 501.04 (A) for approval to the City.

#### **706.13 Precast Reinforced Concrete Manhole Riser Sections, Catch Basins Inlet Tops, and Portable Barriers**

Page 676

**706.13 Precast Reinforced Concrete Manhole Riser Sections, Catch Basins Inlet Tops, and Portable Barriers.** All manhole and barrier structures will conform to ASTM C478. All catch basins, inlets, and inlet tops will conform to ASTM C913.

#### **706.16 Resilient Connectors Between Precast Manhole Riser Sections, Catch Basins, Inlets, and Pipes.** (New Section)

Page 676

**706.16 Resilient Connectors Between Precast Manhole Riser Sections, Catch Basins, Inlets, and Pipes.** Material and performance requirements shall meet the standards of ASTM C923, and be approved by the Engineer. The actual joint may be one of the following designs:

- (a) Rubber sleeve with stainless steel band
- (b) Rubber gasket compression
- (c) Rubber gasket expansion

#### **711.12 Gray Iron Castings**

Page 699

**711.12 Gray Iron Castings.** Provide gray iron casting in accordance with ASTM A 48, Class ~~35B30B~~, with the following modifications:

### **711.31 Reinforced Propylene Plastic Manhole Steps**

Page 705

**711.31 Reinforced Propylene Plastic Manhole Steps.** Provide reinforced propylene plastic manhole steps conforming to the details shown on the plans and in accordance with ASTM C 478.

Provide steel rod in accordance with 709.01, Grade 60, continuous through the entire length of legs and tread. ~~Coat the steel~~The steel may be coated in accordance with ASTM A 934/A 934M. Submit the manufacturer's written certification to the Engineer. Provide propylene plastic in accordance with ASTM D 4101, Table B 33430. Submit to the Engineer the manufacturer's certified test data for the propylene plastic used in each lot of steps.

### **720.13 Polypropylene Corrugated Double Wall Pipe**

Page 716

**720.13 Polypropylene Corrugated Double Wall Pipe.** Provide polypropylene corrugated double wall pipe for non-pressure sanitary sewer and storm sewer pipe from 6 to 30-inch diameters in accordance with ASTM F 2736, and storm sewer pipe from 36 to 60-inch diameters according to ASTM F2881 or AASHTO M 330, with the following modification.

9.1 Provide a letter of certification to cover each shipment of material verifying that it meets specification requirements.

### **730.017 Street Name Sign Supports (New Section)**

Page 736

**730.017 Street Name Sign Supports.** Provide street name sign posts fabricated from new hot-dipped galvanized steel pipe as in 711.02 and in accordance with ASTM Specification Number A53 with a minimum yield strength of 30,000 psi and a minimum tensile strength of 48,000 psi. Evidence of prior rusting or pitting shall be cause for rejection of the posts. The street name sign post shall have a tubular section of uniform diameter and wall thickness. The diameter and wall thickness shall be for the standard weight (Schedule 40) nominal pipe size (NPS) as specified for each bid item. The finished post shall be straight, have a smooth finish and be free from defects affecting their strength, durability or appearance. All cut ends shall be free from burrs. Each piece shall be continuous with no butt welds.

Provide materials in accordance with the City's QPL.

### **730.24 Cantilever Offset Bracket (New Section)**

Page 739

**730.24 Cantilever Offset Bracket.** Finished street name sign blanks shall be riveted to 2 cantilevered offset bracket assemblies with universal saddle clamps and a double tee section in accordance with 711.01. For signs greater than 48 inch (1.2m ) in length, a special assembly is required. This assembly shall consist of 2 cantilevered offset brackets

placed back to back and placed on top and bottom of sign assembly and riveted to the appropriate double tee section. The signs shall be attached to the sign supports using a stainless steel buckle-strap combination. For fabrication see City of Columbus Standard drawing(s).

### 733.02 Controller Units

Page 757

#### 733.02 Controller Units.

**B. C.** Type TS-2/A2. Provide a controller unit meeting NEMA TS-2...

### 801.02 Design Criteria

Page 782

#### 801.02 Design Criteria.

8. **Design Plans:**

~~C. , Prior to start of work, provide the Engineer 4 copies of a laying schedule, including laying dimensions and pipe calculations for 20" and greater diameter pipe.. The Engineer may require a pictorial layout. Provide a complete and accurate laying schedule conforming to Drawings. For Concrete Pipe, stock additional bevel adapters and short lengths of pipe at the job site to permit field adjustment of the alignment. The unit price bid of Item 801 includes payment for these items..~~

C. Prior to start of work, provide the Engineer 4 copies of a laying schedule, including laying dimensions and pipe calculations for 20" and greater diameter pipe. The Engineer may require a pictorial layout. Provide a complete and accurate laying schedule conforming to Drawings. For 20" and greater diameter pipe, stock additional bevel adapters and short lengths of pipe at the job site to permit field adjustment of the alignment. The unit price bid of Item 801 includes payment for these items.

