

**D-2 GENERAL CONDITIONS, SUPPLEMENTAL GENERAL CONDITIONS AND PLANS**

The provisions of Part B - General Conditions, as amplified or modified by Part C - Supplemental General Conditions, apply to all work performed under these detail specifications, except as otherwise expressly provided herein.

Where there is a conflict, the Detail Specifications (Part D) shall govern over the Supplemental General Conditions (Part C). Between the plans and the specifications, where there is a conflict, the plans shall govern.

Supplemental Detail Specifications (DS) shall govern over Detail Specifications should there be a conflict.

The Detail Specifications (Part D) and Supplemental Detail Specifications (DS) shall govern over the State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, or other specifications for any other City Division, should there be a conflict between the specifications.

**D-3 CONSTRUCTION AND MATERIAL SPECIFICATIONS**

~~The State of Ohio, Department of Transportation, Construction and Material Specifications dated January 1, 2005, only Part 200, EARTHWORK, through Part 700, MATERIAL DETAILS, inclusive, as may be modified on the Construction Plans or in these Specifications, shall govern this project. All of these modifications are in these specifications or are shown on the plans. No other portion of the ODOT Construction and Material Specifications shall apply.~~

~~Copies of the ODOT Construction and Material Specifications are available, cost involved, from the:~~

Ohio Department of Transportation  
Bureau of Contract Sales  
P.O. Box 899  
Columbus, Ohio 43216-0899  
Telephone: (614) 466-3778, 466-3200

For purposes of this project, the following terms in the applicable State of Ohio Department of Transportation, Construction and Material Specifications shall have the below-listed meanings:

Department: The Department of Public Service of the City of Cleveland.

Director: The Director of the Department of Public Service of the City of Cleveland or his/her authorized designee.

Engineer: The Commissioner of Engineering and Construction, Division of the Engineering & Construction, Department of Public Service of the City of Cleveland or his/her authorized designee.

Laboratory: The private laboratory/testing firm, selected by the City of Cleveland.

State: The City of Cleveland acting through its authorized representatives.

#### **D-4 SEASONAL SUSPENSION OF WORK**

Before the Contractor may suspend work for the winter season, any and all areas disturbed by the Contractor's operation must be left in a safe and passable condition. If it should become necessary to install temporary sidewalk, such sidewalk shall be constructed as per ODOT Item 608 concrete walk. Temporary surface on the street is to be constructed using 12" of Item 304 "Aggregate Base" per ODOT Construction and Material Specification requirements and maintained throughout the winter suspension period as directed the Engineer. All temporary work is to be at the Contractor's expense and is to be removed and replaced with the permanent construction in the spring when the weather conditions permit the resumption of work.

#### **D-5 CONTRACTOR HOURS**

The Project work hours shall be an eight hour day five days a week for a maximum of 40 Hours, unless a different 40 hour work schedule is approved by the City.

**The Contractor shall pay for any overtime, which requires City inspection. Prior to the commencement of construction, the Contractor shall deposit \$1,000.00 with the Division of Accounts to cover the City inspector's overtime costs. Any remaining balance will be returned to the Contractor after the project is completed. No additional compensation shall be given for such expense. If the deposit is exhausted before the end of the project, another deposit of \$1,000.00 will be required before any more overtime work is authorized. The estimated overtime rate for inspection shall the current billing rate established by the City of Cleveland**

#### **D-6 WORK HOURS AND NOISE CONTROL**

The Contractor shall restrict his working hours to those permitted by local ordinances or any other applicable ordinances, laws or regulations except as he may obtain written variances from such ordinances, laws or regulations from the appropriate governing authorities.

The noise level resulting from the construction shall be within the limits specified in OSHA regulations and all local ordinances.

#### **D-7 ELEVATIONS AND DIMENSIONS**

Elevations on the Plans refer to sea level datum. Calculated dimensions shall take precedence over measurements by scale.

Pavement thickness and all underground utility locations are approximate and are subject to actual field verification by the Contractor. The City is not liable for utilities not as shown on the drawings or abandoned lines. The Contractor shall cut out any abandoned lines with all costs incurred shall be included in the Bid Item for that work.

#### **D-8 NEW MATERIAL SPECIFIED**

All materials for the Bid Items specified are to be considered all new material unless clearly and distinctly indicated on the plans or in these specifications as recycled, reset or used. The use of any other material is prohibited.

#### **D-9 RESTORATION OF ROADWAYS, DRIVEWAYS, SIDEWALKS, CURBING AND TREELAWNS**

The Contractor shall properly restore all roadways, driveways, sidewalks, curbing treelawns including the area behind the sidewalk and the Right-of-Way line not designated for removal or repair that have been damaged or disturbed during construction, at no cost to the City.

Generally any damaged slab shall be totally replaced. Partial replacement will be permitted only if adjacent slab is replaced & as directed by the engineers.

#### **D-10 INCONVENIENCE TO THE PUBLIC**

It is intended that the public be put to a minimum of inconvenience due to the construction work. The Contractor must therefore complete the work as rapidly as possible, once it is begun in a particular area. The Engineer will pay particular attention to the scheduling and sequencing of the work.

**D-11 WORK PERMITS**

The Contractor shall obtain all permits and pay all applicable fees to the City of Cleveland and/or respective municipality (ies). The cost of said fees shall be included in the applicable unit prices bid by the Contractor.

**D-12 WATER SUPPLY**

Water will be supplied to the Contractor at the nearest hydrant. The cost of the water supply shall be borne by the Contractor. The Contractor shall obtain the necessary permit from the City of Cleveland Water Department.

The Contractor will be required to provide approved standard tight hose and fittings with which to make connections to hydrants and outlets. No improper, wasteful or undue use of water will be permitted.

**D-13 FORCE ACCOUNTS**

~~The Engineering and Construction Force Account is to be used to cover cost overruns on bid items, the cost (wholly or partially) of change orders (any unbid work item), the cost for any project related (engineering related) materials and supplies, the cost for material tests, consultants, evaluations and inspections, and the cost of other unforeseen, unexpected or unanticipated items, all as authorized in writing by the engineer. Except for quantity overruns, all the above items shall be considered change orders. Change orders shall be numbered, titled (short and descriptive), quantified (if applicable) and priced. The location of cost overruns or underruns shall be recorded by the inspector.~~

~~The dollars related to any Force Account that may be listed in this section are paid directly to the identified party by the City. For cases where this is not true, the line item shall so state.~~

**D-14 REDUCTION/ELIMINATION OF WORK AND/OR INCREASE IN WORK**

The City of Cleveland reserves the right to reduce or eliminate portions of any or all of any items of work. If the project is over budget, work will be eliminated and quantities will be adjusted accordingly. A bid tabulation will be prepared using the reduced quantities and the unit prices submitted by the bidder. This tabulation shall be submitted to the Contractor for his reviews and approval.

**D-15 PAVEMENT AND/ OR BASE REMOVED (ITEM 202)**

This item shall consist of the removal of the existing asphalt wearing course, brick, grout, granite or sandstone block and concrete to the top of the existing cushion/base course. The Limits for removal shall be as indicated on the plans or as directed by the Engineer.

**D-16 ITEM SPECIAL – UNDERCUTTING SUBGRADE AND SUBBASE**

Where soft subgrade is encountered, the unstable material shall be excavated to the depth required by the Engineer, and disposed of. The undercut subgrade shall be replaced in accordance with ODOT Item 204. The area shall be proof-rolled to determine if adequate stabilization was achieved.

Where soft subgrade is due to the failure, neglect or any other fault of the Contractor, the unstable condition shall be corrected as outlined above at no additional expense to the project.

Payment for this item shall include all excavation, aggregate and additional proof-rolling, and shall be paid for at the bid unit price per cubic yard, Item Special – Undercutting Subgrade and Subbase. Any Geotextile fabric, if required by the engineer, shall be paid as separate item.

**D-17 ITEM 202 - REMOVAL MISC.: TRACK REMOVED**

If old tracks are found buried beneath existing pavement, it is required that said tracks be removed as part of this project. The exact location, limits, and type of track are unknown.

If rail tracks are found beneath existing pavement they may be required to be removed as directed by the engineer.

The unit price bid per square yard for this item shall include the removal and disposal of the full depth of track. The limits of payment shall be the width of the railroad tie by the length of the rail removal. Payment will include removal of brick pavers, ties, any angles or other hardware, rails, ballast and the base.

In the areas of complete pavement removal and replacement, the removal of the asphalt wearing course shall also be included in the unit price bid for this item. Any part of the track which is below the proposed subgrade shall be removed and replaced with Item 304, Aggregate Base.

Any additional excavation and/ or embankment required between the bottom of the track base and the proposed subgrade will be paid for under separate item.

The Drawings contain a detail of the most probable type of track, as determined from record drawings.

No additional compensation for minor variation in the existing track features will be made.

**D-18 POLE REMOVED (WOOD OR METAL/CONCRETE), AS PER PLAN (ITEM 202)**

Work performed under these items shall include the removal and disposal of the existing abandoned poles as shown on the Drawings or as directed by the Engineer, in conformance with the applicable portions of Item 202.

All pole foundations encountered shall be removed as a part of the applicable light pole removal item. Removal of the pole foundation shall conform to Item 202, Light Pole Foundation Removed, as per plan.

**D-19 POLE FOUNDATION AND/OR VAULT REMOVED, AS PER PLAN (ITEM 202)**

Work performed under this item shall conform to the applicable provisions of Item 202. Existing pole foundations designated for removal shall be removed to a minimum of 1 foot below the finished subgrade or ground surface and disposed of by the Contractor. The remaining cavity shall be backfilled as required.

Vault shall be completely removed as directed by the Engineer, in conformance with the applicable portions of Item 202, with remaining cavity backfilled as required.

**D-20 LINEAR GRADING (ITEM 203)**

This item of work shall be performed as per ODOT Item 203, Linear Grading except as modified herein:

- 1). The Contractor shall remove all excess material so that the ground elevation is one quarter of one inch (1/4") below the elevation of a theoretical plane projected from the top of the existing sidewalk to the top of the existing curb.
- 2). The Contractor shall remove all excess material so that the ground elevation is one quarter of one inch (1/4") below the elevation of a theoretical plane projected from the top of the existing sidewalk following the natural contour of the existing ground.

- 3). Payment for this item of work shall be per hundred foot (100') station as measured along the centerline that shall include both sides of the street. This curb measurement will be for both the area in between the curb and sidewalk and the area behind the sidewalk.

Payment for all labor, equipment and incidental costs necessary to complete this work, including removal and disposal of materials deemed unfit for reuse by the Engineer and additional or replacement embankment material regardless of the source, shall be included in the contract unit price bid.

#### **D-21 MATERIAL DISPOSAL (ITEM 203)**

The Contractor shall not dump any waste materials on any City property without the written permission of the Department of Public Service, or on other property without the written permission of the owner or lessee thereof, and the Department of Public Service. When such permission is granted, dumping shall be subject to regulations specified by the Department of Public Service.

#### **D-22 EROSION CONTROL (ITEM 207)**

All of the work performed under this contract shall be in compliance with all the pertinent plan specifications and/or details, local regulations, State agencies ( i.e. Ohio Environmental Protection Agency), and Federal regulatory agencies regulating the control of erosion and sediment.

At the Pre-construction meeting, the contractor shall submit their plan for the erosion and sediment control, within the construction limits, for review and acceptance by the City. Construction shall not begin until all sediment and erosion control measures have been installed and approved by the Engineer.

The City's acceptance does not relieve the Contractor from full compliance with erosion and sediment controls required by the above agencies. It is the contractor's responsibility to control any sediment or erosion produced by the Contractors' activities.

Sediment controls shall be installed as a first order of work. Sediment controls shall remain in place until the project is completed and disturbed areas are restored. All devices are to be maintained and kept in good condition. Any additional sediment control devices needed will be placed, at the direction of the Engineer, at no additional cost as noted below.

After construction of the project, all disturbed areas are to be restored as provided in these specifications and/or plans. Upon approval of the Engineer, the Contractor shall remove all sediment control devices and insure that the project site and structures are in reasonably clean condition. If sediment and erosion control devices fail, the contractor

shall clean the site of sediment including all structures and conduits within the project limits, at no additional cost to the City. Those areas outside that are affected by such failure shall also be cleaned at no additional cost to the City.

If no Unit Bid Item is provided in the contract, erosion and sediment control shall be considered incidental to the other Unit Bid Items. If erosion and sediment control Unit Bid Items are provided, payment will be made under those Unit Bid Items.

**D-23 CONSTRUCTION OF CONCRETE BASE, PAVEMENT, SIDEWALKS, DRIVEWAYS AND CURB (ITEMS 305, 451, 452, 608 & 609, SPECIAL)**

**1. WORK INCLUDED**

The Contractor under this section of the specifications shall construct concrete base, pavement, sidewalk, driveway aprons, curb, curb and gutter sections, handicap ramps, and integral radius curb and walk. This includes the restoration of all adjacent surfaces, which are disturbed by this construction and not scheduled to be restored under a separate item of payment.

**2. MATERIALS**

The concrete used shall be the concrete design mix as per D-24 and MS Concrete Mix Design, D-25 or FS Concrete Mix Design, D-26, as appropriate.

**GRADING**

Grading shall include all excavation, fill, and embankment required to permit the construction of the proposed pavement, sidewalk, driveway aprons, and curb to the designated lines and grades.

**3.1 Excavation**

- a) The cost of all excavation for a total depth of the full thickness of the proposed slab shall be included in the price bid for the various items of work including removal and disposal, complete in place. Excavation shall include the removal of all concrete, stone, earth, roots, and other material of every description within the limits of the proposed work.
- b) Except as otherwise ordered, excavation at the elevation of the finished grade of the construction shall extend one (1) foot beyond each edge and then on a slope of one (1) vertical to one and one-half (1 1/2) horizontal and shall be paid for as excavation at the price per cubic yard for such work as it appears on the price sheet of the contract. When so ordered, excavation shall extend to a sufficient



width to permit proper drainage with the cost of excavating beyond the limit stated above paid for as excavation.

- c) The cost of all excavation for a depth in excess of the thickness of the slab shall be paid for as excavation at the lump sum or unit price bid for Item 203 - Excavation.
- d) The Contractor shall use extreme care, by whatever methods and procedures are necessary, in the removal of pavement, sidewalk, driveway aprons, and curb, to ensure that no adjacent slabs beyond those marked for removal by the City Inspector will be disturbed, removed or damaged. Should any pavement, walk, driveway apron or curb be damaged, either in whole or in part, other than that which is marked for removal by the City Inspector, the Contractor shall remove and replace said damaged slabs, in whole, without cost to the City.

### 3.2 Fill or Embankment

- a) Fill or embankment shall be ODOT Item 203-Embankment as per plan notes and meet the following two (2) requirements:
  - It shall be substantially free from vegetable or organic matter and shall contain not more than ten (10) percent of loam or clay.
  - It shall weight not less than ninety (90) pounds per cubic foot, dry compacted weight.

