

CITY OF DETROIT

**PROGRESS CLAUSE**

SMITHGROUP

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06-18-24

The Engineer anticipates that construction can begin no earlier than 10 calendar days after award or as directed by the Engineer.

In no case shall any work be commenced prior to receipt of formal notice of award by the Department. The Contractor shall prepare and submit a complete, detailed, signed Progress Schedule to the Engineer.

All work must be completed by **June 1, 2025**.

Unless specific pay items are provided in the contract any extra costs incurred by the Contractor due to cold- weather protection and winter grading will not be paid for separately but will be included in the payment of other pay items in the contract.

After award and prior to the start of work, the Contractor must attend a preconstruction meeting with the Engineer. The Engineer will determine the day, time and place for the preconstruction meeting. The meeting will be conducted after project award and may be rescheduled if there are delays in the award of the project.

The named subcontractor(s) for Designated and/or Specialty Items, as shown in the Proposal, should attend the preconstruction meeting if such items materially affect the work schedule.

The Progress Schedule shall include, at a minimum, the controlling work items for the completion of the project and the planned dates (or workday(s) for a workday project) that these work items will be controlling operations. The dates that the specific project phases are to be opened to traffic and the public as well as the final project completion date shall also be included in the Progress Schedule. If the bidding proposal specifies other controlling dates, these shall also be included in the Progress Schedule.

The Contractor shall provide a two-week-look-ahead schedule of construction activities identifying planned activities at the bi-weekly construction progress meeting throughout the entire construction schedule.

No extensions of time will be granted for labor disputes unless it can be shown that such disputes are industry wide.

No extensions of time shall be granted for delays in delivery of critical materials unless the delay can be shown to be industry wide and the delay affects the critical item of work.

Failure by the Contractor to meet final completion dates will result in the assessment of liquidated damages in accordance with 108.10.C.1 and 108.10.C.2 of the Standard Specifications for Construction.

CITY OF DETROIT  
SPECIAL PROVISION  
**COORDINATION CLAUSE**

SMITHGROUP

1 of 2

06-18-2024

Other contracts may commence within the immediate area during the life of this Contract.

Work by the City of Detroit, utility companies, and other Contractor activities may be present at any time on the project or near the project.

The Contractor shall coordinate his operations with others performing work within, or adjacent to, the Construction Influence Area (CIA), to avoid conflicts in maintaining traffic, construction signing, and progression of construction activities.

Where applicable, the Contractor will be required to coordinate construction work with the curb-side garbage pick-up and garbage pick-up for businesses within the Construction Influence Area.

Contractor shall coordinate construction activities with adjacent businesses and property owners to ensure that deliveries, loading, unloading, service, etc. can continue to operate.

Contractor shall coordinate with the Detroit Department of Transportation (DDOT) to minimize impact to transit customers and ensure sufficient notice is given to DDOT employees and customers affected by construction activity.

The Contractor's attention is called to the requirements of cooperation with others as covered in 104.08 of the Standard Specifications for Construction.

No claim for extra compensation or adjustments in contract unit prices will be allowed on account of delay or failure of others to complete work units scheduled.

The contracts that may be in progress during the execution of this contract may include, but are not limited to the following:

- Ralph C Wilson Centennial Park – Park Construction  
Almir Omerovic  
Detroit Riverfront Conservancy  
Project Manager  
(248) 510-2149
- DTE Electric and Leidos – Electrical and Joint Utility Rerouting  
Julie Jozwiak  
DTE Energy  
Regional Manager – City of Detroit  
(313) 600-3725  
Roberto Cordova  
Leidos  
Distribution Engineering Manager  
(419) 708-8667
- DTE Gas – Gas Main Replacement  
Joel Bellhorn  
DTE Energy – DTE Gas  
Principal Engineer  
(586) 665-6602
- MCG Utilities – Fiber Optic Lines may interfere with signal pole foundations  
Dan Gardner  
MCG Utilities  
Field Engineer  
(440) 610-7457  
Ruthie Sudduth  
ATT/Transmission - OSP  
Field Engineer  
(734) 218-4980

- Railroad Easement – Easement for underground railroad tunnel  
John Pehar  
Hatch, Ltd.  
Senior Project Engineer  
(416) 578-6928  
Brian Osborne  
Canadian Pacific Railroad  
Manager of Public Works

**UTILITY COORDINATION**

The Contractor shall cooperate and coordinate construction activities with the owners of utilities and local developments that are adjacent to the project as stated in 104.08 of the Standard Specifications for Construction. In addition, for the protection of underground utilities, the Contractor shall follow the requirements in 107.12 of the Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon subsection 108.08 of the Standard Specifications for Construction.

The existing utilities listed below and shown on the plans represent the best information available.

This information does not relieve the Contractor of the responsibility to satisfy themselves as to its accuracy, or of their responsibility in case utilities have been constructed or removed since the most recent surveys.

NAME AND ADDRESS OF OWNER

UTILITY/SERVICE

**Miss Dig**

Call three (3) working days before you dig  
1-800-482-7171

All Underground Utilities

City of Detroit

**Public Lighting Authority**

400 Monroe St. Ste. 485  
Detroit, MI 48226  
Ben Barker  
(313) 324-8291  
abarker@pladetroit.org

Street Lighting

City of Detroit

**Public Lighting Department**

1301 3<sup>rd</sup> Street  
Detroit, MI 48226  
Phone: (313) 267-8153  
Fax: (313) 267-8153  
Emergency 24 Hour Service (313) 224-0500

Street Lighting & Traffic Signals

NAME AND ADDRESS OF OWNERUTILITY/SERVICE

City of Detroit  
**Detroit Water & Sewerage Department**  
Services Facility  
6425 Huber  
Detroit, MI 48211  
Emergency/Customer Service: (313) 267-8000