### 801.03 Ductile Iron Pipe

Page 784

#### 801.03 Ductile Iron Pipe.

Polyethylene Encasement: Wrap all ductile iron pipe with tube style 8-mil linear low density polyethylene (LLDPE) film made from virgin material (no recycle material) in accordance with AWWA C 105/A21.5 ~~for all open cut installations~~. Provide black film with nominal 2% carbon black UV inhibitor and printed per the C105 Standard. Adhere to the following Physical Properties:

### 801.03 Ductile Iron Pipe

Page 785

#### 801.03 Ductile Iron Pipe.



Installation: Deliver film to the jobsite contained in a sound sacrificial sleeve of UV Protected Polyethylene to protect contents during storage prior to installation.

Install the polyethylene encasement per Method A of ANSI/AWWA C105/A21.5. Remove all lumps of clay, mud, cinders, etc. from the pipe surface before encasing the pipe. Keep soil, or bedding material, from becoming trapped between the pipe and the polyethylene sleeve. When lifting polyethylene-encased pipe use a fabric type sling or padded cable to protect the polyethylene. Overlap joints (double coverage) and tape. Fold excess slack over the top of the pipe and tape in place every three feet. Carefully backfill the pipe according to Item 801.11 and 801.12. To avoid damage during backfilling allow adequate slack in the film tube at joints. Use backfill material free of cinders, rocks, boulders, nails, sticks or other material that could damage the polyethylene sleeve.

### **801.10 Excavation and Pipe Laying**

Page 794

#### **801.10 Excavation and Pipe Laying.**

##### **Pipe Laying and Initial Backfill:**

Use a fabric type sling or padded cable when handling pipe. Do not use chains or unpadded cables. Use backfill material free of large rocks or stones, or other materials which could damage coatings.

Pipe Haunching (for 20 inch ~~inch~~ diameter and greater): Provide Crushed Carbonate Stone (CCS) Size No. 57 as specified in 703 – Aggregate. Place backfill carefully and simultaneously on each side of pipe to avoid lateral displacement of pipe and damage to joints. Extend the depth of haunching ~~extend~~ from the trench bottom up to 1/2 times the pipe diameter. If the pipe requires adjustment after placement, remove and re-lay as new pipe. Prevent damage to coating when placing backfill. Place haunching material manually around pipe and spade full depth of lift to prevent bridging and provide uniform bearing and side support.

### **801.10 Excavation and Pipe Laying**

Page 795

#### **801.10 Excavation and Pipe Laying.**

##### **Thrust Restraints:**

Provide concrete blocking, supports and/or buttresses on all water mains 16” diameter and smaller and at connections to existing pipes, regardless of diameter, as required. Also provide concrete blocking at all tees, bends, dead ends and at any other locations shown on the plans or directed by the Engineer. Build these concrete structures to the lines, grades and dimensions shown on the Standard Detail Drawings, L-6310, L-6311, L-6312, and L-7001, or as ordered by the Engineer, and construct with Class "C"

concrete as per Item 499. Include the cost of temporary timber backers and the cost of excavating to line and grade shown for the supports in the unit price bid for Item 801.

On all water mains 20 inch diameter and larger, provide adequate restrained joint lengths. Provide joint restraint for each tee, bends, or dead end with limits designed by an engineer in accordance with manufactures suggested recommendations unless otherwise shown on the drawings. Prior to ordering the pipe and commencing with construction, submit a pipe laying schedule showing the proposed designed restraining system for the entire water main improvement for approval by the City of Columbus Division of Power and Water.

**801.11 Backfill Within The Influence of Pavement**

Page 796

**801.11 Backfill Within The Influence of Pavement.** This section discusses backfilling above the initial backfill up to ground surface or beneath pavement subgrade within the influence of pavement as defined by Standard Drawing L-6309E.

Unless otherwise shown, specified, or ordered, provide granular backfill material meeting the requirements of ~~Section 304.02 or Section~~ Item 703.11. The City will allow use of ~~f~~Flowable Control Density Fill, Type II complying with the requirements of Item 613 as an alternate to compacted granular material. Do not use RPCC for any bedding or backfill material.

Ensure that the moisture content does not exceed less than minus 4 percent of optimum moisture prior to spreading. Shovel in-place and compact material using pneumatic tampers in restricted areas, and vibratory-plate compactors or engine-powered jumping jacks in unrestricted areas. Do not exceed 8 inches for a single layer of compacted thickness. See ~~Section~~ Item 801.12 for compaction requirements. Extend the compacted backfill to the top of the pavement subgrade for trenches within traveled areas, and to within 6 inches of the existing ground in all other areas.