The upper six (6) inches of embankment outside of the edge of the sidewalk, driveway apron or curb shall be topsoil or excavated material approved by the engineer. (No sand)

- b) Fill shall extend at least one and one-half (1 1/2) feet beyond each side of the construction unless otherwise ordered or permitted. Side slopes shall be trimmed to a slop of one (1) vertical to one and one-half (1 1/2) horizontal, except as otherwise ordered by the City.
- c) Fill shall be in place in advance of construction to allow for settlement. The fill material shall be thoroughly compacted by tamping or rolling, or both, so as to produce a solid dense subgrade.
- d) It shall be the Contractor's responsibility to raise all municipally owned utility castings to finished grade of new work. Adjusting these castings to new grade shall constitute a separate item of work and payment.

- e) Non-municipally owned castings are the responsibility of their respective owners to adjust to the proper grade. Adjusting these castings to the new grade shall not be paid for under this contract.

#### 4. CONCRETE

- a) All concrete used shall be concrete design mix as per D-24 (Concrete Design Mix) of these Specifications, D-25 MS Concrete Mix Design or D-26 FS Concrete Mix Design, as specified. All concrete delivered shall be subjected to any or all tests described in the "Testing of Construction Materials" section of these Detail Specifications. All concrete failing any of these tests shall be removed and replaced as many times as required, until it passes all tests performed. The removal and replacement shall be at no cost to the City.
- b) All concrete delivered to the construction site shall be accompanied by dray slips. Dray slips shall contain all of the information required by ASTM C-94, Paragraph #16, Batch Ticket Information. Any concrete truck without a dray slip or with an incomplete dray slip shall be rejected.
- c) Trucks shall conform to AASHTO M 157 - 10.1, 10.2, 11.5, 11.6, 11.7, & 11.8 (18<sup>th</sup> Edition Part 1-1997)
- d) The slump and percent of air entrainment shall conform to the limits shown in section D-24 (Concrete Design Mix) of these specifications.
- e) All concrete shall be discharged from the truck within ninety (90) minutes of the batching time as indicated on the dray slip.
- f) The temperature of the concrete at the time of placement shall be between minimum concrete temperature as per AASHTO M157-1997 section 11.1.1 minimum concrete temperature table as shown below and ninety (90) degrees Fahrenheit as per the American Concrete Institute (ACI) recommendations for hot weather concrete.

<u>Air Temperature</u>	<u>Thin Sections and Uniformed Slabs</u>	<u>Heavy Sections and Mass Concrete</u>
<u><i>Fahrenheit</i></u>	<u><i>Degrees</i></u>	<u><i>Degrees</i></u>
30 to 45 degrees	60	50
0 to 30 degrees	65	55
Below 0 degrees	70	60
<u><i>Centigrade</i></u>		
-1 to 7 degrees	16	10
-18 to -1 degrees	18	13
Below -18 degrees	21	16

- g) Rejected Trucks and Loads - Any truck and its load of concrete rejected for failure to meet all the requirements of paragraph's 4c and 4d as stated above shall have the following condition imposed:

**Any truck rejected from any construction site covered by this section of the specifications shall also be banned from all construction sites covered by this section of the specifications.**

- h) Any concrete which fails to meet all of the requirements of paragraph's 4e, 4f, and 4g as stated above, or the requirements of the job mix, shall not be used on this or any other construction project where the specifications have been prepared by the Division of Engineering & Construction.

## 5. CONSTRUCTION

All of the various types of pavement, sidewalk, driveway aprons, curb or any combination thereof shall be constructed as per these specifications, plans, details and the respective Standard Drawings.

Except as otherwise directed, all concrete for pavement, sidewalk, driveways aprons, curb, handicap ramps and integral radius curb and walk shall be of one (1) course. Sidewalk shall be a minimum of four inches (4") thick. Driveway aprons shall be a minimum of six inches (6") thick for residential, eight inches (8") thick for commercial driveways and 10" for heavy commercial aprons. The minimum thickness for integral concrete radius curb and walk shall be eight inches (8") and as also shown on City of Cleveland Standard Drawing # 244ME.

The thickness of the pavement, sidewalk and/or driveway aprons shall be increased as indicated on the plans or as directed by the Engineer. Sidewalk through the driveway and driveway aprons of the same thickness may be combined into one item of work and payment.

### 5.1 Forms

- a) Forms for pavement, sidewalk, integral concrete radius curb and walk, and driveway apron construction shall be made of steel.
- b) Where standard lengths of steel forms cannot properly be used, a wooden form will be permitted for closure. Said wooden form shall not be less than one and five-eighths inches (1 5/8") in thickness. The minimum depth shall be as shown below:

Sidewalk	4", 6" or 8"
Driveway Apron	6" or 8"
Integral Concrete Radius	
Curb and Walk	8"
Base, Plain and Reinforced Pavement	9", 10" or 12"

### 5.2 Saw Cutting and Concrete Removal

When existing concrete pavement, drive aprons, curb or sidewalk necessitates cutting into the existing slab for removal, the cutting shall be accomplished by using a suitable concrete power saw which will produce a straight and smooth finish along the sawed edge. The depth of cutting or scoring shall be such that no damage will result to the remaining slab after removal of the designated section. The location of all saw cuts shall be determined by the Engineer. Any damage to the slab not designated for removal shall be replaced at no expense to the City.

### 5.3 Affidavit

An affidavit shall be secured from each company supplying the concrete stating that only the concrete design mix as per D-24, D-25 or D-26 shall be supplied. This affidavit shall also state that the material supplier has read the specifications relative to the concrete being supplied. It shall be signed by an officer of the supplying company and **notarized**.

### 5.4 Placing Concrete

- a) No concrete shall be poured until the inspector has approved the preparation of the foundation bed.
- b) No concrete shall be poured unless the inspector is on the jobsite observing the work.
- c) If any concrete is poured without the prior approval of the preparation of the foundation bed, with observation of the work by

the inspector, the concrete poured shall not be accepted by the City for payment.

- d) Foundation beds shall be sprinkled immediately prior to depositing of concrete during hot or dry weather conditions.
- e) All welded steel wire fabric for concrete reinforcement, as per construction plans, shall meet the requirements of Section 709.10 of ODOT Construction and Material Specifications.
- f) Concrete shall be continuously deposited between bulkheads to a uniform thickness and to the full depth and width. The concrete, after being placed, shall be thoroughly compacted and brought to the proper pitch and grade with a template or straightedge.
- g) No concrete showing segregation or clumps of material shall be deposited in the work.
- h) Immediately prior to the finishing of the surface, the concrete shall be cut into slabs not longer than six feet (6') on any one side for walks and driveways. Pavements shall be cut as per plan details and City of Cleveland Standard Drawings. The joints shall be formed by a cutting tool or some other means satisfactory to the City and shall not be less than one-quarter (1/4) of the depth of the slab. All edges shall be rounded, with an approved edging tool, to a radius of one-quarter inch (1/4").

#### 5.5 Surface Finish

- a) The finishing of the concrete shall immediately follow the placing and compacting of the concrete. Unless otherwise ordered, a broom finish shall be required. Rubbing with floats, the only other acceptable method shall be done only at the direction of the Engineer. All concrete slabs shall be edged around the entire perimeter unless otherwise directed by the Engineer. The surface shall be free from depressions and inequalities.
- b) The application of dry cement to hasten drying of the surface is prohibited.

## 5.6 White Liquid Film Method

- a) All concrete pavement, sidewalk, driveway aprons, curb, curb and gutter sections, handicap ramps, and integral radius curb and walk shall be cured by the use of white liquid film. This white liquid film shall have twenty-five (25%) to thirty percent (30%) effective solids and meet the requirements of ODOT Construction Materials Specifications Item 705.07 Type 2.
- b) The white liquid film may be used for curing all concrete placed except for concrete which is to be bonded to future concrete placement
- c) The curing materials shall be applied uniformly by means of an approved pressure spray distributor at the rate of one (1) gallon to each two hundred (200) square feet of surface, and it shall be so applied that the concrete surface is completely coated and sealed in one (1) application. The curing material shall be applied immediately after the concrete surface to be cured has been finished and before any marked dehydration has occurred. After the surface has been coated, it shall be protected from all traffic or abrasive action from any source.
- d) When this method of curing is used, a complete duplicate spraying system shall be on the site before starting the placement of the concrete.
- e) Final curing by the white liquid film method shall be considered to extend for two (2) complete days from the time the material is placed. During this period, the surface of the concrete shall be protected by barricades from all traffic or work operations.
- f) A transparent liquid film may be substituted as directed by the Engineer.

## 5.7 Expansion Joints

- a) Prepared strips of preformed expansion joint material meeting the requirements of 705.03 of the ODOT Construction and Material Specifications shall be one-half inch (1/2") in thickness and of sufficient width to extend the entire depth of the concrete. They shall be placed in such a manner that the joint will be filled to within one-half inch (1/2") of the finished surface of the walk. Joints shall be constructed at intervals no greater than fifty feet (50') in all sidewalks, driveway aprons, curb and gutter section, cast-in-place

curb and integral curb and walk unless otherwise ordered. Pavement expansion joints shall be placed as per plan details.

- b) Joints shall be placed where the walk abuts curbing or other lateral walks and along the building line where the walk is placed full width from the curb to the building or other structures or as otherwise directed by the Inspector in the field. The edges of all joints so placed shall be rounded as herein before specified. The cost for expansion joints shall be included in the unit price bid for the respective items of work.
- c) Where new concrete curb or the curb portion of integral concrete radius curb and walk abuts existing pavement, a three-quarter inch (3/4") thick preformed expansion strip as called for in 705.03 of the ODOT Construction and Material Specifications shall be placed to separate the pavement and curb. The upper one-half inch (1/2") of the joint shall be hot sealed.

#### 5.8 ODOT ITEM 305-PLAIN CONCRETE BASE

ODOT Item 305 - Plain Concrete Base shall meet all requirements for Item 452 - Plain Concrete Pavement except that concrete mix design shall be as per these Detail Specifications. All jointing and transfer devices are to be installed. The concrete shall have a broom finish.

**D-24 CONCRETE DESIGN MIX (ITEM SPECIAL)**

All applicable work items shall be bid using the concrete mix design specified in this section. Under this section of these specifications the contractor is required to submit a separate mix design for each combination of cement type, aggregate type and concrete supplier they will use under this contract. Each mix shall be designed in accordance with ASTM-C94-94 Option C and as herein modified.

<u>REQUIREMENT</u>	<u>DESCRIPTION</u>
Minimum twenty-eight (28)	4,000 PSI for 28 days compressive strength test. Four cylinders will be taken and tested as per ASTM C-39-04. One to be tested at seven days and the remaining three will be tested at twenty-eight) days. Acceptance will be based on the average results of the three cylinders.
Minimum Cement Content	650 lbs. per cubic yard. The cement shall conform to ASTM C-150-04 or C-595-04. IF <u>ANY</u> limestone is used, then the City <u>REQUIRES THAT</u> all of the information described in ASTM C-150-04 be furnished.
Water Cement Ratio	0.45 Maximum
Slump	Nominal three inches (3") as per ASTM C-94-04 (2"-4" actual). The use of chemical admixtures meeting ASTM C-494, to increase the slump to a maximum of 7", may be used with prior written approval of the Engineer. If this option is selected the admixture and resultant maximum slump shall be submitted for approval.
Air Content	Four percent (4%) to seven and one half percent (7 1/2%) ASTM C-173-04 or C-231-04.
Aggregate Size	No. 57 for course aggregate shall be limestone, gravel or crushed air-cooled blast furnace slag. Both course & fine aggregate as per ASTM C-33-04.

If crushed air-cooled blast furnace slag is used it shall meet all of the requirements of ODOT 703.01 and 703.02. Copies of all tests and certifications for the crushed air-cooled blast furnace slag, if used, shall be submitted as a part of the concrete mix design.

Steel Slag Aggregate (703.01E) is not permitted for use as an aggregate in concrete.



When high early strength is required, ASTM C-150-04 Type III A cement or admixtures in accordance with ASTM C-494-04 shall be used.

The contractor is required to furnish a signed affidavit, in triplicate, from each concrete supplier to the Commissioner giving dry weight and type of cement, saturated surface-dry weight and the type of fine and course aggregate, quantity, type and name of each admixture and weight of water per cubic yard of concrete. The contractor shall also furnish twenty-eight (28) day cylinder tests (per testing section) as verification that the materials used and the proportions selected will produce concrete of the quality specified.

Hot and cold weather protection (blankets, heaters, ice etc.) shall be included in the unit price bid.

The contractor is required to comply with all the above requirements. The contractor shall require that all of the sub-contractors placing concrete under this contract also comply with all of the above requirements.

**D-25 CONCRETE MIX DESIGN FOR CLASS MS CONCRETE (ITEM SPECIAL)**

All applicable work items shall be bid using the concrete mix design specified in this section. Under this section of these specifications the contractor is required to submit a separate Class MS Concrete with D-24 Concrete Mix Design, (Item Special) and as herein modified.

<u>Requirement</u>	<u>Description</u>
Minimum twenty-four (24) Hour Strength	400 PSI Modulus of rupture as per ASTM C-78
Minimum Cement Content	800 Lbs. Fly ash or additional aggregate shall not be used as a substitute for the cement
Water Cement Ratio	0.43 Maximum

Calcium chloride shall not be used this mix design. The results of the 24-hour beam test, as per ASTM C-78, shall be furnished in addition to the results of the twenty-eight (28) day cylinder tests.

Payment for MS concrete will be as a surcharge to the unit price per cubic yard per requirements of D-23 and D-24.

The Engineer will mark in the field the areas that require construction using Class MS Concrete. These marks will be limits of the payment for the various bid items using Class MS Concrete.

If the Contractor chooses to place Class MS Concrete outside of the Engineers marks for the Contractor's own convenience, then it will be measured and paid for as concrete which only meets the requirements of D-24 Concrete Mix Design, (Item Special).

**D-26 CONCRETE MIX DESIGN FOR CLASS FS CONCRETE (ITEM SPECIAL)**

All applicable work items shall be bid using the concrete mix design specified in this section. Under this section of these specifications the contractor is required to submit a separate Class FS Concrete with D-24 Concrete Mix Design, (Item Special) and as herein modified.

<u>Requirement</u>	<u>Description</u>
Minimum four (4) Hour Strength	400 PSI Modulus of rupture as per ASTM C-78
Minimum Cement Content	900 Lbs. Fly ash or additional aggregate shall not be used as a substitute for the cement
Water Cement Ratio	0.40 Maximum
Calcium Chloride	For 94 to 97% purity; 1.6% by weight of cement For 70 to 80% purity; 2% by weight of cement

The source, purity AND amount of calcium chloride shall be on each mix design. If the contractor desires to change either the source or purity, the contractor shall submit an additional mix design for review and approval showing the proposed changes.

Just before placement, add and mix the calcium chloride with each batch of concrete, as above described. When using a calcium chloride and water solution, consider the water as part of the concrete mixing water and make the appropriate adjustments for its inclusion in the total concrete mixture.