Water Mains & Sewers

Permits

Hannah Slabaugh  
Permits Division (313) 267-8000  
[DWSD-permits@detroitmi.gov](mailto:DWSD-permits@detroitmi.gov)

City of Detroit  
**Department of Public Works – Traffic Engineering**  
2633 Michigan Avenue  
Detroit, MI 48207  
General: (313) 224-1610  
Prasad Nannapaneni (313) 628-5603  
[prasadn@detroitmi.gov](mailto:prasadn@detroitmi.gov)  
Kirit Patel – Traffic Signals  
(313)628-5641  
[patelki@detroitmi.gov](mailto:patelki@detroitmi.gov)  
Johathan Flint – Pavement Markings  
(313) 224-4493  
[flintj@detroitmi.gov](mailto:flintj@detroitmi.gov)

Pavement Markings,  
Traffic Signals

**Sign Shop**

2425 Fenkell  
Detroit, MI 48238  
Willie Riley (313) 628-2923  
Fax: (313) 628-4966

Sign Removals & Installations

City of Detroit  
**Detroit Fire Department**  
1301 3rd Street  
Detroit, MI 48226  
General: (313) 596-2900  
Fax: (313) 224-4128  
[communityrelations@detroitmi.gov](mailto:communityrelations@detroitmi.gov)  
Emergency Medical Services: (313) 596-5180

KNOX Boxes & Fire Hydrants

NAME AND ADDRESS OF OWNERUTILITY/SERVICE

City of Detroit  
**Detroit Police Department**  
 1301 3rd Street  
 Detroit, MI 48226  
 General: (313) 596-2200  
 Fax: (313) 596-1450  
[publicinfo@detroitmi.gov](mailto:publicinfo@detroitmi.gov)

Police Call Boxes

**DTE/Detroit Edison**  
 One Energy Plaza  
 Detroit, MI 48226  
 Customer Service: (800) 477-4747  
 Jake Hermann  
[Jacob.hermann@dteenergy.com](mailto:Jacob.hermann@dteenergy.com)  
 Exposed or damaged utilities: (313)237-9567

Electric

**DTE Gas**  
 One Energy Plaza  
 Detroit, MI 48226  
 Phone: (800) 338-0178  
 Gas Leak: (800) 947-5000  
 Exposed or Damaged utilities: (800) 477-4747  
 Barbara Saunders (313) 235-5111  
[saundersb@dteenergy.com](mailto:saundersb@dteenergy.com)  
 Kurt Weitzmann  
[mappingteam@dteenergy.com](mailto:mappingteam@dteenergy.com)

Gas

*Contact DTE ten working days prior to the construction start date to coordinate adjustments for DTE electric and gas manhole frames and covers.*

**AT&T**  
 10 S. Main St. Suite 314  
 Mt Clemens, MI 48043-2374  
 Hoe Chang  
 Phone: (248) 622-9602  
[HC2353@att.com](mailto:HC2353@att.com)  
 or  
 Michael Kryz  
 Phone: (248) 972-0143  
[MK2127@att.com](mailto:MK2127@att.com)

Telephone  
 For Adjusting Frame and  
 Covers

*AT&T will require five to seven business days advance notice prior to adjusting frames and covers.*

NAME AND ADDRESS OF OWNERUTILITY/SERVICE**AT&T**

Ruthie Sudduth  
AT&T/Transmission  
Phone 734-218-4980  
[Rs2362@att.com](mailto:Rs2362@att.com)

or

Mike Griffin  
AT&T/Transmission  
Phone (248) 450-1235  
[mg3151@att.com](mailto:mg3151@att.com)

Mike Diederich  
National Const. & Engineering  
AT&T Corp  
Phone 216-212-8556  
[Md4145@att.com](mailto:Md4145@att.com)

Brian Griffin  
Regional Design Engineer – Planning & Coordination  
17561 Michigan Ave.  
Dearborn, MI 48126  
Phone 734-218-5826  
[bg2619@att.com](mailto:bg2619@att.com)

Bill Taggart  
Utility Coordination  
AT&T Corp  
[wt2462@att.com](mailto:wt2462@att.com)

Chad Harkness  
Metropolitan Communications Group (MCG)  
Project Engineer  
Phone 770-584-7083  
[Chad.harkness@mcgfiber.com](mailto:Chad.harkness@mcgfiber.com)

James Schneider  
Metropolitan Communications Group  
Field Engineer  
[james.schneider@mcgfiber.com](mailto:james.schneider@mcgfiber.com)

**MC/VERIZON BUSINESS**

Michael (Mike) J. Bruning  
Regional Design Engineer – Planning & Coordination  
21500 Melrose Avenue  
Southfield, MI 48075  
Phone: 248-794-7906  
Email: [michael.bruning@verizonwireless.com](mailto:michael.bruning@verizonwireless.com)

Fiber / Transmission

NAME AND ADDRESS OF OWNERUTILITY/SERVICE**Great Lakes Water Authority**

6425 Huber

Detroit, MI 48211

Anupam Kumar

Phone: (313) 267-4857

[anupam.kumar@glwater.org](mailto:anupam.kumar@glwater.org)

Water

**Sigma Network Services (Comcast CATV)**

Tiffany Forbes

27096 Oakmead Drive

Perrysburg, OK 35551

Phone: (419) 874-9262, Ext. 144

[tforbes@teamsigma.com](mailto:tforbes@teamsigma.com)

or

25626 Telegraph

Southfield, MI 48034

Craig Pudas

Phone: (248) 809-2715

[craig\\_pudas@cable.comcast.com](mailto:craig_pudas@cable.comcast.com)

Cable

**Century Link**

Kendal Williams-Zetina

100S Cincinnati, Suite 1200

Tulsa, OK 74103

Phone: (918) 547-0547

[kemdal.zetina@centurylink.com](mailto:kemdal.zetina@centurylink.com)

Cable

**ITC Holding Corp**

27175 Energy Way

Novi, MI 48377

Adelaide Pascaris

Phone: (248) 469-2131

[apascaris@itctransco.com](mailto:apascaris@itctransco.com)

Electric

CITY OF DETROIT  
SPECIAL PROVISION  
FOR  
**DRAINAGE STRUCTURES AND STRUCTURE COVERS**

SG:AR/JB

1 of 3

06-18-2024

**a. Description.** The work shall consist of constructing manhole and catch basin structures to the size and type, as shown on the specified plans and details, to the line and elevation of final grade, of Portland cement concrete block masonry, brick masonry, or precast concrete units (with or without steel reinforcement as provided); furnishing and placing metal frames and covers for new structures or removal and replacement of damaged frames and covers as determined by the Engineer.