**801.12 Backfill Outside The Influence of Pavement**

Page 797

**801.12 Backfill Outside The Influence of Pavement.** Backfill in conformance with the requirements of Section 801.11 above, outside the influence of pavement, as defined by Standard Detail L-6309E, except as herein modified..

Provide suitable backfill material native to the project, or granular backfill material conforming to the requirements of ~~Section 304.02 or Section~~ Item 703.11. Do not use RPCC for any bedding or backfill material. Dispose of excavated material unsuitable for backfill compacting at no additional cost to the City. Provide granular backfill material from somewhere else. Spread material in successive layers not exceeding a depth of 8 inches. Compact from above the initial backfill to within 6 inches of the existing ground. The following requirements apply to granular material conforming to Section 304.02, Section 703.11, and to native material:

<b>Max. Lab. Dry Wt.</b>	<b>Min. Compaction</b>
--------------------------	------------------------

<b>Lbs./cu. Ft.</b>	<b>Requirements % Lab. Max.</b>
90-104.9	102%
105-119.9	100%
120 and more	98%

Backfill the remaining 6 inches of excavation with approved material without mounding of fill. Maintain trenches in good and safe condition up to the time of acceptance of the work.

Backfill traveled areas in accordance with Section 801.11.

### **801.14 Hydrostatic Tests**

Page 798

**801.14 Hydrostatic Tests.** Apply a hydrostatic test to the mains and fire hydrant leads as required in Section 5 of the Standard AWWA Specification C600 for Ductile Iron Pipe, Section 4 of AWWA Specification C604 and M11 for Steel Pipe or AWWA M9 for Concrete Pipe. Test all new services to the curb stop. Test each valved section of water main independently of one another unless otherwise approved by the Engineer. Conduct pressure test with all watch valves open and hydrant foot valves closed.

Maintain 150 psi of pressure in any tested section for a minimum of two hours.

~~Maintain 150 psi of pressure in any tested section.. Test for at least two hours, except when the test indicates zero leakage after the first hour. The City may approve termination of the pressure test after one hour with zero leakage..~~

Furnish all materials, make all taps required and furnish a pump, metering equipment, piping, other equipment and all necessary assistance for conducting the tests.

### **801.15 Chlorination of Completed Pipe Line**

Page 799

**801.15 Chlorination of Completed Pipe Line.** After satisfactory hydrostatic testing, the City will chlorinate the completed pipe in accordance with AWWA C651. The City will furnish the chlorine, pumping equipment necessary to introduce the chlorine into the chlorination tap, and one man. Furnish and pay for all other labor, material and equipment including chlorination taps and blow-off taps. Only one connection to an existing water main is permitted before disinfection of a new water line has been completed. All other connections must be made after the line has been disinfected. No service connection permits shall be issued or connections made to any service taps until water mains have been disinfected by the City. Provide taps with tapping valves, sufficient tubing or pipe to extend outside the trench, and an operable valve above ground. Provide blow-offs with sufficient tubing to extend to an approved drainage facility. Provide blow-offs with adequate protection from pedestrian and vehicular traffic. Install blow-offs of ~~the sizes and at the locations shown on the drawings~~sufficient sizes and at appropriate locations, as per AWWA C651, or as directed by the Engineer. Chlorination taps and blow-offs shall be installed within 2 feet of the end of the tested section, or as directed by the Engineer. Do not reuse corporation Stops, 2-inch and under, used in the chlorination process as part of a water service, air

release, or any other permanent feature of the water main. The Division of Power and Water will approve the time and the section of line for chlorination. The Division of Power and Water will notify the Contractor when to remove the temporary blow-offs and corporation stops. Plug the blow off hole with an approved plug as identified in the Division of Power and Water Approved Materials List.

Hand swab all pipes and fittings not otherwise disinfected. The Division of Power and Water will determine amount of chlorine used during hand swabbing operations.

### **801.16 Main Shuts**

Page 799 - 800

**801.16 Main Shuts.** Prior to the start of proposed water main improvement, submit a plan and an accompanying schedule identifying the location and estimated dates for water main shuts to the Division of Power and Water for approval.

Only Division of Power and Water personnel will operate valves. Operation of existing valves by the Contractor or their representative may result in penalties as identified in Chapter 1113 of the City Code.

Notify Division of Power and Water personnel at least 72 hours in advance to the actual water main shut. Notify and coordinate water main shuts with all affected customers. City personnel will work with the Contractor in identifying affected customers and will provide a sample notification letter. The City will approve the final notification letter. The Division of Power and Water personnel may re-schedule the main shut at its discretion if the Contractor appears unprepared to perform the work scheduled during the shut.. The City will not pay for costs associated with lost time due to lack of preparation by the Contractor. At a minimum, notify critical users (large 801.17 businesses, hospitals, medical centers, industries, etc.) of non-shuts due to rescheduling or delays in the work.