The results of the 4-hour beam test, as per ASTM C-78, shall be furnished in addition to the results of the twenty-eight (28) day cylinder tests.

The Engineer will mark in the field the areas that require construction using Class FS Concrete. These marks will be limits of the payment for the various bid items using Class FS Concrete.

Payment for FS concrete will be as a surcharge to the unit price per cubic yard per requirements of D-23 and D-24.

If the Contractor chooses to place Class FS Concrete outside of the Engineers marks for the Contractor's own convenience, then it will be measured and paid for as concrete which only meets the requirements of D-24 Concrete Mix Design, (Item Special).

**D-27 ADA CURB RAMP LAYOUT, AS PER PLAN, ITEM 608**

The ADA curb ramps and landings, including any sidewalk curbs, shall be measured and paid for per square foot of the unit price of the pertinent Item for sidewalk.

Under this pay item, the Contractor shall be responsible for laying out Americans with Disabilities Act (ADA) compliant curb ramps and landings that conform to City of Cleveland Curb Ramps Standard Drawings, and Special Provisions.

Payment shall include all surveying, construction layout and form work. The pay item is "Item Special, Curb Ramp Layout, As per Plan". Payment shall be per each corner at conventional intersections, per each corner at T-intersections (each corner at the leg, and the independent ramp opposite the leg which shall be considered a corner), and per each ramp at mid-block locations. Each side of the street for a mid-block location shall be considered as a corner. There may be either 1 or 2 curb ramps at a conventional intersection corner or at a T-intersection corner.

City of Cleveland Standard Drawings Curb Ramp Type 1 through Type 11 shall be used as a base for construction of the curb ramp. Any curb ramp not meeting ADA requirements will be removed and replaced by the Contractor, at his/her cost, to the satisfaction of the City.

Curb ramp and landing thicknesses

Sidewalk areas	6" thick
IRC&W areas	8" thick

**D-28 PORTLAND CEMENT CONCRETE SEALING - ITEM SPECIAL**

A. Submittals:

1. The Contractor shall submit technical information and a certified statement stating that the material to be furnished conforms to the material requirements of this section of the specifications.
2. Copies of waybills and delivery tickets shall be submitted to the contracting officer during the progress of the work. Before final payment is allowed, the Contractor shall file with the contracting officer certified waybills and delivery tickets for all concrete sealer used in the work.

B. Portland Cement Concrete Sealing Treatment

1. The concrete sealer shall be an approved non-epoxy, non-silicone, non-toxic, non-hydrophobic, non-solvent material, and shall meet the following qualifications and AASHTO and ASTM test performance criteria, based in accordance with the manufacturer's recommended rate of coverage.
  - a. The penetrating concrete sealer, after finished application, shall not darken, stain or discolor the treated concrete.
  - b. Application of the sealer shall not alter the surface texture or forms a film or coating on the surface, and shall be compatible with the concrete pavement joint materials.
  - c. AASHTO T 259 Resistance of Concrete to Chloride Ion Penetration

Sealer-treated test specimens shall exhibit the following average values when an average of 0.125 inches of the treated concrete specimen has been abraded from the surface to simulate 10-12 years of traffic wear. Abrasion will be performed after treatment with sealer; and before ponding with chloride solution.

Test	Duration	Average Absorbed CL	Method Used
Salt Water	90 Days	2.50 lbs per cubic yard	AASHTO T 259
Ponding	2160 Hours	Depth of Measurement: 1/16" to 1/2"*  0.04 lbs per cubic yard Depth of Measurement: 1/2" to 1.0"	AASHTO T 260

\*Based on abraded concrete specimens.

d. ASTM C 672 Scaling Resistance of Concrete Surfaces

Sealer-treated test specimens shall exhibit a 0 (zero) scale reading, and an improvement over untreated specimens after completion of a minimum of 50 freeze-thaw cycles; or until a difference between treated and untreated specimens develops. Example after 50 cycles:

<u>Specimen</u>	<u>Scale Rating</u>
Untreated	2+ (light to moderate scaling)
Treated	0 (no scaling)

e. AASHTO T 161/ASTM C 666 Resistance of Concrete to Rapid Freezing and Thawing.

Treated specimens shall demonstrate equal or better durability to surface scaling than the frost resistant concrete used as a control upon completion of the test after a minimum of 300 freeze-thaw cycles.

Example:

<u>Cycles</u>	<u>Control</u>	<u>Treated</u>
146	Slight	None
237	Slight	Slight
480	Slight	Slight

f. ASTM C 501 Relative Resistance to Wear

Treated test specimens shall meet or exceed the improvement percentages as specified below on nominal 3,000 psi concrete after 1,000 revolutions:

<u>Specimen</u>	<u>Avg. Abrasive Wear Index</u>	<u>Avg. Depth of Wear</u>	<u>Avg. Absolute Weight Loss</u>
Treated	27.4	.026 in	3.227 gm
Untreated	19.9	.033 in	4.525 gm
Improvement	37.7%	21.2%	28.7%

g. ASTM C 882 Bond Strength of Epoxy-Resin Systems Used with Concrete

Test results shall demonstrate bond strength of treated samples equal to untreated samples used as a control.

h. Depth of Penetration

Depth of penetration shall be a minimum of 1/8 in. as demonstrated by successful testing in accordance with AASHTO T 2590 (based on abroad specimens).

2. The concrete sealer to be used shall be SINAK Concrete Sealer or Approved Equal. To be considered equal, the Contractor must submit the following with his bid. Products submitted after the bid date will not be considered.

- a. Verifiable evidence from approved independent laboratory(s) confirming that the material proposed for consideration meets or exceeds the test criteria of each and every test set forth in this specification. Any product that does not meet or exceed the results of all tests will not be considered.
- b. A written certification from the manufacturer that the material proposed for consideration meets all of the other requirements of this specification as listed in paragraph B above.
- c. The manufacturer's application instructions and procedures, and rate of coverage shall be included with all submittals for consideration.

C. Surface Preparation

The Contractor shall prepare surfaces to be sealed by thoroughly cleaning same with mechanical sweepers of an approved type and with wire brooms where necessary. To be clean, the surfaces shall be free of sand, clay, dust, salt, grease, oil and other foreign matter that might adversely affect the penetrating capability of the sealer.

D. Application of Concrete Sealer

1. Equipment to be used shall be as recommended by the manufacturer and shall include a low pressure airless or gravity type sprayer with an application pressure of approximately 40 psi, using a spray tip large enough to deliver an even fan spray without misting.
2. Application of the concrete sealer shall be recommended by the manufacturer and in accordance with the following:

The application shall consist of two coats minimum. Each coat shall be in a light, even coat that shall be allowed to dry completely before continuing application. If a light sheen is visible when the second coat is dry, stop sealer application, and proceed to the water spray application.

If no sheen is visible when the second coat is dry, repeat coats until a light sheen is apparent. Immediately after the final seal coat has been applied and allowed to dry, a light, even water-spray shall be applied to all treated surfaces to ensure complete penetration of the sealer. If a sheen is still visible after the water coat has dried, additional water coats shall be applied until the sheen is no longer evident and the concrete finish appears dull.

Coverage rate for SINAK Concrete Sealer S-102 will generally average 300-500 square feet per coat. The manufacturer or approved distributor will be present during the application of the first 1,000 square feet application to insure proper application procedures are followed. Based upon the first 1,000 square feet application, the manufacturer (or distributor) and the project Engineer will agree upon a coverage rate to use for both coat within the range noted above.

**E. Weather Limitations:**

Sealer should not be applied when temperatures are below 40 degrees F or are expected to fall below 32 degrees F within 24 hours or when rain is forecasted within 24 hours.

**F. Method of Measurement:**

Concrete Sealer: The quantity to be paid for will be measured by the actual number of square yards of accepted pavement sealed with concrete sealer in accordance with this section of the specifications.

**G. Payment:**

The quantity as provided above shall be paid for at the applicable contract price per unit of measurement, which price and payment shall be full compensation for all materials, labor, equipment, tools, and incidentals necessary to complete the work required by this section of the specifications.

**D-29 ASPHALT CONCRETE ITEM 301, 446 AND 448**

Asphalt Concrete shall comply with ODOT Item 301, 446, and 448, PG64-22, unless specified different on the bid form, plans or supplemental specifications.

Recycled material shall be limited to wearing course maximum of 10%, intermediate course maximum of 20% and bituminous base course maximum of 30%.

### Gutter Seal

Unless otherwise specified or permitted, gutters shall be sealed with the same type of asphalt cement used in the concrete mixture for a distance of 4 inches from the curb. The seal shall be applied at a uniform rate and width by the means of a squeegee or distributor in such a manner that no excess material will be left on the surface. The asphalt gutter seal shall be applied at a temperature between 300 degrees Fahrenheit and 350 degrees Fahrenheit immediately upon the completion of the surface course.

The cost of the gutter seal applied as herein specified shall be included in the price per square yard for surface course bid by the Contractor.

### **D-30 BACKFILL MATERIAL (ITEM 603, SPECIAL)**

The use of "Flowable Fill" (Item 603, Special) as specified herein is required for all backfill operations in the right-of-way; #304 may be used at the direction of the Commissioner of Engineering & Construction.

All backfill material used under any pavements shall be crushed limestone or gravel as per ODOT Item 304 - Aggregate Base. Crushed air-cooled slag meeting # 304 gradation may be used with prior written approval of the Engineer. The use of sand or # 57 aggregate as premium backfill is prohibited. Sand may only be used as indicated on the plan details for items such as conduit cover, etc. The backfill shall be installed in 4 inch (4") lifts and compacted using mechanical means only. The use of water for compaction is prohibited. E.g. flooding or puddling. Sand used as embankment construction and as backfill around structures shall be ODOT Item 203 - Embankment or meeting the requirements of 703.11 Special Backfill Material of this section.

### **D-31 BACKFILL MATERIAL - FLOWABLE FILL SPECIFICATION FOR UTILITY TRENCHES (INSIDE OF PAVEMENT AREA) (ITEM 603, SPECIAL)**

#### PART 1: CERTIFICATE OF COMPLIANCE

Material must come from a plant with a current Certificate of Compliance demonstrating the ability of the mix design to meet the specified requirements. Certificates in excess of one year will not be accepted. Certificates must contain the name of supplier, date, contract number and mix design data on each delivery ticket.



## PART 11: MATERIALS

All materials shall conform to the applicable requirements stated herein.

1. Cement shall be ASTM C-150 Type I.
2. **The use of Fly Ash is strictly prohibited.**
3. Fine Aggregate shall conform to ODOT Specification 703.03 Fine Aggregate for Mortar or Grout. (ODOT Construction and Materials Specifications most current edition). The use of spent foundry sand or core sand is strictly prohibited.

## PART III: PERFORMANCE ENHANCING ADMIXTURE

An air-enhancing admixture shall be incorporated in the mix that will have the effect of lowering the water/cement ratio to between 95 and 105 lbs/cubic foot. The air entrained content for the mix shall be 30% to eliminate/minimize the excessive water and segregation. Compressive strengths shall have a range of 50 PSI to 80 PSI at 28 days will be required if additional excavation by machine or hand is required.

Approved Admixtures

<b>Manufacturer</b>	<b>Product Name</b>
a) Master Builders	Rheofill
b) Axim	Flow Air
c) W.R. Grace	DaraFill
d) Or approved equal	

## PART IV: FLOWABLE FILL MIX DESIGN

The mix design shall be proportioned as follows:

Cement (Type I)	50lbs/cubic yard
Sand (SSD)	2475 lbs/cubic yard
Water	25 gallons/cubic yard
Admixture (Air)	3 oz/cubic yard

## PART V: APPLICATION

- Flowable fill shall begin 12 inches above the top of pipe and continue in the trench to the concrete base.
- Material for pipe bedding and pipe zone to a maximum depth of 12 inches over the top of pipe shall be as specified by the utility.
- Exposed bolts and valves exposed in the trench should be wrapped with polyethylene material conforming to ODOT 748.07 (8 mil thick).

- Cover all joints in existing clay pipe in the trench area with polyethylene material before pouring flowable fill. Repair all observed openings in any pipe or manhole in the trench area prior to backfilling with flowable fill. Repair techniques shall be in accordance with the utility company's standard repair procedures.
- Contact the respective utility owner for repair procedures.

#### 703.11 SPECIAL BACK FILL MATERIAL

Material used for backfilling trenches (outside of pavement area) and for such similar purposes as may be specified shall consist of hard, durable particles of a natural or artificial aggregate, such as gravel, sand, crushed air-cooled slag. At least eighty-seven percent (87%) by weight of the grains or particles shall be retained on a No. 200 sieve.

It shall be of such character that it can be placed in four (4) inch layers, loose depth.

It shall be substantially free from vegetable or organic matter and shall not contain more than ten percent (10%) of loam or clay as determined by decanting over No. 200 sieve.

Except in the case of slag, backfill material shall weigh not less than ninety (90) pounds per cubic foot, dry compacted weight.

#### **D-32 PIPE CULVERTS, SEWERS AND CONNECTIONS (ITEM 603)**

~~This items shall consist of the construction or reconstruction of sewers of the size and at the locations shown on the plans. The construction shall conform to the requirements of ODOT Item 603. Conduit to be used shall be item 706.08 ≤18" Extra strength Vitrified Clay pipe with 706.12 joints and >18" shall be Item 706.02 Reinforced Concrete Pipe Class III with item 706.11 joints. The conduit used for catch basin connection shall be in accordance with ODOT Item 603 — Pipe Culverts, Sewers, and Drains. — Backfill material shall be as per D-30. The backfill shall be compacted using mechanical means only; the use of flooding or puddling is prohibited. Payment shall be based on the accepted linear feet of pipe complete in place for the sizes and types of pipe indicated. Price bid per Linear Foot of pipe shall include costs of all bends and joints.~~

#### **D-33 CROSSING AND CONNECTIONS TO EXISTING PIPE AND UTILITIES**

- A. Where plans provide for a proposed conduit to be connected to, or cross over or under an existing sewer or underground utility, the Contractor shall locate the existing pipes or utilities both as to line and grade before starting to lay the proposed conduit.

- B. If it is determined that the elevation of the existing conduit, or existing appurtenance to be connected, differs from the plan elevation or results in a change in the plan conduit slope, the Engineer shall be notified before starting construction of any portion of the proposed conduit which will be affected by the variance in the existing elevations.**
- C. If it is determined that the proposed conduit will intersect an existing sewer or underground utility if constructed as shown on the plan, the Engineer shall be notified before starting construction of any portion of the proposed conduit which would be affected by the interference with an existing facility.
- D. Payment for all of the operations described above shall be included in the contract price for the pertinent 603 conduit item.

**D-34 CATCH BASINS (ITEM 604)**

This item shall consist of the construction of catch basins as located on the plans and as per the City of Cleveland Standard details. If the catch basin is to be installed in the same location that has an existing catch basin, then the removal of the existing catch basin is included in the catch basin pay item for installing a new catch basin. If a pay item for removal of the catch basin is included then payment will be made accordingly. The construction shall be in accordance with Item 604. Payment will be based on as per each basis of completed and accepted catch basins. Catch basins and connections shall be free of all debris before final acceptance, under this section, at no additional cost to the City.