**b. Materials.** The materials used for constructing sanitary and storm sewer manholes and catch basins shall conform to the requirements of the Standard Specifications for Construction subsection 403.02, unless otherwise specified herein.

Backfill for sanitary and storm sewer manholes and catch basins shall be Class IIIA granular material as specified in Table 902.3 of the Standard Specifications for Construction.

Pavement subgrade backfill shall be Class II or 21AA aggregate and shall conform to the Standard Specifications for Construction, subsection 902.05

Gray Iron Castings shall be as specified in subsection 908.05. Gray Iron Castings of the Standard Specifications for Construction, City of Detroit Department of Public Works (DPW), City Engineering Department (CED), and Detroit Water and Sewerage Department (DWSD) Manhole and Catch Basin Drawings No's. 101 thru 113, Public Lighting Department (PLD) Manhole and Handhole Drawings, and as specified herein.

The manhole and catch basin frame and its cover or grate shall constitute one unit. Each unit shall conform to the detailed requirement of the respective DPW/CED/DWSD/PLD drawing. Each unit shall have a weight, with a tolerance of plus or minus 3 percent, of that specified in the respective DPW/CED/DWSD/PLD drawing.

**c. Construction.** Manholes and Catch Basins shall be constructed in accordance with subsection 403.03, of the Standard Specifications for Construction and Standard Plan R-1-Series Drainage Structures, for "Typical Manhole", "Inlet", and, "Catch Basin" unless otherwise specified herein.

The Contractor shall comply with all Federal, State, and local laws and regulations governing construction methods and the furnishing and use of all safeguards, safety devices, protective equipment, and pollution controls. It shall be the Contractor's responsibility to protect, as reasonably necessary, the life and health of all personnel on the job, the safety and health of the public, and to protect property during the construction of the project.

The Contractor shall inform the local Fire and Police Departments 48 hours in advance of his/her program of street obstruction and detours, so that the Fire and Police Departments can set up plans for servicing the area in case of an emergency.

Pavement, curbs, sidewalks, and driveways which are required to be removed, shall be removed as specified in the applicable sections of the standard specifications. Pavement, curbs, sidewalks, and driveways shall be sawed in straight lines parallel or perpendicular to the line of work or removed to the nearest joint and shall be limited to the minimum area necessary to do the required underground work. Any broken or damaged walks or driveways shall not be patched but shall be entirely replaced.

Excavation for constructing manholes and catch basins shall conform to subsection 206.03.A of the Standard Specification for Construction unless otherwise specified herein.

Backfilling for structures shall be as specified in subsection 401.03.D of the Standard Specifications for Construction. The backfilling around structures shall not begin any sooner than 12 hours after the structure has been completed, except precast structures which may be backfilled immediately.

Excavation shall be made in such a manner so as to protect the side walls from caving in, and so as not to incur damage to either private or public property. Excavated material shall be hauled away from the trench area continually as part of the trenching operation.

Excavation beyond the minimum dimensions specified or shown on the Plans, when not so directed by the Engineer, will be deemed unauthorized, and the space of excess excavation shall be filled in the same manner as specified above at no increase in Contract Price.

Adequate pumping equipment and drainage facilities shall be provided and maintained, to dewater the work area, and water entering the work from whatever source shall be promptly removed and properly disposed of. All required pumping and drainage shall be done without damage to adjacent property or structures, or to the operations of other contractors, and without interference with the rights of public or private owners or pedestrian and vehicular traffic.

Bottoms for structures may be of precast units or poured in place concrete and shall be supported by a compacted six (6) inch minimum granular base unless otherwise noted on plans. If the bottoms are poured in place, they shall be allowed to set for 24 hours before placing masonry or otherwise working on top of it.

Manhole and catch basin base slabs shall have a nominal diameter and thickness, and be reinforced, as shown on the MDOT Standard Plans.

The metal frames, covers, and grates on existing manholes and catch basins that are to be reused shall be carefully removed to prevent damage. Any reusable casting damaged by the Contractor shall be replaced with a new casting without additional cost to the City. All salvaged castings that are not to be used on the work shall become the property of the Contractor and shall be promptly removed from the job site.

**d. Measurement and Payment.** The completed work as described for constructing new “Manholes”, “Catch Basins” and “Inlets” of the size and type specified will be measured as units,

<b>Pay Item</b>	<b>Pay Unit</b>
Dr Structure Cover, Type __, Modified.....	Each
Dr Structure, __ inch dia, Modified.....	Each

**Dr Structure Cover, Type \_\_, Modified** and will be paid for at the Contract unit price per each. This price shall be full compensation for all labor, equipment, materials, excavation, including removal and disposal of all materials encountered, openings, and backfilling, required to complete the construction as specified herein. **Dr Structure Cover, Type \_\_, Modified** unit price shall include removing and disposing of existing damaged cover and frame, and furnishing and installing structure cover and frame of the appropriate type. Pavement removal and replacement, when required, will be paid for separately.