To minimize impacts to customers, the City may require the Contractor to make shuts at night and/or on weekends. Include costs incurred to perform contract work after regularly scheduled hours due to main shuts and all cost associated with coordinating shuts with the City in Item 801.

No shuts are permitted to occur on or one (1) business day before a National Holiday or National Holiday weekend, unless otherwise approved by the Engineer.

### **805.01 Description**

Page 807

**805.01 Description.** Provide all work necessary to furnish and install or transfer water service taps complete and ready for use where shown on the plans or otherwise required and in accordance with these specifications. The City defines water "tap" and "service line" as stated in Columbus City Code 1105.01.

Provide new water service taps consisting of all pipe, valves, fittings and appurtenances required from and including the water main connection to and including the control valve and box. Wrap new service lines with an approved polyethylene wrap or dielectric tape material for a minimum clear distance of 3 feet away from the water main, in accordance with Standard Drawing L-1004. Prior to constructing any new water service tap, obtain a tap permit from the Division of Power and Water.

Provide a transferred water service tap consisting of all pipe, valves, fittings and appurtenances required from and including the water main connection to and including the control valve and connection to the service line and the abandonment of the existing service tap. Relocate the existing curb box to the new curb stop location. If the Contractor discovers a box damaged due to no negligence of the Contractor, provide and install a new curb box. The City will pay for the new curb box and ferrule box, if required, separately under this item. Replace~~d~~ boxes damaged by the Contractor at no additional expense to the City. Verify the location of the curb box prior to installing the corporation stop on the new or existing main.

Complete surface restoration in accordance with the requirements of the appropriate bid items. The City will pay for this work also in accordance with the requirements of the appropriate bid items.

#### **805.04 Control Valves and Boxes**

Page 808

**805.04 Control Valves and Boxes.** Use curb stops without drain in accordance with the current Approved Materials List for control valves for 2 inch and smaller water service taps. Provide boxes in accordance with the current Approved Materials List. Provide box lids with the word "WATER" cast neatly and legibly on it and held securely in place by a bronze or brass bolt. Provide a box with an enlarged base section, in accordance with the current Approved Materials List when using a 2 inch curb stop. Include a Columbus standard ferrule box and cover in the top section of the curb box where installing 2 inch and smaller curb stops within traveled areas. ~~shall~~ Install a concrete paver block, minimum size 4-inches wide by 8-inches long by 2-inches thick, under all curb stops.

Provide control valves for 3 inch and larger water service taps that conform to requirements of Item 802. Provide valve boxes that conform to Items 802 and 804. Provide a control valve and box, in addition to the valve and box installed with the water main connection, for all water service taps 3 inch or larger. Install and restrain the control valve at the location shown on the plans or approved by the Engineer.

For 3 inch and larger water service taps not under pavement or traveled portion of right-of-way use the valve installed at the water main connection as the control valve and provide with a valve box in conformance to Item 802.

#### **805.05 Installation**

Page 808-809

**805.05 Installation.** Install 3 inch and larger taps in accordance with Items 801, 802 and 803. Install water service taps 2 inch and smaller by jacking or open cut methods, unless the plans specify one method or the other. Do not bend or kink the service pipe nor strain the pipe joints when jacking the pipe . Install the pipe from the water main connection to the control valve to the grade and elevations shown on the plans, but in no case provide less than 3 feet 6 inches of cover. Minimize bends in taps and obtain bending approval, if necessary to bend, from the Engineer prior to installation. Wrap new service lines with an approved polyethylene wrap or dielectric tape material for a minimum clear distance of 3 feet away from the water main, in accordance with Standard Drawing L-1004. Locate curb boxes 1 foot from the edge of the proposed or existing sidewalk between the sidewalk and the curb, 2 feet inside the right-of-way or easement line in areas with no existing or proposed sidewalk, or as indicated on the construction plans.

Prior to backfilling, pressure test all water service taps from the water main connection to the control valve and repair all leaks. Test water service taps 2 inch and smaller at normal city water pressure, unless installed with the construction of a water line, in which case test per Item 801. Test water service taps 3 inch and larger at 150 psi in accordance with requirements of Item 801 up to the meter inlet and valve on the meter by-pass line.

After completing testing, connect the transfer water tap to the existing service line and abandon the existing water tap. Attempt to coordinate with the customer prior to performing service transfers. Unless otherwise approved by the Engineer, water service transfers are not permitted on Fridays (or Thursdays if the Contractor is only working Monday through Thursday) unless the Contractor is able to verify the customer has water through verbal confirmation. On Fridays (or Thursdays if the Contractor is only working Monday through Thursday), confirming water service transfer by means of a hose bib only is not permitted.