**D-35 CLEAN CATCH BASINS AND CONNECTIONS (ITEM 604, SPECIAL)**

The work performed under this item of these specifications shall include cleaning the catch basin trap, and catch basin connection to the main sewer.

This work shall be performed by the use of equipment and methods intended for the purpose of cleaning catch basins and their appurtenances.

Prior to accepting this project the Engineer reserves the right to test catch basins, which have been cleaned. This test shall use the flow from a three inch (3") or larger fire hose as directed by the Engineer. The cost associated with performing said test shall be included in the bid price for cleaning catch basins.

The Contractor shall be paid at the price bid for each catch basin/manhole cleaned under "Item 604 - Clean Catch Basin".

**D-36 PRE-CONSTRUCTION VIDEO TAPING OF RIGHT OF WAY**

Prior to the delivery of any materials or supplies to the site of any work, or to the beginning of any of the construction work, the Contractor shall provide Preconstruction Audio-Video Taping for the purpose of establishing the surface conditions existing in all areas affected by the work. Video taping shall include, but shall not be limited to, driveway, driveway apron, and basement window, especially, the area where a temporary connection might be made or where a temporary hose might go through a basement window. Two passes in each direction are required to complete this activity; one focusing on Right Of Way and one focusing on private property. The Preconstruction videography shall be performed by an independent company having had previous experience in similar type of work. The name of the company shall be submitted to the City for approval prior to engaging the work. The Contractor shall provide one copy of the Preconstruction videography to the City and one copy for themselves. The full cost of furnishing all labor, materials and equipment to perform the required audio-video taping as described herein shall be included for payment in the Lump Sum Bid for Preconstruction Videography.

#### **D-37 CLEAN AND TELEWISE CONDUIT (SEWER)**

Television inspection of sewers shall consist of obtaining an internal photographic record in color of sewers requested by the City. Sewers forty-eight inches (48") in diameter and larger, in addition to televising, shall be visually inspected.

A three-quarter inch (3/4") video cassette shall be used. The report, covering the video tape, shall be considered as an integral part of the service and shall, in no case be deleted from the record. Three copies of the tape and report are required.

The sewer shall be cleaned of all debris, including roots and other obstructions, prior to inspection by water jetting the line. The length of the sewer to be televised and paid for will be the actual linear feet measured along the center line of the sewer with no deductions being made for manholes or junction chambers. The accepted quantity for sewer line televised and cleaned, regardless of size of the sewer, will be paid for at the quoted unit price per linear foot. The item shall be paid under the Bid Item "Clean and Telewise Conduit (Sewer)". This item shall only be performed as directed by the Engineer.

#### **D-38 CATCH BASIN RECONSTRUCTED TO GRADE (ITEM 604)**

This item of work shall be performed as per ODOT Item 604-Manholes and Catch Basins except as modified herein:

- a) The concrete used for this item of work shall conform to the concrete design mix section of these specifications.
- b) If the backplate is missing it shall be replaced. The casting is to be reinstalled if in reusable condition. The casting, once removed and the reconstruction work

completed, shall be reset at the elevation necessary for repaving.

Payment for the work shall be under Item 604 - Catch Basin Reconstructed to Grade

**D-39 ADJUSTING STREET CASTINGS (ITEM 604)**

All manhole, catch basins, water meter manholes, valve boxes and Cleveland Public Power castings shall be brought to proper grade by the Contractor by adjusting said castings with mortar, brick, or stone masonry as may be directed. No adjusting rings or bands will be permitted.

The Contractor shall use extreme care in the removal and adjustment of the castings. The contractor shall remove existing pavement as required to adjust the casting and shall replace same with Job mix "high early strength" concrete.

Unless otherwise directed by the City, all castings shall be brought to grade after the binder or leveling course is placed and before the wearing course is placed.

Castings belonging to private utilities shall be adjusted to grade by such utilities and does not constitute a part of the Contractor's obligations. However, Contractor is responsible for coordinate such work.

The price paid for bringing each street casting to line and grade shall be the Contractor's unit price bid for each and shall include all labor and material necessary for this work.

Care shall be exercised in moving the castings so as not to damage the casting or the structure. Damaged castings or structures shall be repaired or replaced at the Contractor's expense.

If the engineer changes the structure elevation by one foot it shall be paid for under the appropriate item. Valve boxes and other castings extending 1 foot below grade that, in the judgment of the engineer, require replacement, shall be replaced with a new casting. Payment will be the cost of casting adjustment plus miscellaneous metal furnished.

Items outlined shall be paid for under Item 604 - Adjusting Street Castings to Grade.

**D-40 MONUMENT ASSEMBLIES, (ITEM 604)**

Any person, Contractor, utility, or governmental agency, herein referred to as the Contractor, disturbing, removing and/or replacing pavement in the City of Cleveland's Public Right-of-Way shall provide information as to the type of work and the limits of the work to the City of Cleveland Chief Surveyor prior to performing such work. The Chief Surveyor will determine which monuments, if any will be affected by the work.

Where New Monument Assemblies are to be constructed, the Contractor shall furnish the following for each assembly as detailed on the City of Cleveland's Monument Box & Assemblies Standard Construction Drawing MB-1C: One(1) Cleveland Monument Box Assembly, One(1) one inch diameter epoxy steel deformed reinforcing bar thirty-six inches (36") long, flat on top with a round pointed end.

All Monuments Existing and Proposed must be referenced prior to construction. A minimum of 3-Ref. Pts. per Mon. must be used and must be located outside of the Construction Zone ("Work Area"). Care and Protective Measures shall be employed by the Contractor to Preserve Existing Monuments. All monuments disturbed and/or destroyed shall be reset as detailed on the City of Cleveland's Monument Box & Assemblies Standard Construction Drawing MB-1C. The Contractor shall use Competent Personnel and Suitable Equipment for the work required by this Detail Specification. All work shall be done by said Competent Personnel under direct supervision of a Professional Surveyor, Licensed and Registered to practice in the State of Ohio. Said Surveyor and Competent Personnel shall be hired by the Contractor.

Prior to beginning any work a copy of all Survey and Reference Notes is to be sent to the Attention of the Chief Surveyor at the City of Cleveland, Department of Public Service, Division of Engineering and Construction, 601 Lakeside Ave. Room 518, Cleveland, Oh. 44114. (216) 664-2460.

For monuments outside the Contractor's "Work Area", but near enough to the "Work Area" that may be disturbed for any reason, the Contractor shall be responsible for the replacement as if the monument were originally inside the "work area" as herein specified.

The Contractor shall perform all other operations necessary to complete this work item, such as pavement removal, excavation, setting the box to grade and pavement replacement. All work completed and accepted shall be paid for by the unit price bid for Monument Box Assemblies (Item 604).

All work shall be included and paid for at the bid unit price per Monument Assembly.

**D-41 MONUMENT BOX ADJUSTED TO GRADE OR REPLACED (ITEM 604)**

Where Monument Boxes are both suitable for re-use and conform to the City of Cleveland's Monument Box & Assemblies Standard Construction Drawing MB-C1, they shall be adjusted to grade as required and specified.

Where the plans call for the existing monument boxes to be replaced, the Contractor shall remove the existing monument box and replace it as detailed on the City of Cleveland's Monument Box & Assemblies Standard Construction Drawing MB-1C; set to proper grade.

In addition to adjusting the casting vertically this pay item shall include centering the casting over the existing iron pin or stone. The entire monument box casting shall be adjusted to grade; no inserts or adjusting rings will be permitted.

If the existing iron pin or stone is either missing or damaged, a new monument assembly, as per D-40 shall be installed and paid for as a monument assembly.

All Monuments Existing and Proposed must be referenced prior to construction. A minimum of 3-Ref. Pts. per Mon. must be used and must be located outside of the Construction Zone ("Work Area"). Care and Protective Measures shall be employed by the Contractor to Preserve Existing Monuments. All monuments disturbed and/or destroyed shall be reset as detailed on the City of Cleveland's Monument Box & Assemblies Standard Construction Drawing MB-1C. The Contractor shall use Competent Personnel and Suitable Equipment for the work required by this Detail Specification. All work shall be done by said Competent Personnel under direct supervision of a Professional Surveyor, Licensed and Registered to practice in the State of Ohio. Said Surveyor and Competent Personnel shall be hired by the Contractor.

Prior to beginning any work a copy of all Survey and Reference Notes is to be sent to the Attention of the Chief Surveyor at the City of Cleveland, Department of Public Service, Division of Engineering and Construction, 601 Lakeside Ave. Room 518, Cleveland, Oh. 44114. (216) 664-2460.

Payment for the above work shall be made under Item 604 - Monument Adjusted to Grade or Item 604-Monument Replaced and Set to Grade.

**D-42 4" UNCLASSIFIED PIPE UNDERDRAIN (ITEM 605)**

In addition to the applicable work and materials described under Item 605 of the Construction and Materials Specifications, the unit price bid for this item shall also include, but not be limited to, the following:

A. All labor and materials required to outlet the underdrain into the catch basins, in conformance with 605.06.

- B. Furnishing and installation of filter fabric, in conformance with 605.02.  
Payment for the all of the above work shall be included in the contract unit price bid for Item 605, 4" Unclassified Underdrain.

**D-43 UNDERDRAIN, MISC.: EDGEDRAIN (ITEM SPECIAL)**

Work Included

~~The contract unit price bid for this item shall include all labor, equipment, tools and incidentals necessary to furnish and install the geocomposite edgedrain system, including fittings, as shown on the drawings and as specified herein.~~

~~Edgedrain shall be used at locations where the precast concrete curb is being installed, as directed by the Engineer.~~

Material

- A.) ~~The geocomposite edgedrain shall be "AdvanEDGE" as manufactured by (or approved equal):~~

~~Advanced Drainage Systems, Inc.~~

~~3300 Riverside Drive~~

~~Columbus, Ohio 43221~~

~~Phone: (614) 457-3051~~

- B.) ~~Edgedrain shall be panel shape pipe, 12" high.~~
- C.) ~~Edgedrain backfill material shall conform to 605.03(c). Limits of the edgedrain backfill are as shown on the drawings.~~
- D.) ~~At either end of the edgedrain, the Contractor shall furnish and install an end outlet fitting. All costs in connecting the edgedrain to the underdrain shall be included in the unit price bid for this item.~~

**D-44 DRIVEWAY ACCESS (ITEM 614)**

This work shall be in conjunction with Item 614 - Maintaining Traffic and all costs incurred for this item shall be included in the lump sum bid for Maintaining Traffic - NO ADDITIONAL PAYMENTS WILL BE MADE. Access to all property owners, including residences and businesses, shall be made available at all times during construction.



The Contractor shall make available during the construction, steel plates, bridges or other means approved by the Engineer to bridge across the half width roadway construction, to provide full time (24 hours-7 days a week) access to driveways that require it.

The contractor shall submit to the engineer for approval, at the pre-construction meeting, his proposal for providing access to the driveways.

For estimating purposes the number of drive aprons to be maintained should be the number of driveways in each construction phase

**D-45 FIELD OFFICE (ITEM 619)**

The field office shall be as per ODOT Item 619 - Field Office Type B or Type C, except as modified below:

- a) It shall meet all the requirements of C-9 (Field Office) of Part C - Supplemental General Conditions Field Office of the specifications.
- b) Three all weather parking spaces are required for the exclusive use of the City.
- c) Two telephone lines with the second line shall be connected to a plain paper fax machine. The fax machine furnished shall also be able to be used as second telephone. Phones provided shall be two line speakerphones with conferencing ability. Voice Mail service shall be included. The cost of the fax machine and Voice Mail service shall be included in the cost of the field office.
- d) The contractor shall furnish a mobile phone for the use of the City Inspector for the duration of the project. The cost of the telephone shall be paid for under the Mobile Phone Bid Item.
- e) The Contractor shall provide all office supplies needed by the City Inspector.
- f) Copy machine capable of enlarging/ reducing images to 11" x 17"

Payment for this item of work shall be unit bid price per month for Item 619 - Field Office (Type B or Type C).

#### **D-46 COMPUTER EQUIPMENT (ITEM 619, SPECIAL)**

The contractor shall furnish, install and maintain the following items for the life of the contract. All items furnished shall be for the exclusive use of the Engineer and staff and shall be operable by the first day of work.

This system shall not experience down time exceeding 48 hours from notification by the Engineer. The contractor shall replace stolen, vandalized, or units otherwise inoperable within 48 hours after notification by the Engineer. Upon completion of the contract, the hardware and software furnished by the Contractor shall either become the property of the City or remain the property of the Contractor as indicated by the unit bid price.

Item 619 – Computer Equipment for City ownership – lump sum  
item 619 – Computer Equipment for City use – per month

The Contractor's failure to provide equipment as required below may result in the withholding of payment estimates.

#### **Computer Hardware**

##### **Type A, B, C Offices**

One (1) personal computer consisting of and including the following:

- (1) One IBM PC compatible notebook or desktop (as directed by the City) computer with an Intel processor operating at least 2 GHz or the current speed available as directed by the City. This computer shall be provided with the following as a minimum:
  - a. 200 Gig. Hard Disk
  - b. 1 Gig. DDR SDRAM
  - c. Multiple media reader drive
  - d. 16x DVD-ROM and 40 x 10 x 40 CD-RW or higher
  - e. one 56k Hayes compatible internal modem, broadband, DSL or approved equal
  - f. Active Matrix VGA color display
  - g. one parallel port and one serial port
  - h. one built in trackball (or equivalent)
  - i. one docking station, including 19" Flat-Tube monitor if not notebook or approved equal
  - j. AC adapter and two (2) rechargeable batteries
  - k. Operating system- Windows XP Professional
  - l. Software- MSOFFICE Professional latest edition.
  - m. Norton System Works Professional ( Current version) or approved equal

- (2) Computer and hardware maintenance agreement with a minimum four (4) hour on-site maintenance for all hardware stated here lasting for three years.
- (3) Hewlett Packard LaserJet HP 1200se or DeskJet 1220c/ps (as directed by the City), or approved equal, and parallel printer cable.
- (4) Surge protector, 15 amp six (6) outlet with circuit breaker control and surge indicator light.