**Dr Structure, \_\_ inch dia, Modified** and will be paid for at the Contract unit price per each. This price shall be full compensation for all labor, equipment, materials, excavation, including removal and disposal of all materials encountered, openings, and backfilling, required to complete the construction as specified herein. Pavement removal and replacement, when required, will be paid for separately.

SPECIAL PROVISION  
FOR  
**STRUCTURE COVER ADJUSTMENT, HANDHOLE COVER  
ADJUSTMENT, RECONSTRUCTING STRUCTURE,  
AND WATER SHUTOFF ADJUSTMENT**

SMITHGROUP

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06-18-2024

**a. Description.** The work consists of adjusting utility structure covers in accordance with the applicable provisions of section 403 and 823 of the Standard Specifications for Construction, except as modified herein.

Utility structure cover adjustments will include all Public Lighting Department (PLD) manholes, all Public Lighting Authority (PLA), and all Detroit Water and Sewerage Department (DWSD) gate wells, sewer manholes, and catch basins whose covers are required to be raised or lowered to meet the required new pavement elevations. Water shutoff adjustments will include DWSD water shutoff boxes or stop boxes, and PLD hand holes which are required to be raised or lowered to meet the required new pavement elevations.

Before starting this work, the Contractor and the Engineer, or his representative, shall jointly inspect each structure to evaluate its interior conditions. Access to the structure will be provided by the Contractor. The Engineer, or his representative, shall determine whether the structure is to be adjusted or reconstructed. The Engineer shall also determine if any structure cleaning is necessary to remove existing debris. The Contractor shall remove all debris from the structure resulting from the Contractor's operations.

**b. Materials.** Materials used in the adjustment and reconstruction of drainage structures shall be as specified in section 403 of the Standard Specifications for Construction.

**c. Construction.** Where called for on the plans or authorized by the Engineer, existing structure covers shall be adjusted to the proper elevation in accordance with section 403 of the Standard Specifications for Construction, except as modified herein.

For Case 1 structures, saw cut full depth and remove the adjacent concrete and/or HMA pavement, curb, curb and gutter, or sidewalk as necessary to adjust the structure and cover. Remove an area of pavement and curb at least five (5) feet by five (5) feet around the structure. The existing frame and cover shall be carefully removed and the upper portion of the existing utility structure repaired as necessary and raised or lowered as required. The frame and cover shall then be reset on the adjusted structure so constructed as to hold them firmly in place and reset on a full mortar bed so as to fit the required new pavement grade and cross section. Replace adjacent concrete and/or HMA pavement, curb, curb and gutter, or sidewalk to match existing grades or to the required new pavement grade and cross section.

Case 2 structures shall be those that are located outside of existing pavement, curb, and curb and gutter.

When the existing frames and covers are unacceptable for reuse, as determined by the Engineer, new frames and covers shall be furnished and installed.

Drainage structure frames and covers shall be as specified in the City of Detroit Special Provision for Drainage Structures and Structure Covers, and as specified in the Plans for DWSD Watergate and PLD Manhole covers. Any reusable frame and cover damaged by the Contractor shall be replaced by the Contractor at no cost to the City. The frames and covers that are not to be used on the work shall become property of the Contractor and shall be promptly removed from the jobsite and properly disposed of.

Where the structure is in need of repair, as determined by the Engineer, in excess of the adjustment limits set forth herein, the existing structure shall be broken down and rebuilt with new materials as specified in the City of Detroit Special Provision for Drainage Structures and Structure Covers, to the required new pavement elevations. The cost of this shall be included in the Dr Structure, \_inch dia, Modified pay item.

A finished concrete collar shall be placed around any structure adjusted that is within five (5) feet of the Detroit Thermal (formerly Detroit Edison) steam lines, as directed by the Engineer. The cost of this shall be included in the Dr Structure Cover, Adj, Case 1, Modified pay item.

Non-ferrous handholes and covers used by PLD and other City Utilities are made of fiberglass, copolymer propylene or similar material. These structures and covers shall be adjusted by a qualified electrical contractor. The removal of concrete around the perimeter of a non-ferrous handholes shall be performed with light chipping hammers to insure that no damage is done to the handhole, cover or any conduit or other utility that may feed the structure. Any damage to structures, conduits, cable and wiring shall be repaired by the Contractor at no cost to the City or utility.

For HMA pavement sections, immediately before placing the HMA top course or overlay, make final adjustments to drainage structure covers. Equipment will not be permitted to operate over adjusted structures for a period of twenty-four (24) hours after their completion, unless otherwise approved by the Engineer.

**d. Measurement and Payment:** The completed work as described for adjusting or reconstructing structure will be measured as units and will be paid for at the Contract Unit Price.

**Pay Item**

**Pay Unit**

Dr Structure Cover, Adj, Case 1, Modified .....	Each
Water Shutoff, Adj, Case 1, Modified .....	Each

**1. Dr Structure Cover, Adj, Case 1, Modified** shall include the above described work necessary to raise or lower the existing catch basin, manhole, or gate well rim elevation involving adjustment, repair, or replacement of less than or equal to five (5) layers of bricks or three (3) layers of concrete blocks, both including mortar, regardless of whether or not it is necessary to remove a cone section to accommodate the rim elevation adjustment.

**2. Water Shutoff, Adj, Case 1, Modified** shall include the above described work necessary to raise or lower the existing structure and cover of water DWSD water shutoff boxes or stop boxes, and PLD and PLA hand holes.

The completed work as described herein will include excavation, backfilling, disposal of surplus material, removal of all debris and foreign material from the structure (including the sump); adjusting the structure and cover to the required new pavement grade and cross section, with the existing or new cover; and providing access to all structures for inspection, as directed by the Engineer. Structure damage, due to the Contractors operations shall be repaired at the Contractors expense.