After performing a successful pressure test backfill all excavations in accordance with the requirements of Item 801.

**805.07 Basis of Payment**

Page 809

**805.07 Basis of Payment.** The City will pay the unit price shown in the proposal and will consider the payment as complete compensation for providing all work necessary to furnish and, install or transfer, the water service tap complete and ready for use or any component part thereof.

The City will make payment at the contract price for:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
805	Each	_____ Inch Corporation Stop
805	Each	_____ Inch Curb Stop
805	Each	Curb Box

805	Each	C.I. Ferrule Valve Box and Cover
805	Linear Foot	_____ Inch Water Tubing
805	Each	_____ Inch Water Service Tap, Complete
805	Each	_____ Inch Water Service Tap, Transferred

**807.03 Basis of Payment**

Page 812

**807.03 Basis of Payment.** The City will consider the price bid for adjusting the various valve boxes or service boxes to grade as full compensation for all labor, material and equipment to complete the work as covered in these specifications including backfill and sidewalk or pavement replacement.

The City will consider the unit prices bid for Columbus Standard heavy duty valve box ~~or C.I. Ferrule Box and Cover~~ as full compensation for the heavy duty valve box complete and installed to final grade.

The City will make payment at the contract price for:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
807	Each	Valve Boxes Adjusted to Grade
807	Each	Valve Boxes Adjusted to Grade using Riser
807	Each	Service Boxes Adjusted to Grade
807	Each	Columbus Standard Heavy Duty Valve Box
807	Each	C.I. Ferrule Valve Box and Cover

**809.01 Scope of Work**

Page 814

**809.01 Scope of Work.** The Contractor shall furnish all labor, tools, material and equipment, and coordinate inspections necessary to furnish and install new fire hydrants at the locations shown on the plans or as ordered and specified.

The item shall include all excavation, furnishing and installing the new fire hydrant complete with all fittings, approved polyethylene wrap, blocking, backfilling and all other incidental work necessary to complete this item of work. The Contractor shall install hydrant watch valves and 6 inch ductile iron hydrant leads where necessary, under Items 801 and 802.

The Contractor shall notify the Division of Fire prior to taking any fire hydrant out of service. All hydrants, whether new or relocated, shall be inspected and approved by the Division of Fire prior to being put into service.

## 809.02 Description of Fire Hydrants

Page 815

### 809.02 Description of Fire Hydrants.

7. **Paint.** Provide hydrants with two good coats in a gloss enamel of one color for the entire hydrant. The color shall be Safety Orange. After installation of the fire hydrants, the contractor is responsible to apply touch-up paint to any damage to the factory-applied hydrant paint. Hydrants will not be accepted until any paint damage from shipping or installation has been repaired. Use hydrant touch-up paint in accordance with the approved material list.

~~7. **Paint.** Provide hydrants with two good coats of special yellow hydrant enamel, with the top 4 inches (102 mm) of the hydrant from operating nut down painted flat black.~~

## 809.03 Installation

Page 816 - 817

**809.03 Installation.** Furnish and install hydrants at the locations shown on the plans. Locate hydrants 2 feet behind the back of the curb line or 8 feet from the edge of paved area on non-curbed roadways unless otherwise shown on the plans or directed by the Engineer. Provide hydrants of the proper length to suit the depth of cover over the water lines at the locations shown on the plans and furnish the necessary extensions to obtain the proper length. Locate fire hydrants a minimum of 6 feet clear of all residential driveway openings and curb returns, and a minimum of 10 feet clear of all commercial driveway openings. Install and restrain a second watch valve within 2 feet of the hydrant if the hydrant lead exceeds 15 feet in length.

Excavate the pit or trench for the fire hydrant so when it installed, the hydrant base rests on a concrete slab on undisturbed soil. Set the hydrant plumb with nozzle outlet approximately 18 inches from ground line. Set hydrants set in accordance with grade line or approximately 2 inches below bottom of break connection on the hydrant standpipe.

Install fire hydrants with hardwood backing against Class "C" concrete backing poured against undisturbed earth, as approved by the Engineer.

Any fire hydrant used between the dates of September 15<sup>th</sup> and April 15<sup>th</sup> shall be pumped dry to the foot valve of the hydrant barrel or a minimum of five (5) feet below the surface of the existing ground, by the contractor, immediately after each time the hydrant is operated or after initial installation.