**D-47 CONSTRUCTION LAYOUT STAKES (ITEM 623)**

This item of work shall be performed as per ODOT Item 623 and as modified below:

- a) Contractor shall furnish dimensions, measurement, sketches, etc. necessary to determine pay quantities. This will mainly apply to change orders, quantities to be used as directed and disputed payment quantities or calculations.
- b) The Contractor shall be responsible for providing all necessary surveying, calculations and/ or layout not furnished in the bid documents to comply with the Engineer's direction. Contractor shall provide cut sheets, temporary benchmarks, and layout (including stationing and hubs) as directed by the Engineer or his representative. All stationing and reference marks shall be maintained as directed by the Engineer or his representative.
- c) The Contractor shall use competent personnel and suitable equipment for the layout work required and shall provide that it be done under the supervision of a Registered Surveyor, licensed to practice in the State of Ohio.
- d) The Contractor is to provide "As-Built" Drawings showing all elevations and inverts, locations of roadways both horizontal and vertical. These drawings and/or CAD drawings shall be drawn on Mylars or Cad files (if available) provided by the City. The Inspector shall sign the sheets verifying that all changes have been shown on the "As-Built" drawings. The Inspector is not responsible for the accuracy of the locations or elevations. All elevations and locations are to be certified by the Registered Surveyor, licensed to practice in the State of Ohio.
- e) Payment for the above work shall be included in the lump sum bid price of Item 623- Construction Layout Stakes.
- f) Failure to comply with these provisions may incur a penalty of 10% reduction in the Bid Item "Construction Layout Staking" per failure to comply. Upon compliance that reduction may be restored by the Engineer. Final contract payment will not be processed until "As-Built" drawings are submitted and accepted by the City.

**D-48 SIGNAL SUPPORT FOUNDATION, AS PER PLAN (ITEM 632)**

The Contractor shall protect pedestrians and vehicles from exposed anchor bolts AT ALL TIMES until the associated signal support is erected. The method of covering the anchor bolts shall be approved by the engineer.

All costs associated with the procedures as outlined above shall be considered incidental to the cost of the unit price bid (each) for item 632-SIGNAL SUPPORT FOUNDATION, AS PER PLAN

#### **D-49 MAINTENANCE OF TRAFFIC SIGNAL/FLASHER INSTALLATIONS**

The Contractor shall be responsible for maintaining traffic signal installations within the project under the following conditions:

A) New signal installations or devices, installed by the Contractor. The Contractor shall be responsible for maintenance of these from the time of installation until the work is accepted.

B) Existing signal installations or devices installed or modified by the Contractor. The Contractor shall be responsible for maintenance of these from the time of initial installation or modification until the work is accepted.

The Contractor shall correct as quickly as possible all outages or malfunctions. He shall provide the city and the engineer such addresses and phone numbers where his maintenance forces may be contacted. The Contractor shall provide one or more persons to receive all calls and dispatch the necessary maintenance forces to correct outages. Such a person or persons may be used to perform other duties as long as prompt attention is given to these calls and a person is readily available continuously 24 hours a day, 7 days a week. All lamp outages, cable outages, electrical failures, equipment malfunctions and misaligned signal heads shall be corrected to the satisfaction of the Engineer with the signal back to service within eight (8) hours after the Contractor has been notified of the outage.

In the event new signals are damaged prior to acceptance all damaged equipment shall be replaced by the Contractor to the satisfaction of the Engineer. The signal shall be back in service within eight (8) hours after the Contractor's notification of the outage or malfunction.

If poles and/or control equipment are damaged and must be replaced, the contractor shall make temporary repairs as necessary to bring the signal back into full operation within the allowed 8-hour period, and shall make permanent repairs or replacement as soon thereafter as possible.

None of the above shall be construed as collective or consecutive outage time periods at any one location. That is, where more than one outage occurs at any one location,

then the allotted time limit shall be for the worst single outage.

Where outages are the direct result of a vehicle accident, the response of the Contractor shall be as outlined above. The Contractor shall be responsible for collection of any compensation for this work from those parties responsible for the damage.

Where the Contractor has failed to or cannot respond to an outage or signal equipment malfunction at these locations within his or her responsibility, within periods as outlined above, the Engineer may invoke the provisions of section 105.15 and any subsequent billings by the State or the City of Cleveland for police service and/or maintenance services by state and/or City forces shall be deducted from monies due or to become due the Contractor in accordance with provisions of section 105.15.

The Contractor shall provide the maintenance service entirely with his forces or he may choose to enter into a cooperative understanding with the local maintaining agency to provide the maintenance. The Contractor shall inform the Engineer, in writing, of the maintenance method selected.

Any vehicular traffic signal head, either new or existing, which will be out of operation, shall be covered in the manner described in section 632.25.

All cost resulting from the above requirements shall be considered to be included in the lump sum price bid for item 614-MAINTAINING TRAFFIC.

#### **D-50 POWER SERVICE (Traffic Control)**

Electric power shall be obtained from Cleveland Public Power (CPP) at the location indicated on the plans. Power supplied shall be 120 volts. All power cables shall be rated for 600 volts and consist of No. 6 AWG copper. All connections of power cable to equipment shall be by means of approved solderless type connectors. The solderless connections are to be taped. Power service shall also include 2" conduit risers where necessary.

The Contractor shall meet on site with CPP three (3) days prior to construction. Contact Fred Rodriguez at (216) 664-6640, Ext. 173 to make arrangements.

#### **D-51 CONDUIT 2", 3" OR 4" (ITEM 625)**

All conduit installed under pavement in this project for traffic signals shall be concrete encased. Conduit shall be schedule 40 and conform to Ohio Department of Transportation's specification 625.12.

**D-52 SIGNALIZATION MISC.: FOUNDATION TEST HOLES**

If underground obstructions are encountered that preclude use of the standard or alternate foundation designs, the Contractor shall provide the Engineer with complete information regarding the obstruction including type (i.e. utility), size, depth and lateral clearances to the sides of the foundation excavation. The foundation hole shall be covered with a steel plate (3/4" plywood in pedestrian accessible areas) until the Engineer determines if a new foundation location will be required. If subsequently directed by the Engineer, the Contractor shall backfill and compact the hole and restore the surface as described in "RESTORATION OF DISTURBED AREAS."

The Contractor shall be compensated for each foundation hole that must be abandoned. Payment for all labor, materials, tools, equipment and other incidentals, including back fill compacting and surface restoration shall be at the contract unit price bid for Item "632 – SIGNALIZATION MISC.: FOUNDATION TEST HOLES" for the number excavated and backfilled. The following quantity is estimated:

<u>ITEM</u>	<u>TOTAL</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
632	1	EA.	SIGNALIZATION MISC.: FOUNDATION TEST HOLES

**D-53 SIGN LIGHTING MISC.: SIGN LIGHTING CABLE (ITEM 631)**

Cable for overhead sign lighting shall be field determined by the Engineer.

**D-54 LIGHTING MISC.: LUMINAIRE LIGHTING CABLE (ITEM 625)**

Cable for luminaires shall be field determined by the Engineer.

**D-55 POWER CABLE MISC.: POWER FOR SIGN LIGHTING (ITEM 632)**

Power cable for overhead sign lighting shall be field determined by the Engineer.

**D-56 POWER CABLE MISC.: POWER FOR LUMINAIRE LIGHTING (ITEM 632)**

Power cable for luminaires shall be field determined by the Engineer.

**D-57 POWER CABLE MISC.: PUSHBUTTON CABLE (ITEM 632)**

Cable for pedestrian pushbuttons shall be per manufacturer's requirements.

**D-58 GROUND ROD (ITEM 625)**

All ground rods shall be 1" diameter, copper clad steel. All ground rods are to be bonded electrically to the foundation reinforcement. Ground rods shall comply with Ohio Department of Transportation specification 625.09.

**D-59 TEMPORARY FACILITIES & CONSTRUCTION IN THE PEDESTRIAN ACCESS ROUTE**

An alternate pedestrian circulation path shall be provided whenever the existing pedestrian access route in the public right-of-way is blocked by construction, alteration and maintenance or other temporary conditions. The alternate pedestrian circulation path shall comply with the Americans with disabilities accessibility guidelines (ADAAG) and signage shall be installed in accordance with the MUTCD.

**D-60 CONTROLLER ACTUATED, 8 PHASE SOLID STATE DIGITAL MICROPROCESSOR (ITEM 633)**

Traffic signal controller:

The purpose of this specification is to define the minimum operating requirement and characteristics for a NEMA TS1-1983 standard, and all adopted revisions, microprocessor based traffic signal controller and cabinet. Exceptions to this specification must be included with the bid. Unacceptable exceptions and/or substitutions by any bidder will result in rejection of that bidder's bid. Failure to comply with this provision may be considered cause for better declaring the contract in default.

General requirements:

The controller shall meet or exceed all requirements set forth by the institute of transportation engineers, the Manual of Uniform Traffic Control Devices, Latest Edition, and the NEMA TS1-1983 standards and all adopted revisions. All controllers shall be completely compatible with the latest edition of approved closed loop software for the existing city of Cleveland's closed loop system.

All circuit components such as transistors, diodes, integrated circuits, resistors, capacitors, etc., shall be commuter-grade quality. No vacuum tubes, relays or stepping switches shall be permitted. Integrated circuits shall be socket mounted. All components shall be identified with manufactures' part number for availability. No custom components, except for software and programmable chips, shall be permitted.

Overlaps shall be internally generated. Overlaps shall be user selectable using a standard NEMA program overlap card and wire jumper straps located within the controller unit in accordance with NEMA TS1-1983, Figure 14.3-6 or through internal programming. If internal programming is anticipated, the manufacturer shall still provide the NEMA overlap card with jumpers.

There shall be complete phase skip capability of any phase without a valid detector call.

The controller shall be capable of accepting a call from any standard vehicle or pedestrian detector without the use of special external isolation devices.

All timing shall be based on the 60 HZ frequency. All components on printed circuit boards shall have their identification permanently labeled on the circuit board in a manner so as not to be obscured by component mounting.

All required programming parameters required by this specification shall be user entered by means of front panel keyboard(s).

Programming of the controller shall be according to standard NEMA sequence charts, unless otherwise stated by the bid document.

The controller shall be designed to operate in standard traffic control cabinet without the need for environmental control devices other than a standard cabinet fan and ventilation vents in the controller housing cabinet.

All user entered data shall be stored in EEPROM devices which shall preclude the need for any battery or battery operated devices. Only the real-time clock for the time-based coordination shall utilize a battery. All user-entered data stored in the EEPROM shall be permanently stored in the devices. Loss of controller operation power shall not alter the values of EEPROM.

EEPROM shall be provided in addition to any other type of memory device or chip. The following front panel indicators shall be provided:

- A) Phase in service (per phase)
- B) Phase next (per phase)
- C) Detector call (Per phase)
- D) Pedestrian call (per phase)
- E) Gap termination (per phase)
- F) Max green termination (per ring)
- G) Max green two in effect (per ring)
- H) Termination by force off (per ring)
- I) Det lock/non lock (per ring)
- J) Hold (per ring)

There shall be means for user entry of the following via front panel switches on the



keyboard:

Per phase selection of:

- 1) Minimum recall
- 2) Maximum recall
- 3) Pedestrian recall
- 4) Phase non-actuated
- 5) Detector lock/non lock

Timer display shall be a quality back light liquid crystal.

Coordination:

Unless otherwise specified in the plans and/or bid documents, controllers shall be furnished with coordination capability contained internally within the controller unit.

The coordination capabilities shall provide as a minimum three (3) cycles, three (3) offsets, and three (3) splits.

Force-off and begin/end yield points shall be programmable by the user with respect to the local or system cycle as appropriate. There shall be a minimum of two permissive yield periods available.

The phases which are to be the coordinated phases shall be programmable by the user and are to be independently selectable in each ring.

The external coordination inputs which shall be accepted by the controlled unit through the addition of a fourth or "D" connector shall be as follows:

- A) Cycle 2
- B) Cycle 3
- C) Offset 1
- D) Offset 2
- E) Offset 3
- F) Split 2
- G) Split 3

The coordination cable for the fourth or "D" connector on the controller unit shall be terminated on a termination panel containing the required number of barrier terminal strips. This panel shall be mounted on the right sidewall of the cabinets. All terminals shall be clearly numbered.

Communication/coordination harness and panel shall be provided with each cabinet and shall be located in the lower sidewall of controller cabinet. Surge protection devices shall be provided.

Cabinet:

The cabinet shall be weather-tight construction fabricated from sheet aluminum (0.125"). All welds on fabricated cabinets shall be internal and continuous; spot welding is not acceptable. The cabinets shall be white inside and bronze (brown) on the outside.

The cabinet shall be equipped with properly rated circuit breaker(s) conforming to the national electrical code to accept No. 6 AWG wire.

There shall be two properly rated circuit breaker(s) conforming to the national electrical code to accept No. 6 AWG wire.

There shall be two properly rated circuit breakers for the following:

- 1) One breaker shall provide service for the controller, conflict monitor, load switches, fan and other controller appurtenances.
- 2) One breaker shall provide service for the cabinet light, convenience outlet and fan.

The cabinet shall be of suitable size to allow access to all cabinet terminals for installation and maintenance with shelf space for all provided equipment and one detector amplifier per phase.

The cabinet shall have a field test panel equipped with the following switches:

- A) Per phase detector simulation for momentary call.
- B) Per phase pedestrian call for momentary call.
- C) Stop timing per controller. When in stop timing, shall apply stop timing to both rings of the controller.
- D) Cabinet light on/off.
- E) Flash switch. When in position, will put intersection to flash and controller will continue to cycle.
- F) 110 VAC convenience outlet.

The cabinet shall have a police sub-panel equipped as follows:

- A) An auto/flash switch shall provide for normal controller operation when in auto position. When placed in flash position, will place intersection on flash and apply stop timing to controller.
- B) A signal on/off switch.

The cabinet shall be wired for vehicle and pedestrian NEMA LED indication load switches. Eight-phase controller shall be wired for eight vehicle movements and four pedestrian phases. Twelve NEMA load switches and positions shall be provided, eight for vehicle phases and four for pedestrian use. It shall be possible to change the pedestrian load switch position to overlap use by changing the appropriate cabinet wiring at the terminal strips.

The load switches shall have input indicators mounted on the front panel of the switch. The load switches shall be the replaceable cube type. Load switches made from discrete components shall not be acceptable.

The cabinet shall be provided with a minimum of two 12- position copper ground strips to accept #10 AWG wire.

All cabinet wiring shall be neatly routed, laced, and permanently secured.

All inputs to and outputs from the controller and conflict monitor and other equipment, whether used or not, shall be terminated in barrier type terminal strips. All terminal strips and wires shall be clearly marked with fade resistant terminals.

All barrier terminal connections shall utilize spade-type connectors. No "feed-through" terminal blocks shall be acceptable.

Also to be provided with each cabinet shall be one lot each of 50 cable straps (4" x 0.10" Tyton T-18R or equal), 50 circular waterproof cable tags, and two each capacitors, MMWA 6WLK IMFD plus 10%, 600 VDC CDET.

The cabinet shall be equipped with all necessary terminals, harnesses, and wiring to connect power, signals, detectors, controller monitor, and coordination inputs. Interconnect cable lightning protection devices, sufficient in quantity for cable protection, shall be provided with each cabinet.

The cabinet shall be wired for and include a NEMA flasher mounted on the back panel. All controllers shall have two circuit flashers. The flashers shall have output indicators mounted on the front of the flasher case.

The cabinet flash select sequence shall be accomplished via jumper straps or wires. It shall be possible to program flash select from the front of the load bay and any changes in the flashing program will be done without having to remove or lower the main panel assembly.