CITY OF DETROIT  
SPECIAL PROVISION  
FOR  
**CONCRETE PAVEMENTS**

SMITHGROUP

1 of 2

06-18-2024

**a. Description.** This work shall consist of constructing concrete pavement, or a concrete base pavement, in accordance with section 602 and 801 of the Standard Specifications for Construction as applicable and as specified herein.

**b. Materials.** Concrete Pavement materials shall meet the requirements of section 602 and 801 of the Standard Specifications for Construction.

1. Concrete Grade 4,000 (4,000 psi at 28 days). All concrete finish types shall be the same concrete mix, contain the same coarse and fine aggregates, and shall NOT have any changes in concrete admixtures.

2. Fiber reinforcement: Provide monofilament polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, type III, ¾ inches long and dosed between 3 and 4 pounds per cubic yard.

3. Curing Compound. Curing compound shall be Type 1, clear, conforming to ASTM C-309.

4. Joint Sealant to be a 2-component, premium grade, polyurethane based elastomeric sealant in a non-sag consistency. Color, from product's standard list of colors, to be submitted for Engineer review and approval. Joint sealant to be Sikaflex 2cNS, Sonneborn NP2, or equal as approved by the Engineer.

5. Submit the following documents to the Engineer for review and approval prior to proceeding with construction of concrete pavements:

- A. Concrete mix design
- B. Curing method and materials
- C. Joint sealant and color samples

**c. Construction.**

1. Installer Qualifications. The installer shall have a minimum of 5 years' experience in concrete pavement with the finishes and joint types indicated and successfully completed not less than 6 projects comparable in scale and complexity. Documented proof that the proposed installer has a 5-year proven record of performance, confirmed by at least 3 local projects that the Engineer can examine.

2. Project Conditions. Concrete placement shall be installed within the following environmental requirements:

A. Maintain an ambient temperature of between 50 degrees F and 90 degrees F during application and at least 48 hours after application. Do not place concrete when the temperature of the surrounding air is expected to be below 40 degrees F during placing or within 24 hours thereafter. Do not allow the temperature of plastic concrete to drop below 55 degrees F.

B. When the mean daily temperature of the atmosphere is 80 degrees F and above, do not place concrete with a placing temperature which causes difficulty from loss of slump, flash set, or cold joints 75 degrees F where possible and not more than 90 degrees F in any event. Where climatic conditions cause too rapid drying, make arrangements prior to placing concrete for installation of wind breaks, shading, fog spraying, water sprinkling, ponding, or wet covering of a light color. Take such protective measures as quickly as concrete hardening and finishing operation allow and maintain throughout the entire curing period.

3. Slope sidewalks as shown on plans and details. Construct concrete pavements to ADA slope requirements where located as an ADA accessible path.

A. Construct **Conc Pavt, Misc, Reinf, 8 inch, Modified** for driveway approaches as shown on plans. Include, at a minimum, the first flags of sidewalk adjacent to the driveway and alley approaches as **Conc Pavt, Misc, Reinf, 8 inch, Modified**.

4. All exposed portions of concrete pavement to have a medium broom finish without imperfections, chips, marks, and holes.

A. Provide a medium broom finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom.

B. Medium broom finish to be provided perpendicular to the primary direction of travel.

5. Concrete pavement joints shall be constructed and located as shown on plans.

6. Restore area disturbed beyond actual concrete pavement to pre-construction conditions or as shown on plans.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price for the following pay items:

<b>Pay Item</b>	<b>Pay Unit</b>
Conc Pavt, Misc, Reinf, 8 inch, Modified.....	Square Yard
Conc Base Cse, Nonreinf, 10 inch, Modified.....	Square Yard

1. Sawcutting, control joints, expansion joints, sealant, reinforcement, tie bars, and other items which may be required shall be considered included in the construction and will not be paid for separately.

2. Any extra costs including but not limited to additional labor, materials, and equipment incurred by the contractor due to cold weather protection requirements will not be paid for separately and are considered included in the construction. The contractor shall include all costs required to complete the construction activities per the construction milestone dates identified in the bidding proposal.

CITY OF DETROIT  
SPECIAL PROVISION  
FOR  
**SIDEWALK, CONCRETE**

SMITHGROUP

1 of 4

06-18-2024

**a. Description.** The work consists of constructing concrete sidewalk, in accordance with section 803 of the Standard Specifications for Construction, and as specified herein.

**b. Materials.** Sidewalk materials shall meet the requirements of subsection 803.02 of the Standard Specifications for Construction.

1. Concrete Grade 4000 (4,000 psi at 28 days). All concrete finish types shall be the same concrete mix, contain the same coarse and fine aggregates and shall NOT have any changes in concrete admixtures.

2. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source.

3. Fiber reinforcement: Provide monofilament polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, type III,  $\frac{3}{4}$  inches long and dosed between 3 and 4 pounds per cubic yard.

4. Curing Compound. Curing compound shall be Type 1, clear, conforming to ASTM C-309.

5. Joint Sealant to be a 2-component, premium grade, polyurethane based elastomeric sealant in a non-sag consistency. Color, from product's standard list of colors, to be submitted for Engineer review and approval. Joint sealant to be Sikaflex 2cNS, Sonneborn NP2, or equal as approved by the Engineer.

6. Submit the following documents to the Engineer for review and approval prior to proceeding with construction of sidewalks:

- A. Concrete Mix Design
- B. Sandblast Finish Concrete Coarse Aggregate: 5 lb. Ziplock bag of representative sample.
- C. Curing method and materials
- D. Joint Sealant and color samples

**c. Construction.**

1. Installer Qualifications. The installer shall have a minimum of 5 years experience in concrete pavement with the finishes and joint types indicated and successfully completed not less than 6 projects comparable in scale and complexity. Documented proof that the proposed installer has a 5-year proven record of performance, confirmed by at least 3 local projects that the Engineer can examine.