## 809.06 Hydrant Relocation

Page 817

**809.06 Hydrant Relocation.** Relocate fire hydrants removing the existing hydrant, installing new 6 inch ductile iron pipe and cast iron fittings as required to set hydrant at location and elevation shown on the plans, resetting hydrant, blocking and backfilling to



complete the work. If the new hydrant lead exceeds 15 feet in length, install a second watch valve and restrain within 2 feet of the relocated hydrant. For relocations that parallel the right-of-way, if relocating more than 15 feet abandon the existing fire hydrant per Item 809.07 and a new fire hydrant installed at the proposed location. All piping and/or fittings installed with the relocation, including hydrants, shall be tested at line pressure, visually inspected by the City for leakage, and hand swabbed with chlorine for disinfection.

## 901.02 Materials and Material Handling

Page 824

**901.02 Materials and Material Handling.** Provide pipe of the size and kind specified in the proposal and shown on the plans and meeting the requirements of the relevant parts of Section 706, Section 720 or Section 801. If the proposal or plans do not specifically itemize the type of pipe, the Contractor may use pipe from its list of approved manufacturers. The City will maintain a list of current Approved Manufacturers, Product Types and Sizes, and Authorization Letters on file at the Laboratory.

Provide specific materials as follows unless otherwise specified in the Contract Documents:

1. Concrete for encasement, cradle, backing and backfill Class A .....	499, 905
2. Concrete for blocking - Class C .....	499
3. Stone or gravel bedding - No. 57 .....	703
4. Compacted granular material .....	912.02
5. Cement for mortar .....	701
6. Sand for mortar .....	703.03
7. Lime for mortar .....	712.04
8. Gaskets for Concrete Pipe Joints .....	901.15
9. Gaskets for Vitrified Clay Pipe Joints .....	901.15
10. Gaskets for PVC Pipe Joints.....	901.15
11. Gaskets for Ductile Iron Pipe Joints .....	901.15
12. Non-Reinforced Concrete Pipe .....	706.01
13. Reinforced Concrete Pipe .....	706.02
14. Reinforced Elliptical Concrete Pipe .....	706.04
15. Vitrified Clay Pipe, Extra Strength .....	706.08
16. Polyvinyl Chloride (PVC) Sewer Pipe .....	720
17. Ductile Iron Pipe .....	801.03
18. Precast Reinforced Concrete Box Sections .....	706.05
19. High Density Polyethylene Pipe (HDPE) .....	720
<u>20. High Density Polypropylene Pipe (HDPP) .....</u>	<u>720</u>

Exercise care in material handling to prevent field and installation damage that could impair the function and durability of the installation. In particular, carefully handle thermoplastic conduits during cold weather.

## 901.11 Bedding and Embedment

Page 826 - 827

**901.11 Bedding and Embedment.** Place cutoff trench dams of native clay or impervious soil across and along the trench at 150 foot (45.7 m) intervals. Place at least 1 trench dam between adjacent manholes regardless of spacing. Compact the trench dams 6 feet (1.8 m) in length, as measured along the sewer centerline and bench into the undisturbed trench sides from the subgrade or top of cradle, to within 5 feet (1.5 m) of the existing surface. If constructing trench dams in rock or hardpan, extend to the top thereof whichever is greater. Where pipe cover is less than 5 feet (1.5 m) ~~the~~ extend the dam to within 1 foot (0.3 m) of the existing surface. Provide the trench dam installation with a minimum of 3 feet (0.9 m) of compacted material above the crown of the pipe.

### Type I.

1. For flexible sanitary and storm sewers 6 inches (152 mm) in diameter up to and including 60 inches (1524 mm) in diameter, provide a bedding of No. 57 stone, ~~conforming to Item 703.08, or compacted granular material in accordance with Section 912.02~~ extending from a point 4 inches (101 mm) below the bottom of the pipe to a point ~~12-6~~ inches (~~305-152~~ mm) above the outside top of pipe as shown on the standard drawings.
2. For rigid sanitary and storm sewers 6 inches (152 mm) in diameter up to and including 27 inches (685 mm) in diameter, provide a bedding of No. 57 stone, ~~conforming to Item 703.08, or compacted granular material in accordance with Section 912.02~~ extending from a point 4 inches (102 mm) below the bottom of the pipe to spring line of the pipe as shown on the standard drawings.
3. For rigid sanitary and storm sewers 30 inches (762 mm) in diameter up to and including 108 inches (2743 mm) in diameter, provide a bedding of No. 57 stone, ~~conforming to Item 703.08, or compacted granular material in accordance with 912.02~~ extending from a point 6 inches (152 mm) below the bottom of the pipe to the spring line of the pipe as shown on the standard drawings.