All relays external to the controller or appurtenances shall meet the following requirements.

- A) Flash transfer relays shall be AEMCO #136-4962, Midland Ross # 136-62T3A1 or approved equal, 10 amp contacts, 8-pin cinch jones base.

- B) Other control relays shall be potter brumfield KRP, Midland Ross 159 series, or approved equal, 5 amp contacts, 8-pin octal base.

Cabinet shall have a doorstop self-latching mechanism, which will provide a positive retention of door when open. This will be located at the bottom of the cabinet, and have a minimum of two locked positions, 90 and 120 degrees.

A three-point locking mechanism shall be provided to secure the door at three points: top, center and bottom.

All cabinets shall be provided with a minimum of two shelves, fabricated with the same material as the cabinet. They shall be adjustable vertically, and be mounted to the cabinet wall with mounting strips with spring-retained nuts and machine screws.

Panels will be located in cabinet as described below:

- A) Communications/coordination-lower left wall
- B) Detectors-lower left wall
- C) AC power-lower right side of main panel
- D) Police switches-door
- E) Load bay-back wall
- F) Test switches-rear of main door

A wiring diagram shall be provided for each cabinet supplied and shall be approved by the Engineer before final acceptance of material.

Exterior cabinet painting:

Powder coating – color: dark bronze

Surface preparation – the exterior steel surface shall be blasé cleaned to steel structures painting council surface preparation specification No. 6 (SSPC-SP6) requirements utilizing cast steel abrasives conforming to the Society of Automotive Engineers (SAE) recommended practice J827. The blast method used is a recirculating, closed cycle centrifugal wheel system with abrasive conforming to SAE shot number S280.

Interior coating – interior surfaces (pole shafts only) at the base end for a length of approximately 2.0 feet shall be mechanically cleaned and coated with a zinc rich epoxy powder. The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit.

Exterior coating – all the exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a minimum film thickness of 2.0 mils (0.002”). The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classifications of ASTM D3359.

Combination coating galvanized-powder top coat color: Dark Bronze

Surface preparation – prior to being incorporated into an assembled product, steel plates ¾ inches or more in thickness shall be blast cleaned when required to remove rolled-in mill scale, impurities and non-metallic foreign materials. After assembly, all weld flux shall be mechanically removed. The iron or steel product shall be degreased by immersion in an agitated 4.5% - 6.0% concentrated caustic solution elevated to a temperature ranging from 150 degrees Fahrenheit to 190 degrees Fahrenheit. It shall next be rinsed clean from any residual effects of the caustic or acid solutions by immersion in a circulating fresh water bath. Final preparation shall be accomplished by immersion in concentrated zinc ammonium chloride flux solution heated to 130 degrees Fahrenheit. The solution’s acidity content shall be maintained between 4.5 – 5.0pH. The assembly shall be air-dried to remove any moisture remaining in the flux coat and/or trapped within the product.

Zinc coating – the product shall be hot-dip galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A153 (hardware items) by immersion in a molten bath of prime western grade zinc maintained between 810 degrees Fahrenheit and 850 degrees Fahrenheit. The entire product shall be totally immersed with no part of it protruding out of the zinc (no double dipping). This is to limit a risk of trapped contaminants containing chlorides and reduce the risk of bare spots (bare spots can occur when flux on the steel surface is burned away by heat of the first dip). Maximum aluminum content of the bath shall be 0.01%. Flux ash shall be skimmed from the bath surface prior to immersion and extraction of the product to assure a debris free zinc coating.

Exterior coating – all galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a minimum film thickness of 2.0 mils (0.002”). Prior to application, the surfaces to be powder coated shall be mechanically etched by brush blasting (ref. SSPC-SP7) and the zinc coated substrate preheated to 450 degrees Fahrenheit for a minimum of one hour in a gas fired convection oven. The coating shall be electrostatically applied and cured in a gas fire convection oven by heating the zinc coated substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classification of ASTM D3559.

Base Mounted Cabinets:

The controller shall be provided in a base-mounted control cabinet.

All necessary installation hardware and templates shall be provided.

Minimum outside dimensions of cabinet shall be 25 inches (width) by 16 inches (depth) by 48 inches (height).

A telephone modem shall be completely wired in each cabinet in order to report cabinet failures, detector failures and traffic counts. The controller shall be completely compatible with the latest edition of the City of Cleveland's closed loop system software.

The items supplied shall be in conformance with the above reference specification and shall be supplemented with the latest edition of the State of Ohio Department of Transportation, Construction and Material Specifications. Payment for accepted materials will be made at the unit bid price of each item installed and accepted.

**D-61 PLASTIC CAUTION TAPE (ITEM 625 SPECIAL)**

The location of the conduit in the trench shall be marked by the use of a continuous identifying tape buried in that trench above the line. The identifying tape shall be an inert material approximately 6" wide composed of polyethylene plastic and shall be highly resistant to alkalis, acids or other chemical components likely to be encountered in soils. The type shall be red with the words "electric line buried below" printed in black letters on one side only. It shall be supplied in continuous rolls with the identifying letters repeated for the full length of the tape. The contractor shall bury the tape in the trench with one strip placed approximately down the centerline and 8" to 12" below the final grade. It shall be placed in the trench with the printed side up and shall be essentially parallel to the finished surface. The contractor shall take any necessary precautions to insure that the tape is not pulled, distorted or otherwise misplaced in completing the trench backfilling. The tape shall be "Terra Tape", "Allen System's" or an equal as approved by the engineer in advance.

**D-62 REMOVAL OF TRAFFIC SIGNAL INSTALLATION (ITEM 632)**

Traffic signal installation, including signal heads, cable, messenger wire, strain poles, pedestrian poles, luminaires, cabinet, controller, pullboxes, etc., shall be removed in accordance with 632.26.

Removed items shall be delivered to the City. Contact Andrew Cross, Traffic Engineer at (216) 664-3199. Items to be delivered shall include traffic signal heads, controller, pedestrian pushbuttons, pedestrian signal heads and cabinets, pedestrian poles and luminaires.

**D-63 SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN (ITEM 630)**

Signs mounted on proposed traffic signal mast arms shall be rigidly attached to the arm and centered vertically on the arm. The contractor may use the method of attachment shown in standard construction drawing TC-16.20 or another method of rigid attachment as approved by the engineer.

The contractor shall insure the sign face is mounted perpendicular (90 degrees) to the direction of traffic.

Payment for Item 630 – Sign Hanger Assembly, Mast Arm, As Per Plan shall be made at the contract unit price bid for each. Payment shall be full compensation for all materials, labor, tools, equipment and all parts necessary to erect one individual sign.

**D-64 COMBINATION SIGNAL SUPPORT (BY TYPE AND DESIGN) & SIGNALIZATION MISC.: SIGNAL, OVERHEAD SIGN AND LIGHT POLE SUPPORT, AS PER PLAN (ITEM 632)**

In addition to the requirements of specification 632, signal supports shall be painted in accordance with the following:

Powder coating – color: dark bronze

Surface preparation – the exterior steel surface shall be blast cleaned to steel structures painting council surface preparation specification No. 6 (SSPC-SP6) requirements utilizing cast steel abrasives conforming to the Society of Automotive Engineers (SAE) recommended practice J827. The blast method used is a recirculating, closed cycle centrifugal wheel system with abrasive conforming to SAE shot number S280.

Interior coating – interior surfaces (pole shafts only) at the base end for a length of approximately 2.0 feet shall be mechanically cleaned and coated with a zinc rich epoxy powder. The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit.

Exterior coating – all the exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a minimum film thickness of 2.0 mils (0.002”). The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classifications of ASTM D3359.

Combination coating galvanized-powder top coat color: Dark Bronze

Surface preparation – prior to being incorporated into an assembled product, steel plates ¾ inches or more in thickness shall be blast cleaned when required to remove rolled-in mill scale, impurities and non-metallic foreign materials. After assembly, all weld flux shall be mechanically removed. The iron or steel product shall be degreased by immersion in an agitated 4.5% - 6.0% concentrated caustic solution elevated to a temperature ranging from 150 degrees Fahrenheit to 190 degrees Fahrenheit. It shall next be rinsed clean from any residual effects of the caustic or acid solutions by immersion in a circulating fresh water bath. Final preparation shall be accomplished by immersion in concentrated zinc ammonium chloride flux solution heated to 130 degrees Fahrenheit. The solution's acidity content shall be maintained between 4.5 – 5.0pH. The assembly shall be air-dried to remove any moisture remaining in the flux coat and/or trapped within the product.

Zinc coating – the product shall be hot-dip galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A153 (hardware items) by immersion in a molten bath of prime western grade zinc maintained between 810 degrees Fahrenheit and 850 degrees Fahrenheit. The entire product shall be totally immersed with no part of it protruding out of the zinc (no double dipping). This is to limit a risk of trapped contaminants containing chlorides and reduce the risk of bare spots (bare spots can occur when flux on the steel surface is burned away by heat of the first dip). Maximum aluminum content of the bath shall be 0.01%. Flux ash shall be skimmed from the bath surface prior to immersion and extraction of the product to assure a debris free zinc coating.

Exterior coating – all galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a minimum film thickness of 2.0 mils (0.002”). Prior to application, the surfaces to be powder coated shall be mechanically etched by brush blasting (ref. SSPC-SP7) and the zinc coated substrate preheated to 450 degrees Fahrenheit for a minimum of one hour in a gas fired convection oven. The coating shall be electrostatically applied and cured in a gas fire convection oven by heating the zinc coated substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classification of ASTM D3559.

The City of Cleveland, Division of Traffic Engineering requires that the contractor meet with a Traffic Department representative prior to foundation installations to verify locations and for final pole orientations. Contact Andrew Cross, Traffic Engineer at (216) 664-3194, 48 hours prior to commencing work.



Orders for signal poles and mast arms shall be placed systematically after the respective foundations have been constructed. In the event that utility or other conflict requires that a signal support be constructed in a location other than as indicated on the plan, the engineer shall determine whether the specified arm length is appropriate. If a longer or shorter arm is required, the City shall provide the engineer with design information for the revised pole and arm. Changes in pole and/or arm size, strength and/or length due to revised foundation locations shall not receive additional compensation beyond the contract unit price for the item(s) actually furnished.

## **D-65 WATER WORK DETAILS**

All of the work specified in Division of Water Part D or Part E of these specifications and/or indicated on the Contract Drawings shall be considered as Required Work. Work not specifically indicated in Part D or Part E nor shown on the Contract Drawings shall be considered Additional Work.

The Contractor shall perform Additional Work items only after receiving prior written approval from the City and shall be paid for this work at the bid unit prices submitted for each item.

### **A. FIRE HYDRANT REPLACEMENT**

1. Where determined by the City that an existing hydrant is to be replaced, the Contractor shall furnish all hydrants, materials, labor, tools and equipment for removing an existing hydrant and installing a new six (6) inch hydrant assembly complete. Hydrant replacements shall include the removal and replacement of the hydrant tee, the hydrant branch, the branch valve, and all appurtenances from the hydrant to the main.

2. The six (6) inch hydrant shall be City of Cleveland Standard and shall conform to the Division of Water's specifications and approved hydrant drawings on file with the Division of Water at the Public Utilities Building, 1201 Lakeside Ave., Cleveland, Ohio 44114.

3. The Contractor shall be paid at the bid unit price submitted for each fire hydrant replaced which shall include: the removal and furnishing of hydrants, testing, painting, the excavation, sheeting and shoring, backfilling, seeding and sodding, ductile iron pipe and fittings, concrete piers or thrust blocks; and shall include the furnishing of all labor, materials, and tools necessary to complete the work as specified or as shown or as directed.

B. WATER SERVICE CONNECTION REPLACEMENT

1. Where determined by the City, the Contractor shall furnish all materials and provide all labor and equipment necessary to replace (2" and less) service connections as required in accordance with the general requirements as specified by Division of Water specifications. The requirements shall include, but not limited to the followings:

Contractor shall provide City with list of connections replaced including Station number, address and connection number.

a- 1" Service connection on Ductile / Cast Iron Water Mains

- 1 1" Corporation stop-copper to iron
- 1 1" Curb stop valve-copper to iron
- 1 Curb stop valve box top
- 1 Curb stop valve box bottom
- X Ft 1" Type K, ASTM B88, copper tubing

OR

- 1 1" Compression corporation stop
- 1 1" Oriseal compression valve
- 1 1" Oriseal Compression valve
- X Ft 1" Type K, ASTM B88, copper tubing

b- 1-1/2" Service connection on Ductile / Cast Iron Water Mains

- 1 SOM x 1-1/2" Bronze double strap tapping saddle
- 1 1-1/2" Corporation stop - copper to iron
- 1 1-1/2" x 12" long Bronze Nipple
- 2 1-1/2" Bronze square head gate valve (one valve at Main, 2<sup>nd</sup> valve used as curb valve)
- 2 1-1/2" Streamline unions - copper to copper, Male
- 2 1-1/2" Compression three (3) part unions-copper to iron, Male
- X Ft 1-1/2" Type K, ASTM B88, copper tubing
- 2 Valve box covers
- 2 Valve box tops
  
- 2 Valve box bottoms
- X Ft 1" Type K, ASTM B88, copper tubing

OR

1	SOM x 1-1/2" Bronze double strap tapping saddle
2	1-1/2" Oriseal valve
1	1-1/2" x 6" long Bronze Nipple
2	1-1/2" Streamline unions - copper to copper, Male
2	1-1/2" Compression three (3) part unions - copper to iron, Male
X Ft	1-1/2" Type K, ASTM B88, copper tubing
2	Valve box covers
2	Valve box tops
2	Valve box bottoms
2	Stationary rods for Oriseal valve

NOTE: NO SPLICES BETWEEN CURB VALVE AND CORPORATION.

2. The Contractor shall be paid at the unit bid price for each water service connection replaced.

H. PLUGGING WATER SERVICE CONNECTION, 2" OR LESS. IN ALL PLUGGING SCENARIOS.

1. Where directed by the City, the contractor shall provide all labor, equipment, and materials necessary to plug service connections per City standards. The following work methods will be used for plugging the specified service conditions:

- a) Ferrule connections - Remove ferrule, install repair clamp or tap saddle with plug.
- b) 1" connection with Corporation valves - If corporation is leaking or the City Inspector determines that replacement is necessary, the Contractor shall remove the corp. and install a repair clamp at tap or tap saddle with plug. Otherwise, if corp. is sound, connection could be plugged by shutting corp. valve and cutting and crimping the service connection just after corp. valve.
- c) 1-1/2" and 2" saddles and corps- Cut service connection pipe and crimp at corporation, remove saddle, install double full-circle repair clamp.
- d) The curb valve must be shut prior to performing any plugging activities.

2. The Contractor shall be paid at the unit bid price for plugging service connection.

3. The Contractor shall provide City with a list of connections plugged including Station number, address and connection number.