2. Project Conditions. Concrete placement shall be installed within the following environmental requirements:

A. Maintain an ambient temperature of between 50 degrees F and 90 degrees F during application. Do not place concrete when the temperature of the surrounding air is expected to be below 40 degrees F during placing or within 24 hours thereafter. Do not allow the temperature of plastic concrete to drop below 55 degrees F.

B. When the mean daily temperature of the atmosphere is 80 degrees F and above, do not place concrete with a placing temperature which causes difficulty from loss of slump, flash set, or cold joints 75 degrees F where possible and not more than 90 degrees F in any event. Where climatic conditions cause too rapid drying, make arrangements prior to placing concrete for installation of wind breaks, shading, fog spraying, water sprinkling, ponding, or wet covering of a light color. Take such protective measures as quickly as concrete hardening and finishing operation allow and maintain throughout the entire curing period.

3. Construct all sidewalks with a maximum cross slope of 2.00 % (1/4 inch per foot) sloping inclusive of all tolerances but not less than 1.00 % minimum. Slope sidewalks as shown on plans.

4. Construct concrete sidewalk to a minimum 6-inch thickness at locations indicated on the plans.

5. Restore area disturbed beyond actual sidewalk limits to pre-construction conditions or as shown on plans.

6. Pavement finish will be as indicated on plans. Verify and coordinate concrete finishes with Engineer prior to proceeding with work.

A. Do not add water to concrete surfaces during finishing operations.

B. Medium (Coarse) Broom Finish

(1) Concrete sidewalks, ADA sidewalk ramps, and concrete pads for site furnishings and amenities.

(2) Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom, perpendicular to direction of traffic and as shown on the plans.

(3) Confirm direction of broom finish with Engineer prior to proceeding with construction.

C. Medium Sandblast Finish

(1) Provide medium sandblast finish to provide symbols, markings, and decorative areas as shown on plans and details.

(2) Partially expose coarse aggregate to an approximate reveal of 1/16 to 1/8 inch reveal.

7. Project Mock-Up. Construct mock-up samples of the sidewalk concrete large enough to illustrate each type of sandblast symbol and sandblast finish type shown on plans and details. Mock-up samples, shall be constructed to indicate the jointing, texture and finish, and curing compound in actual construction. Make mock-up samples as required until acceptance by the Engineer. The location of the mockup shall be approved by the Engineer prior to proceeding with the mockup. The cost for construction of the mock-up samples shall be included in the unit prices for the respective concrete sidewalk pay item and no additional compensation shall be provided for additional samples. Consider the approved mock-ups as a standard of workmanship to be matched throughout the Project. The sample may NOT be constructed as part of the Project. Remove samples which fail to meet the Engineer's approval. The approved samples shall remain in place during the complete duration of construction and shall be removed and disposed of by the contractor at the completion of the project.

A. Note: Contractor to schedule and construct mock-up within appropriate time-frame to accommodate the review and approval process as well as the potential need for subsequent mock-up samples to obtain approval prior to the scheduled time to commence construction of the concrete sidewalks per the approved project schedule.

8. Concrete pavement joints shall be constructed and located as shown on plans and as defined below.

A. Notify Engineer of any jointing layout discrepancies shown on the plans for supplemental directions prior to proceeding with construction.

B. All dimensions are back of curb, edge of pavement, center of arc, or center of fixture unless otherwise noted.

C. There shall be ½" sealed expansion joint at all curb/sidewalk, seat wall/sidewalk, footing/sidewalk, building/sidewalk, light pole, or any other fixed objects (i.e. existing pavement, walls, poles, foundations). Plans may not show every required sealed expansion joint.

D. Control joints and sealed expansion joints in curbs and walls to align with control joints and sealed expansion joints in the adjacent concrete pavement and sidewalk.

E. Control joints and sealed expansion joints at driveway and alley approaches shall align with adjacent curb returns.

F. Control joints and sealed expansion joints to align with adjacent pavement, curbs, walls, etc. unless otherwise noted on the plans. Align joints perpendicular to pavement edge and align with center point of arcs, as shown.

G. Sawcut joints cut with irregularities as identified by the Engineer shall require the removal and replacement of the concrete pavement and joints at no additional cost.

9. Finished concrete pavement shall meet or exceed the quality, finish, and workmanship exhibited in the approved mock-up or be subject to rejection and replacement at the contractor's expense.

10. Provide the necessary materials and take the steps required to protect subsequent pours of concrete, saw cutting joints, finish treatment, and other related work from damage, damage from finish applications, staining, discoloring, contaminating, and/or causing any type of blemishes. Finished concrete pavement shall meet or exceed the quality, color, finishes (all types), and workmanship exhibited in the approved mock-up or be subject to rejection and replacement at the contractor's expense.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price for the following pay item:

<b>Pay Item</b>	<b>Pay Unit</b>
Sidewalk, Conc, 6 inch, Modified .....	Square Foot
Conc, Sandblast .....	Square Foot
Conc, Sandblast, Sym, Bike .....	Each
Conc, Sandblast, Sym, Arrow .....	Each
Conc, Sandblast, 4 inch, Line .....	Foot

1. Sawcutting, control joints, sealed expansion joints, sealant, reinforcement, tie bars, finishing, and other items which may be required shall be considered included in the construction and will not be paid for separately.

2. Any extra costs including but not limited to additional labor, materials, and equipment incurred by the contractor due to cold weather protection requirements will not be paid for separately and are considered incidental to related items of work. The contractor shall include all costs required to complete the construction activities per the construction milestone dates identified and in the bidding proposal.

CITY OF DETROIT  
SPECIAL PROVISION  
FOR  
**HYDRANT, RELOCATE**

SMITHGROUP

1 of 2

06-18-2024

**a. Description.** This work consists of replacing existing hydrants with new hydrants and installation of the hydrant, including the valve and box if required, to a new location. This work also includes adjusting the elevation of the hydrant to the proper height above grade. All work must be done in accordance with the standard specifications except as modified herein.