If using Type I bedding, include the cost of all bedding as described above in the price bid for the various pipe items. ~~If compacted granular material fails to meet the compaction required under Section 912.03, under pipe haunches and around the pipe, the Engineer will direct the use of stone bedding, No. 57, in lieu of compacted granular material at no additional cost to the City.~~

Provide embedment for thermoplastic pipe ~~used in areas where lateral soil support is negligible or questionable~~ in accordance with the recommendations of ASTM D2321, 7.5 ~~Appendix XI Commentary.~~

## 901.12 Laying Pipe

Page 827 - 828

**901.12 Laying Pipe.** Examine each pipe for defects and damage. Do not use defective or damaged pipe. Lay pipelines to the grades and alignment indicated. Provide proper

facilities for lowering sections of pipe into trenches. Do not, under any circumstances lay pipe in water or when trench conditions or weather prove unsuitable for such work. Provide for the diversion of drainage or dewatering of trenches during construction as necessary. Inspect all pipe in place before backfilling, and remove and replace those pipes damaged during placement.

Lay pipes in finished trenches starting at the lowest point so that the spigot ends point in the direction of flow. Lay all pipes with ends abutting and true to line and grade.

Where necessary with bell end pipe, excavate suitable bell-holes in the bedding material for the bell of each pipe so that the bells will not support the weight of the pipe. Fit and match the pipes so that when placed, they will form a conduit with a smooth and uniform invert. Use all possible care when shoving the pipes together to minimize the joints and carefully clean the pipe ends before placing the pipes. Install gaskets in accordance with the manufacturer's recommendations.

Use Class A concrete encasement, in accordance with ~~to~~ the applicable dimensional standard drawing, within the limits of existing or proposed paved areas inside right-of-way, where minimum cover during construction or proposed cover over the outside top of the pipe to top of finished grade is 48 36 inches (~~762 914~~ mm) or less.

Make all connections with existing structures after cleaning the structures in a thorough, first class, neat and workmanlike manner acceptable to the Engineer. Include the cost of this work in the price bid for the various pipe items.

## 901.15 Pipe Joints

Page 829

### 901.15 Pipe Joints.

#### Sanitary Sewers

**Concrete.** Provide pipe joints conforming to the requirements of ASTM C 443 and as specified herein. Use solid gaskets of circular cross section confined in an annular space formed by the shoulder on the bell and spigot or in the groove in the spigot of the pipe so that movement of the pipe or hydrostatic and hydrodynamic pressure cannot displace the gasket. When the joint is assembled, compress the gasket to form a watertight seal.

Provide all elliptical reinforced concrete pipe for sanitary sewers with Type B - mortar joints and ASTM C 877 rubber and mastic sealing band.

**Vitrified Clay.** Provide pipe joints conforming to the requirements of ASTM C 425 Compression Joints for Vitrified Clay Bell and Spigot Pipe.

**Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe.** Provide pipe joints conforming to the requirements of ASTM D 3212.

**Ductile Iron.** Use mechanical or push on joints meeting AWWA C111 or restrained joints meeting AWWA C110 or C153.

**Polypropylene Sewer Pipe. Provide pipe joints conforming to the requirements of ASTM D 3212.**

**Storm Sewers**

**Concrete.** Use pipe joints conforming to one of the following:

Type A Rubber Gasket. Meet the requirements of ASTM C 443.

Type B Mortar. On sewers 30 inches (762 mm) in diameter and larger, lay the groove end of the pipe to line and grade and wash with a wet brush and butter the bottom half of the groove with 1 to 2 Portland Cement mortar. Clean the tongue of the next section of pipe with a wet brush and apply a layer of 1 to 2 Portland Cement mortar to the top half of it. Then fit the tongue end of the second pipe into the groove end of the first pipe until the mortar is squeezed out onto the inner and outer surfaces. Point the inner surface of the pipe at the joint and smooth with a long handled brush. Point the outside with a bead of mortar. If the joint opening on the bottom half of the pipe exceeds 1/2 inch (13 mm), fill with 1 to 2 Portland Cement mortar.

Type C Bituminous pipe joint filler. Meet the requirements of Section 706.10.

Type D Preformed butyl rubber material. Meet the requirements of 706.14. For concrete pipe 78 inch (2.0 m) diameter and over, prime the annular mating surfaces.

**Vitrified Clay.** Construct pipe joints conforming to one of the following:

Type A Compression. Meet the requirements for vitrified clay pipe joints used in sanitary sewers as specified herein.

Type C Bituminous filler. Meet the requirements of 706.10.

Type D Preformed butyl rubber material. Meeting the requirements of 706.14.

**High Density Polyethylene/Polypropylene.** Construct pipe joints conforming to one of the following:

Type A pipe joints. Meet the requirements of ASTM D 3212.

Type B pipe joints. Meet the requirements of AASHTO M-252, M-294, and Section 23 of the Standard Specification for Highway Bridges, Division II. Construct joints "silt tight" with bell and spigot connection. Provide bells either integrally joined to the pipe, or with separate sleeves (double-belled) designed to join the pipe in the field. The Contractor may use split couplings or separate sleeves to make field repairs.