**D-66 SEEDING AND MULCHING (ITEM 659)**

This item shall conform to ODOT Item No. 659 with the following exception:

a) The Contractor shall seed and mulch all grass areas within right-of-way and utility easements. Contractor shall submit seed mix for City approval prior to seeding. All areas shall be seeded with the following mixture:

44 Percent Hubbard Fescue  
22 Percent Bonanza Fescue  
22 Percent Apache Fescue  
12 Percent Annual Ryegrass

b) There shall be restoration of all existing grass areas disturbed by the Contractor; the cost for this work shall be included in the unit price bid per square yard for ODOT Item 659 - Seeding and Mulching.

c) Mowing shall be done at the direction of the Engineer. The first mowing shall be as soon as grass top growth reaches a 3" height and is to be cut back to 2" in height. After the second mowing and two days later the Contractor shall apply Triaiminic Plus or approved equal to eliminate weeds in the seeded and restored areas. The third cutting, as directed by the Engineer, is the final mowing required.

d) Contractor is responsible for repairing seeded and restored areas until final cutting at no additional cost to the City.

**D-67 WATER FOR SEEDING (ITEM 659)**

This item shall conform to ODOT Item 659.

Payment shall be made at the contract unit price bid per thousand (M) gallons for Water for Seeding.

**D-68 COMMERCIAL FERTILIZER (ITEM 659)**

This item shall conform to ODOT Item 659 with the following exceptions:

(1) Fertilizer shall be 12-12-12 and applied at the rate of 20 pounds per 1,000 square feet and shall be distributed in an even pattern, then thoroughly raked into the soil to a depth of not less than one inch (1").

(2) The Contractor shall fertilize all areas to be seeded.

Payment shall be made at the contract unit price bid per ton for ODOT Item 659 Commercial Fertilizer.

**D-69 TREE PRUNING (ITEM 666)**

The following information and instruction are subject to the direction of the City Forester or Urban Forestry Representative.

In general, trees are to be pruned in accordance with accepted arboriculture practice, by the contractor or subcontractor approved by Urban Forestry.

Under the "No Fee" permit, which the contractor must obtain from the City Forester 72 hours in advance of starting construction, the contractor shall prune every tree to be saved to forestall damage by construction equipment. The Contractor shall also remove all trash and debris resulting from the pruning, which has accumulated within the area's limits.

No tree shall be pruned except as directed by Urban Forestry.

The types of pruning generally used are: Crown Cleaning, Crown Thinning, Crown Raising, Crown Restoration and Utility Pruning. The above listing is not intended to be a complete representation of the International Society of Arboriculture standards. For complete specifications refer to Tree-Pruning Guidelines, an official publication of the International Society of Arboriculture 1995.

The Contractor shall carefully protect against damage to all existing vegetation and other features designated to remain. The Contractor shall be liable for any and all damage to such vegetation, features and other real property and vehicles, caused by their work. The Contractor shall be responsible for restoring or replacing to their original condition, and to the satisfaction of the Urban Forestry representative, any and all of these items damaged during the performance for this work.

Prior to starting construction of the project the contractor shall prune every tree within the project site as needed. All cuts shall be made sufficiently close to the parent stem and according to NAA pruning standards to facilitate natural healing processes. All limbs one inch in diameter and over must be precut to prevent splitting. All pruning shall be done to a lateral branch (drop crotch pruning). All pruning shall be guaranteed for a period of one year. Do not leave stubs and do not flush cut.

Branches shall be removed to a height sufficient to permit free passage of both pedestrian and vehicular traffic. In lifting the bottom branches of trees to provide clearance, care should be given to overall appearance, and cuts shall not be made that will prevent normal sap flow.

All trees, which require corrective pruning and maintenance due to root and trunk

damage in the course of proximal excavation, shall have such corrective pruning and maintenance, performed within fifteen calendar days of said damage.

When pruning within City right of ways, all pruned material and all other debris shall be removed from the site within twenty-four hours and disposed of properly.

#### **D-70 TREE REMOVAL**

Tree removal shall be done only under the direction of the engineer or as shown on the plans. The contractor is reminded that a tree removal permit from the Urban Forestry section shall be obtained prior to the removal of any tree in any City right of way.

- 1). Brush is defined as trees up to and including 3 inches in diameter.
- 2). The diameter of the trees will be measured at a height of 54 inches above the ground.

Trees marked for removal shall be measured in accordance with the following schedule of sizes:

Over 3 inches to 12 inches	9-inch size each
Over 12 inches to 24 inches	15-inch size each
Over 24 inches to 36 inches	30-inch size each
Over 36 inches to 60 inches	48-inch size each
Over 60 inches	60-inch size each

- 3). **Existing stumps partially or totally inside of the area of excavation for any sidewalks, handicap ramp, driveway or curb shall be partially or totally removed as part of the excavation requirements. No additional payment will be made for removing these stumps.**

#### **D-71 ROOT PRUNING**

Root pruning should be prohibited when construction alternatives exist that make root pruning unnecessary. Some of these alternatives include; re-alignment or narrowing of the sidewalk blocks around the trees to eliminate the need to prune or cut major roots. Curb construction should be performed using a "slip form paving machine" using a model that has zero clearance and requires minimum excavation. Installing curb drain under the curb instead of next to it should also be a construction requirement.

After it has been determined that root pruning is necessary all root pruning operations will be subject to inspection, supervision and approval by the appropriate Urban Forestry personnel or consulting arborist working under the auspices of the Urban Forestry section. All root pruning should be performed by a certified arborist.

All roots should be removed by severing them cleanly with a sharp axe, power saw or by grinding them off using a root grinding machine. Roots may not be “torn off” or removed using power equipment, such as, backhoes, steerskid loaders or front end loaders.

Disruption of soil and roots should be kept to a minimum whenever possible. Root pruning or soil excavation shall not occur closer than three feet from the outer portion of the trunk, on trees that are 12” in diameter or less. For trees larger than 12” in diameter, soil excavation and root pruning shall not occur closer than the distance measured by the circumference of the tree. If there is an inability to perform the work necessary, following the distance guidelines outlined above, a representative of Urban Forestry Section shall be called to the tree site to make an inspection and recommendation, pertaining to the need to remove the tree.

Soil excavation work is permitted closer than the distance parameters established under the above categories; provided all excavation is accomplished using hand tools and no roots greater than two inches in diameter are severed.

Roots under sidewalk areas should be removed to a depth of (6-1/2”) inches below the top of the finished sidewalk only. The sub-grade material under the sidewalk should have acceptable pore space to allow for root aeration.

Whenever appropriate a “root barrier system” should be installed along the length of the work area, on sidewalk side only. Installation of this barrier should be done using the manufacturers specification and as directed by the Chief of the Bureau of Sidewalks.

Root pruning will not be performed on private trees by City personnel or by contractors working under the auspices of the City of Cleveland. The property owner who is responsible for the tree shall contact a qualified tree company, at their expense, and remove any offensive roots, before the sidewalk area can be repaired.

Exposed roots should be kept moist by applying water and adding an organic layer over the exposed area, until the site can be returned to a pre-construction condition.

Trees growing in the public right-of-way are the property of the City of Cleveland and their care and protection are governed by the Commissioner of Park Maintenance & Properties. No person, firm or corporation without a permit from the Director of Parks, Recreation and Properties shall cut, break, climb, injure, prune, spray or remove any tree or portion of tree planted in the public right-of-way within the City or cause, authorize or procure any person to break, climb or injure any such tree or portion thereof. All types of construction activity, being performed within a close proximity to a city owned tree are subject to the inspection and review by the Division of Park Maintenance.

The Consulting Arborist will perform an initial on site inspection, of all tree sidewalk conflicts provided by the City of Cleveland and will prepare either a Pre-Construction Tree Assessment or a Tree Assessment at time of sidewalk removal. Said report must

address both the condition of each tree and the sidewalk conflict from roots and or the trunk itself. Recommendations must be made as to whether roots can be cut, tree removal is advisable or an alternative can be done to protect the tree. The City's main concern is the preservation of all healthy and safe trees whether in the tree lawn or on private property and still allow pedestrian and wheelchair use of the sidewalks. All tree removal recommendations are subject to the review and approval of the Division of Park Maintenance & Properties and the Urban Forestry Section. In the event that tree removal becomes necessary and only after approval, this service shall be scheduled through the office of Urban Forestry. If root removal is recommended the Consulting Arborist will direct both the contractor performing the cement repair and the contractor performing the root grinding, on sidewalk adjustment/change in design and the amount of root removal needed. A final inspection of the area may also be required, after the root grinding has been completed and before any backfill has been added, to re-evaluate the condition of the tree and on the performance of the root removal operation. The Division of Park Maintenance & Properties reserves the right to approve the selection of the Consulting Arborist.

All root removal operations must be performed under the supervision and direction of a Registered Consultant Arborist. The Consulting Arborist must advise the sidewalk repair contractor of proper root pruning techniques prior to or at the start of construction. Upon removal of the old pavement, the contractor is advised to inspect and probe for additional roots before excavating soil. If more roots are to be cut than anticipated and those roots are in excess of two inches in diameter at the point of cutting, then the Consulting Arborist must be notified before any root cutting shall take place. The consulting Arborist may need to inspect the exposed roots. Notes will be required and photographs are advisable.

Root cutting performed with the use of hand tools may be done by non-arboriculture employees of the sidewalk repair contractor only after a briefing and instruction by the Consulting Arborist. Root grinding by machine must be done by either a qualified tree worker, or an equipment operator experienced in root cutting for sidewalk repair, but only after adequate instruction by the Consulting Arborist. Caution is advised that ripping old roots may damage both public and private property.

Clean up shall be completed within two hours after debris has been "ground out" around each site where root removal operations are taking place. The work site shall be left in a manner that is equal or cleaner than pre-work conditions. It shall be the responsibility of the contractor to remove and dispose of any wood debris (chips, roots, limbs etc...) in a proper and acceptable manner.

The contractor must have in their possession or available to them by formal agreement, trucks, stump grinders, hand tools and other equipment and supplies which are necessary to perform the outlined work as specified.

The contractor performing the root removal is responsible for contacting the necessary utility agencies any time work is being performed around overhead or underground



utility installations. The contractor shall protect all utilities from damage, shall immediately contact the appropriate utility should damage occur, and shall be responsible for all claims of damage due to his operation.

The contractor shall perform the work with due care, taking precautions against injury to persons and damage to property and against interference with traffic or abutting property and he shall at his own expense, erect barricades, display lights or signs, give warnings and adopt and enforce rules and regulations as may be necessary or required by the agency or by the authorities having jurisdiction to safeguard the public.

Traffic control is the total responsibility of the contractor and shall be coordinated with the proper departments of the City of Cleveland and shall be accomplished in conformance with State, County and local highway construction codes. The contractor is solely responsible for pedestrian and vehicular safety control within the work site and shall provide the necessary warning devices.

Damage by the contractor to any person or property, public or private are the total responsibility of the contractor and are repaired or compensated by the contractor to the satisfaction of both injured party and the Division of Park Maintenance & Properties at no cost to the City.

Tree Damage caused by the contractor shall be immediately repaired at no additional expense to the City of Cleveland. Trees damaged as judged by the Division of Park Maintenance & Properties are appraised to determine the value of damage. If the City determines that the damage warrants removal, it shall be done by the contractor at no cost to the City. The appraised cost of the damage may either be paid to the Division of Park Maintenance & Properties or deducted from monies owed by the contractor. If the damage resulted in the removal of the tree, the City may accept replacement trees whose combined diameters are equal to that of the tree to be removed. All replacement trees shall be balled and burlapped and of a species to be determined by the Division of Park Maintenance & Properties.

All equipment to be used and all work to be performed must be in full compliance with the most current version of the American National Standards Institute, (ANSI) standard Z-133-1, (Safety requirements for Pruning, Trimming, Repairing, Maintaining, Removing Trees and for Cutting Brush). ANSI standards are made part of this contract by this reference.

**D-72 MISCELLANEOUS METAL (ITEM SPECIAL)**

This Item shall be used to replace missing, damaged, or broken City of Cleveland castings. The Engineer shall determine which of the castings, if any, shall be replaced under this Item. New casting shall be set to line and grade and paid for as adjusting the respective casting, in addition to the payment for miscellaneous metal furnished.

Dray slips shall be submitted for each separate part of each casting and shall be used to determine the actual weight of miscellaneous metal to be paid for, in pounds (Lbs.). An estimated quantity of miscellaneous metal has been included in the Schedule of Items to perform this work. This quantity is used for estimating purposes only. Items meeting this specification shall be paid under Item Special Miscellaneous Metal.

**D-73 TESTING OF CONSTRUCTION MATERIALS (ITEM SPECIAL)**

The Contractor shall perform all work under this section of the specifications. The Contractor shall hire a Private Laboratory to perform tests on construction materials. The testing laboratory shall be subject to the review and prior approval of the Commissioner and shall not be changed without the approval of the Board of Control

Inspection and review of the laboratory by the Cement and Concrete Reference Laboratory of the National Bureau of Standards, in affiliation with the American Council of Independent Laboratories is required. Accreditation by the Department of Commerce's National Voluntary Laboratory Accreditation Program or other similar organization is not mandatory, but furnishing proof of such compliance would weigh heavily upon the acceptance of that laboratory to perform services under this contract. However, any laboratory performing services under this contract shall be able to verify its independence from the construction contractor and subcontractor, if any, whose work is being tested

Listed below is list of these tests and the respective American Society of Testing and Materials (ASTM) 1994 specifications:

**Tests**

The tests described below shall be performed only as requested and directed by the Commissioner or his designee. Each test shall conform to the specifications indicated. The unit price bid for each type of field test shall include all costs for the test described; including traffic control, mileage and the furnishing of the required reports. **Two (2) copies of each test report plus original are required.**

All tests requiring coring shall be subject to the following two (2) additional requirements. The first is the cored hole shall be filled with material approved by the Commissioner. The second is that the performance of these tests may be observed by a representative of the Commissioner.

**Test reports must include the name of the individual requesting the test and the date of the request. All reports should be sent to:**

, Commissioner of Engineering & Construction  
Division of Engineering & Construction  
Cleveland City Hall, Room 518  
Cleveland, OH 44114

**1. Asphalt Density Test**

This test shall conform to ASTM D-2950 (Density of Bituminous Concrete in Place by Nuclear Method). All tests shall be made at the time of placement of the asphalt at locations furnished by the engineer.

**2. Asphalt Extraction Test**

This test shall conform to ASTM D-2172 (Quantitative Extraction of Bitumen from Bituminous Paving Mixtures) and as herein modified. The first modification is that the sample taken in the field shall be used for a Marshall Stability Test as per ASTM D-1559 (Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus). The second and last modification is that after performing the ASTM D-2172 test, all the sample aggregate shall be subjected to a sieve analysis as per ASTM C-136 (Sieve Analysis of Fine Course Aggregates).

The test report shall include all the results, including test method used, for all three (3) ASTM tests.

**3. Thickness of Compacted Asphalt Test**

This test shall conform to ASTM D-3549 (Thickness or Height of Compacted Bituminous Paving Mixture Specimens). Cores shall be drilled in a random pattern along the pavement of each lane as directed.