**b. Materials.** Pipe, joints, gaskets, fittings, valves, valve boxes, and hydrants to be in accordance with City of Detroit (Municipality) Specifications. Supplemental materials including gravel or concrete for the hydrant base and thrust blocks or joint restraint in accordance with Municipality Specifications. New hydrants to be installed at all locations. New hydrants to be supplied by Detroit Water and Sewerage Department (DWSD). Obtain new hydrants at DWSD supply yard. Coordinate hydrants with Donovan R. Walton, Water Systems Supervisor, 6425 Huber – C.F.S. Room # N-4, Detroit, MI 48211, 313-267-1211.

**c. Construction.** The hydrant location to be staked in the field by the Contractor per the locations shown on the plans. Locations to be approved by the local Fire Department, Detroit Water and Sewerage Department (DWSD), and the Engineer. The Contractor must arrange for the Municipality to shut down the main as required for hydrant relocation. All work to be performed in accordance with section 823 of the Standard Specifications for Construction and applicable American Water Works Association (AWWA), Environment, Great Lakes, and Energy (EGLE), and DWSD requirements.

Care must be exercised when installing the hydrant, gate valve, box, and appurtenances to prevent damage to the materials. The hydrant must be installed level, plumb, and must have nozzles arranged as required by the local Fire Department and at the same height as previously installed or as approved by the Engineer.

All valves must be set and jointed to the water mains in the manner as specified for the laying and jointing of that particular type of pipe. All valves must be installed in the position as shown on the plans or as directed by the Engineer. Care must be taken that the valve stems are plumb.

Paint hydrants per Fire Department standards as directed by the Engineer.

Notify Engineer and DWSD of removed hydrants and valves to determine if DWSD wants to retain the materials. Coordinate with the Engineer and DWSD for DWSD to pick up materials identified for salvage from the project site. All materials identified by the Engineer and/or DWSD that they do not want salvaged shall be disposed of legally off-site by the contractor at no additional cost.

For Hydrant, Relocate, Case 2, Modified, two removal conditions apply, 'Remove Hydrant – Method I', and 'Remove Hydrant – Method II'.

'Remove Hydrant – Method I'. An existing hydrant is connected to the water main, to remain in service, with a tee. Remove existing hydrant, valve, and hydrant lead to water distribution main.

Install a plug and thrust block at the existing hydrant tee in the existing distribution main and removing portions of the existing hydrant system, as necessary for the project construction as determined by the Engineer.

'Remove Hydrant – Method II'. An existing hydrant is connected to the water main, to remain in service, with a tapping sleeve and valve. Remove existing hydrant, valve, and hydrant lead to water distribution main. Remove the existing tapping sleeve and valve from the existing water main by cutting it out of the system. Install new solid piping and sleeves as required. The work also includes removing portions of the existing hydrant system, as necessary for the project construction as determined by the Engineer.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following contract items (pay items):

<b>Pay Item</b>	<b>Pay Unit</b>
Hydrant, Relocate, Case 1, Modified .....	Each
Hydrant, Relocate, Case 2, Modified .....	Each

**Hydrant, Relocate, Case 1, Modified** includes removing the hydrant from its existing location, extending the existing hydrant lead from the gate valve, and reinstalling the hydrant complete and ready for use, including furnishing and installing any necessary sleeves, fittings, additional pipe up to 40 feet in length, thrust blocks or joint restraints per Municipal Standards, and the concrete or gravel base. Also included is hydrostatic testing and disinfection and flushing required per AWWA C651 as required by the EGLE.

**Hydrant, Relocate, Case 2, Modified** includes removing the existing hydrant, gate valve, gate box, removing existing hydrant lead per 'Remove Hydrant – Method I' or 'Remove Hydrant – Method II', and reinstalling the hydrant and gate valve complete and ready for use. This payment will include furnishing and installing the cutting-in-sleeve and/or tee, additional pipe, pipe coupling, tee, elbow, and thrust blocks or joint restraints per Municipal Standards, dewatering the pipe, concrete or gravel base. Also included is hydrostatic testing and disinfection and flushing required per AWWA C651 as required by the EGLE and disinfection and flushing required by the DWSD. Tapping valves and additional pipe required in excess of 40 feet, where shown on the plans, will be paid for separately. Tapping valves, if used at the Contractor's option, will be included in the cost of **Hydrant, Relocate, Case 2, Modified**.

All labor and materials necessary to vertically adjust the relocated hydrant and gate box to final grade is included in the cost of **Hydrant, Relocate, Case 1, Modified** or **Hydrant, Relocate, Case 2, Modified** pay item.

All excavation and furnishing, placing, and compacting of backfill for the hydrant installation will be considered as included in the **Hydrant, Relocate, Case 1, Modified** or **Hydrant, Relocate, Case 2, Modified** pay item.

CITY OF DETROIT  
SPECIAL PROVISION  
FOR  
**LITTER AND DEBRIS REMOVAL**

SMITHGROUP

1 of 1

06-18-2024

**a. Description.** This work consists of miscellaneous litter and debris removal throughout the limits of work and shall be conducted in accordance with the Standard Specification for Construction, section 204, except where noted in this Special Provision.

**b. Materials.** Provide necessary materials in accordance with the standard specifications.

**c. Construction.** Remove all miscellaneous litter and debris in the areas identified on the Plans and as directed by the Engineer throughout the Project area. Miscellaneous litter and debris includes but is not limited to such items as concrete footings and attachments, pavement and aggregate material piled on the ground surface, abandoned vehicles, construction debris, rubble, wood/timbers, brick, cmu block, trash, paper, plastic, wood, metals, cans, litter and other objects identified on the plans and encountered in the Project area.