For all elliptical reinforced concrete pipe for storm sewers, use Type B – mortar or, Type C Bituminous pipe joint filler. Where conditions dictate the use of other types of joints, the City will note such on the plans.

The Contractor may use preformed rubber coupling rings, Fernco 5000 series or approved equal, if approved by the Engineer, when performing field repairs on both rigid and flexible pipes for both sanitary and storm sewer applications. Ensure the rubber sleeve and steel bands make a tight seal capable of meeting the leakage requirements as

specified in Item 901.20. Use preformed rubber coupling rings, Fernco 5000 series, only to join pipe of similar material. Perform all installations of the Columbus standard drawings.

When connecting pipes of dissimilar materials, use the type of coupler specifically manufactured for making the connection between said materials (i.e. concrete to clay, clay to plastic, etc.). Complete the repair by removing the existing pipe to the nearest structurally sound joint and install the new pipe in accordance with all applicable sections of Item 901. Sawcut existing pipe in a neat workmanlike manner, making the cut perpendicular to the longitudinal axis of the pipe. Include the cost of this work in the price bid for the various pipe items, unless directed otherwise by the Engineer.

### 901.20 Leakage Tests

Page 832

**901.20 Leakage Tests.** Acceptance testing of all sanitary sewers shall require a 30 day waiting period from the date of final backfilling. This shall include all laterals installed as part of mainline construction. Do not exceed the allowable limits of leakage for all completed and installed sanitary and storm sewer pipe as follows:

### 901.20 Leakage Tests

Page 834

#### 901.20 Leakage Tests.

- d. When pressure decreases to 3.5 psig, start stop-watch. Determine the time in seconds required for the internal air pressure to reach 2.5 psig. Use minimum permissible pressure holding times for runs of single pipe diameter and for systems of 6 inches or 8 inches (152 or 203 mm) laterals in combination with trunk lines published in the current tables byof the National Clay Pipe Institute for vitrified clay pipe, ASTM C-924 for concrete pipe, and or Table 1 in UNI-B-6-~~\*\*\*90~~ by Uni-Bell PVC Pipe Association for PVC pipe.

### 912.02 Materials

Page 851

**912.02 Materials.** Use the following materials:

Unless otherwise shown, specified, or ordered, provide granular material meeting the requirements of Section 703.11, incorporated in an 8 inch (203 mm) layer. Granular material consisting of natural or synthetic mineral aggregate such as broken or crushed rock, gravel, slag, sand or cinders incorporated in an 8 inch (203 mm) layer, and conforming to the gradation specified in Section 703.11, Type 1.

The Contractor may use controlled density fill mixes as an alternate to compacted granular material, conforming to the requirements of Item 613.

Do not use RPCC as bedding, initial backfill, or final backfill material for any metal sewer pipe installation.

### 912.03 Compaction Requirements

Page 851

**912.03 Compaction Requirements.** Apply the following compaction requirements to granular materials and to native backfill materials if such materials require compaction in accordance with Item 911.

<b>Max. Lab. Dry Wt. Lbs./cu. Ft. (kg/m<sup>3</sup>)</b>	<b>Min. Comp. Requirements % Lab. Max.</b>
90-104.9 (1442-1680)	102%
105-119.9 (1682-1920)	100%
120 and more (1922)	98%

Consider materials having a maximum laboratory dry weight of less than 90 lbs./cu. ft. (1442 kg/m<sup>3</sup>) unsuitable for ~~backfill~~compaction. Spread soil, granular material, or other approved material in successive level layers of a depth to allow compaction to the specified density and of not more than 8 inches (203 mm) in thickness (loose measurement), unless otherwise specified and/or authorized in writing by the Engineer.

Cooperate to the fullest extent to accommodate compaction tests. The City will not pay for delay or time lost due to verification of compaction required.

**REVISED ON A QUARTERLY BASIS, OR AS NEEDED.**

**SUPPLEMENTAL SPECIFICATION 1100**  
**Revision Summary**  
**May 1, 2017**

**703.01 General.**

Page 624

**703.01 General**

The following abbreviations apply:

CCS	Crushed Carbonate Stone.
ACBFS	Air Cooled Blast Furnace Slag
GS	Granulated Slag
RACP	Reclaimed Asphalt Concrete Pavement
RPCC	Recycled Portland Cement Concrete
OH	Open Hearth Slag
EAF	Electric Arc Furnace Slag
BOF	Basic Oxygen Furnace Slag
PCS	Petroleum Contaminated Soil

**Pre-qualified Aggregate Supplier Program (City Supplement 1069). Provide aggregate materials to the City of Columbus from pre-qualified suppliers.**

**A. Soundness.** When the major portion of the unsound material in a coarse aggregate acquires a mud-like condition when tested for soundness, ensure a maximum loss of 5 percent for all uses.