**4. Concrete Compression, Slump, Air Content & Temperature Check Tests (Field)**

This item includes making and curing cylinders in the field and testing them in the laboratory. These tests shall conform to ASTM C-31 (Making and Curing Concrete Test Specimens in the Field) and ASTM C-39 (Compressive Strength of Cylindrical Concrete Specimens) and as herein modified. All samples shall be obtained as stated in ASTM C-172 (Sampling Fresh Concrete).

Each Concrete Compression Test shall be composed of a set of four (4) concrete test specimens made in conformity with ASTM C-31 (Making and Curing Concrete Test Specimens in the Field) at locations as specified by the engineer.

At the time of pouring, a slump test conforming to ASTM C-143 (Slump of Portland Cement Concrete) and an air entrainment test conforming to ASTM C-231 (Air Content of Freshly Mixed Concrete by the Pressure Method) shall be performed. The concrete temperature shall also be taken and recorded as per ASTM C-1064 (Test Method for Temperature of Freshly Mixed Concrete).

One (1) cylinder from each set of four (4) shall be compression tested at seven (7) days and a written report, including results of slump and air entrainment tests and the concrete temperature, shall be forwarded to the Commissioner within twenty-four (24) hours of the test completion.

The three (3) remaining cylinders shall be compression tested at twenty-eight (28) days and a written report of each individual cylinder test and their average shall be forwarded to the Commissioner within twenty-four (24) hours of the test completion. The cost of picking up test cylinders, whether on a holiday, weekend or at night shall be included in the unit price bid for each set tested.

The testing laboratory shall notify the Commissioner of Engineering & Construction, by telephone at (216) 664-2381, immediately on the occurrence of any of the following four (4) conditions:

- a. Any or all of the concrete test specimens of any set are lost or damaged in the field.
- b. Any or all of the concrete test specimens of any set are lost or damaged by the testing laboratory.
- c. The result of the seven (7) day test result is below 3200 psi for Type C concrete or 3400 psi for Type S concrete.
- d. The average of the twenty-eight (28) day test of any set is below 4000 psi for Type C concrete or 4500 psi for Type S concrete.

All telephone calls made, as required above, shall be included in the test report and include the name of the person called, the time and date, and the reason for the call.

The unit price bid for this item shall include making the four (4) cylinders (one set) in the field, curing, testing and the report. **Included in the report should be the exact location of each set of cylinders tested. Reports which do not include this will be rejected. Additionally, no payment will be made for any set which includes less than four (4) cylinders.**

## **5. Concrete Compression, Slump, Air Content & Temperature Check Tests (Lab)**

This item includes making, curing and testing cylinders in the laboratory. These tests shall conform to ASTM C-192 (Making and Curing Test Specimens in the Laboratory), ASTM C-143 (Slump of Portland Cement Concrete), ASTM C-231 Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C-1064 (Test Method for Temperature of Freshly Mixed Concrete) and ASTM C-39 (Compressive Strength of Cylindrical Concrete Specimens).

The testing laboratory shall submit a certified test report, within twenty-four (24) hours, to those designated by the Commissioner.

## **6. Concrete Core Samples for the Determination of Concrete Compressive Strength**

These samples shall be obtained and compression tested as per ASTM C-42 (Obtaining and Testing Drilled Cores and Sawed Beams of Concrete) and ASTM C-39 (Compressive Strength of Cylindrical Concrete Specimen). The concrete to be cored ranges from four (4) to twelve (12) inches in thickness.

The unit price bid to obtain the cores in the field shall include coring, transportation, storage and traffic maintenance.

The pay item testing concrete cores obtained in the field shall include necessary preparation.

## **7. Analysis of Aggregates**

This item covers sampling and testing aggregates used in subbase courses, bituminous paving mixes and concrete mixes. The sample of the aggregate shall be taken as per ASTM D-75 (Sampling Aggregate) and reduced to the proper test size. The sample shall be tested as per ASTM C-136 (Sieve Analysis of Fine and Course Aggregates), ASTM C-117 (Test Method for Materials Finer Than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing) or ASTM C-88 (Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate).

## **8 Soil Test Check**

This item covers the determination of the soil density and percent compaction. The density of the soil or soil aggregate shall be taken as per either ASTM D-2922 (Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)), ASTM D-1556 (Density of Soil in Place by the Sand-Cone Method), ASTM D-2167 (Density and Unit Weight of Soil in Place by the Rubber Balloon Method) or any combination of these tests as required and directed by the Commissioner. This density shall be compared to the maximum density as determined by the Moisture-Density Test as per ASTM D-698 (Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 5.5 lbs. (2.49 kg) Rammer and 12 in. (305 mm) Drop).

### **D-74 ASPHALT REJUVENATING AGENT (ITEM SPECIAL)**

#### **SCOPE OF WORK**

This Work shall consist of furnishing all labor, material, and equipment necessary to perform all operations for the application of an asphalt rejuvenating agent asphaltic concrete surface course. The rejuvenation of surface courses shall be by spray application of a cationic rejuvenating agent composed of petroleum oils and resins emulsified with water. All work shall be in accordance with the specifications, the applicable drawings, and subject to the terms and conditions of this contract.

#### **MATERIAL SPECIFICATIONS**

The asphalt rejuvenating agent shall be emulsion composed of petroleum resins oil base uniformly emulsified with water. Each bidder must submit with his bid a certified statement from the asphalt rejuvenator manufacturer showing that the asphalt rejuvenating emulsion conforms to the required physical and chemical requirements.

#### **SPECIFICATIONS**

<b><u>Tests</u></b>	<b><u>ASTM</u></b>	<b><u>AASHTO</u></b>	<b><u>Requirements</u></b>	
			<b>Min.</b>	<b>Max.</b>
<i>Test on Emulsion:</i>				
Viscosity, @ 25 C,S.F.S	D 244	T-59	15	40
Residue, % W	D 244 (Mod.)	T-59 (Mod.)	60	65
Miscibility test	D 244 (Mod.)	T-59 (Mod.)	No	
			Coagulation	
Sieve test, % W	D 244 (Mod.)	T-59 (Mod.)	-	0.1
Particle Charge Test	D 244	Positive		
Percent Light	GB	GB	-	30
Transmittance				

*Test on Residue from  
Distillation:*

Flash Point, COC, C	D-92	T-48	196	-
Viscosity @ 60 C, cSt	D 445	-	100	200
Asphaltness, % w	D 2006-70	-	0.3	1.00
Maltenes Dist. Ratio	D 2006-70	-	0.6	0.6
<u>PC+A</u>				
S + A				
PC/S Ration	D 2006-70	-	0.5	-
Saturated Hydrocarbons, S	D 2006-70	-	21	28

ASTM D-244 Modified Evaporation Test for percent of residue is made by heating 50 gram sample to 149°C (300F) until foaming ceases, then cool immediately and calculate results.

Test procedure identical with ASTM D-244-60 except that .02 Normal Calcium Chloride solution shall be used in place of distilled water.

Test procedure identical with ASTM D-244 except that distilled water shall be used in place of two percent sodium oleate solution.

Test procedure is attached.

Chemical composition by ASTM Method D-2006-70:

PC=Polar Compounds A=First Acidaffins

A=Second Acidaffins S=Saturated Hydrocarbons

## MATERIAL PERFORMANCE

The material shall have a record of at least five years of satisfactory service as an asphalt rejuvenating agent and in-depth sealer. Satisfactory service shall be based on the capability of the material to decrease the viscosity and increase the penetration value of the asphalt binder as follows. The viscosity shall be reduced by a minimum of 45 percent and the penetration value shall be increased by 25 percent. Testing shall be performed on extracted asphalt cement from a pavement to a depth of three eighth's inch (3/8"). In addition, the pavement shall be in-depth sealed to the intrusion of air and water.

The bidder must submit with his bid the manufacturer's certification that the material proposed for use in compliance with the specifications requirements. The bidder must submit with his bid previous use documentation and test data conclusively demonstrating that the rejuvenating agent has been used successfully for a period of five years by government agencies such as Cities, Counties, etc.; and that the asphalt rejuvenating agent has been proven to perform, as heretofore required, through filed testing by government agencies as to the required change in the asphalt binder viscosity and penetration number. Testing data shall be submitted indicating such product performance on a sufficient number of projects, each being tested for minimum period

of three years to insure reasonable longevity of the treatment, as well as product consistency.

RECLAMITE, manufactured by Witco Corporation, is a product of known quality and accepted performance, but an approved equal may be use.

#### APPLICATOR EXPERIENCE

The asphalt rejuvenating agent shall be applied by an experienced applicator of such material. The bidder shall have a minimum of three years experience applying the product proposed for use. He must submit with his bid a list of five projects on which he applied said rejuvenator. He shall indicate the projects dates, number of square yards treated in each and the name and phone number of the government official in charge of each project.

A project superintendent knowledgeable and experienced in application of the asphalt rejuvenating agent must be in control of each day's work. The bidder shall submit a written experience outline of the project superintendent.

#### APPLICATION TEMPERATURE/WEATHER LIMITATIONS

The temperature of the asphalt rejuvenating emulsion, at the time of application shall be as recommended by the manufacturer. The asphalt rejuvenating agent shall be applied only when the existing surface to be treated is thoroughly dry and when it is not threatening to rain. The asphalt rejuvenating agent shall not be applied when the ambient temperature is below 40 F.

#### HANDLING OF ASPHALT REJUVENATING AGENT

Contents in tank cars or storage tanks shall be circulated at least forty five minutes before withdrawing any material for application. When loading the distributor, the asphalt rejuvenating agent concentrate shall be loaded first and then the required amount of water shall be added. The water shall be added into the distributor with enough force to cause agitation and through mixing of the two materials. To prevent foaming, the discharge end of the water hose or pipe shall be kept below the surface of the material in the distributor which shall be used as a spreader. The distributor truck will be cleaned of all of its asphalt materials, and washed out to the extent that no discoloration of the emulsion may be perceptible. Cleanliness of the spreading equipment shall be subject to the approval and satisfaction of the Engineer.



## APPLICATION EQUIPMENT

The distributor for spreading the emulsion shall be self-propelled, and shall have pneumatic tires. The distributor shall be designed and equipped to distribute the asphalt rejuvenating agent uniformly on variable widths of surface at readily determined and controlled rates from 0.05 to 0.5 gallons per square yard of surface, and with an allowable variation from any specified rate not to exceed 5 percent of the specified rate.

Distributor equipment shall include full circulation spray bars, pump tachometer, volume measuring device and hand hose attachment suitable for application of the emulsion manually to cover areas inaccessible to agitate the emulsion within the tank.

A check of distributor equipment as well as application rate accuracy and uniformly distributed onto the pavement. The spreader shall be able to apply ½ pound to 3 pounds of sand per square yard in a single pass. The spreader shall be adjustable so as not to broadcast sand onto driveways or treelawns.

The sand to be used shall be free flowing, without any leaves, dirt, stones, etc. Any wet sand shall be rejected from the job site.

Any equipment which is not maintained in full working order, or is proven inadequate to obtain the results prescribed, shall be repaired or replaced at the direction of the Engineer.

## APPLICATION OF REJUVENATING AGENT

The asphalt rejuvenating agent shall be applied by a distributor truck at the temperature recommended by the manufacturer and at the pressure required for the proper distribution. The emulsion shall be so applied that uniform distribution is obtained at all points of the area to be treated. Distribution shall be commenced with a running start to insure full rate of spread over the entire area to be treated. Areas inadvertently missed shall receive additional treatment as may be required by hand sprayer application.

Application of asphalt rejuvenating agent shall be on one-half width of the pavement at a time. When the second half of the surface is treated, the distributor nozzle nearest the center of the road shall overlap the previous application by at least one-half of the width of the nozzle spray. In any event the centerline construction joint of pavement shall be treated in both application passes of the distributor truck.

Before spreading, the asphalt rejuvenating agent shall be blended with water at the rate of two (2) parts rejuvenating agent to one (1) part water, by volume or as specified by the manufacturer. The combined mixture of asphalt rejuvenating agent and water shall be spread at the rate of 0.05 to 0.10 gallons per square yard, or as approved by the Engineer following field testing.

Where more than one application is to be made, succeeding application shall be made as soon as penetration of the preceding application has been completed and approval is granted for additional applications by the Engineer.

Grades or super elevations of surface that may cause excessive runoff, in the opinion of the Engineer, shall have re required amounts applied in two or more applications as directed.

After the street has been treated, the area within one foot of the curb line on both sides of the road shall receive an additional treatment of asphalt rejuvenating emulsion. Said treatment shall be uniformly applied by a method acceptable to the Engineer.

After the rejuvenating emulsion has penetrated, a coating of dry sand shall be applied to the surface in sufficient amount to protect the traveling public as required by the Engineer.

The contractor shall furnish a quality inspection report showing the source, manufacturer, and date shipped, for each load of asphalt rejuvenating agent. When directed by the Engineer, the Contractor shall take representative samples of material for testing.

#### STREET SWEEPING

The Contractor shall be responsible for sweeping and cleaning of the streets prior to, and after treatment.

Prior to treatment, the street will be cleaned of all standing water, dirt, leaves, foreign materials, etc. This work shall be accomplished by hand brooming, power blowing or other approved methods. If in the opinion of the Engineer the hand cleaning is not sufficient than a self-propelled street sweeper shall be used.

All sand used during the treatment must be removed no later than 48 hours after treatment of the street. This shall be accomplished by a combination of hand and mechanical sweeping. All turnouts, cul-de-sacs, etc. must be cleaned of any material to the satisfaction of the Engineer. Street sweeping will be included in the price bid per square yard for asphalt rejuvenating agent.

If, after sand is swept and the opinion of the Engineer and hazardous condition exists on the roadway, the Contractor must apply additional sand and sweep same no later than 24 hours following reapplication. No additional compensation will be allowed for reapplication and removal of sand.

## TRAFFIC CONTROL

The Contractor shall schedule his operation and carry out the work in a manner to cause the least disturbance and/or interference with the normal flow of traffic over the area to be treated. Treated portions of the pavement surfaces shall be kept closed and free from traffic until penetration, in the opinion of the Engineer, has become complete and the area is suitable for traffic.

When, in the opinion of the Engineer, traffic must be maintained at all times on a particular street, then the Contractor shall apply asphalt rejuvenating agent to one lane at a time. Traffic shall be maintained in the untreated lane until the traffic may be switched to the completed lane.

The Contractor shall be responsible for all traffic control and signing required to permit safe travel. The Contractor shall notify the police and fire departments as to the streets that are to be treated each day.

If, in the opinion of the Engineer, proper signing is not being used, the Contractor shall stop all operations until safe signing and barricading is achieved.

Payment for maintaining traffic for this item of work shall be included in ODOT Item 614 Maintaining Traffic and shall be bid lump sum.

## METHOD OF MEASUREMENT

Asphalt rejuvenating agent will be measured by the square yard as provided for in the schedule of items.