The limits of litter and debris removal to be field verified and approved by the Engineer prior to removal activities.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price for the following pay item:

<b>Pay Item</b>	<b>Pay Unit</b>
Litter and Debris, Rem .....	Ton

1. **Litter and Debris, Rem** shall include all labor, materials, equipment, disposal fees and trucking. Weigh each load of **Litter and Debris, Rem** to the nearest 20 pounds on an approved scale with an automatic printout system. Payment shall be approved by the Engineer based on documented weight tickets. Payment for removal and disposal costs without documented weight tickets will not be approved. Any damage to existing buildings, walls, utility structures, pavement or other existing site elements to remain shall be repaired to pre-construction conditions at no additional cost to the Project.

CITY OF DETROIT  
SPECIAL PROVISION  
FOR  
**EXTERIOR PLANTS**

SMITHGROUP

1 of 16

06-18-2024

**a. Description.** This work consists of furnishing and installing all materials and completion of all work items associated with the installation and maintenance of all landscaping, trees, shrubs, ground cover, perennials, vines, plant materials, mulch, soil materials, and treatments in accordance with section 815 of the MDOT Standard Specifications for Construction, as indicated on the plans with the following exceptions and additions specified herein.

The Contractor shall be a company specializing in landscape installation and maintenance, having a minimum of 5 years' experience in projects of the scope and scale being specified.

**b. Materials.**

1. Plant procurement verification.

A. Within 4 weeks following execution of the contract for construction, submit vendor purchase orders or bill of lading for each plant species showing sizes, quantities and root treatment.

B. Provide digital photos of all plants materials. Photos must depict the entire size and condition of the plant and include a scale rod or other measuring device to show scale. For species where more than 20 plants are required, include a minimum of three photos that show the average plant, the best quality plant, and the worst quality plant to be provided. Label each photograph with the plant name, plant size, and name of the growing nursery.

C. The Contractor may request the Engineer to provide nursery visits for the purpose of reviewing and tagging plant materials. The Contractor shall compensate the Engineer for said services.

D. Substitutions of plant materials will not be permitted unless authorized in writing by the Engineer. If proof is submitted in writing that a plant specified is not obtainable, the Engineer may assist in identifying alternate sources or substitutions. Plants of larger size may be used if approved and if root balls meet the American Association of Nurserymen (AAN) standards for the increased size. Adjustments will be made at no additional cost. Container plants may be substituted for those designated Balled and Burlap (B&B) if approved by the Engineer.

2. Identify manufacturer and provide the applicable product data for:

A. Tree wrap

B. Fertilizer

C. Soil amendments: Provide information on composition and source of all soil amendments.

- D. Mycorrhizal inoculum.
- E. Pesticides and herbicides. Include product label and manufacturer's application instructions specific to the project site.
- F. Antidesiccants. Include product label and manufacturer's application instructions.
- G. Soil amendments. Provide information on composition and source of all soil amendments. Include test results for compost and peat.
- H. Tree Root Ball Stabilizers (Staples). Provide information for anchoring tree rootballs in tree grates with tree guards.

3. Provide the following physical samples:

- A. Mulch. 1 quart by volume in sealed plastic bag labeled with composition of materials by percentage of weight and source of mulch.
- B. Staking and/or guying materials.
- C. Topsoil. Certified test reports per topsoil special provision.

4. Certifications.

- A. Phytosanitary certification. Plant material Inspection Certificates required by Federal, State or other governing authority shall be submitted to the Engineer upon delivery of each shipment.
- B. Analysis and standards. Products in sealed containers shall be labeled with manufacturer's certified analysis. Bulk materials shall be tested by an approved laboratory in accordance with Association of Official Agricultural Chemists procedures, or as specified by product specifications referenced herein.

5. Schedules and Reporting

- A. Maintenance Schedule. Prior to the issuance of Substantial Completion, submit a detailed typewritten approach and schedule for the maintenance of all landscape activities. Coordinate landscape maintenance with other applicable Sections (Seeding and Topsoil) and combine all maintenance activities into one plan of action. The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
- B. Maintenance Report Forms. Use the approved Maintenance Schedule as the framework for all maintenance activities (plant maintenance, seed bed maintenance, etc.). The Contractor shall provide detailed maintenance report forms for each site visit. The reports shall be completed by the on-site maintenance superintendent performing the work prior to leaving the site and shall be submitted monthly as back-up to each invoice. Office prepared reports will not be permitted and payment for this work will only be approved by the Engineer when proof of completed specified maintenance has been provided. Each report shall include the following:

- (1) Date of activity.
- (2) Length of time on site (start time and finish time).
- (3) Name and signature of the maintenance superintendent.
- (4) Number of personnel performing the work.
- (5) Site climatic conditions (rain, wind, temperature, etc.)
- (6) Detailed description of maintenance activities performed

C. Watering Plan. Prior to the issuance of Substantial Completion, submit a detailed typewritten approach and schedule that outlines watering requirements for maintaining the landscape as described herein. The plan shall address frequencies and durations that will be established to provide the correct watering rates for plants and lawns. Describe means, methods and frequencies for hand watering. Reliance on natural precipitation will only be allowed with provision of recorded data from a rain gauge located within a 2-mile radius of the project site. The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period. An irrigation system is NOT being installed.

#### 6. Delivery, Storage, and Handling of Landscape Materials.

A. Packaged Materials: Deliver packaged materials in original unopened containers showing weight, analysis and name of manufacturer. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage. Store materials only in locations approved by the Engineer.

#### 7. Plant Materials:

A. Schedule shipping to minimize on-site storage of plants. Stock shall not be shipped until the planting preparations have been completed. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. During shipment, do not bend, stack or bind plants in a manner that damages bark, breaks branches or root systems, deforms root balls or destroys natural shape. Transport plants in closed vehicles or with the entire load properly covered to protect from drying winds, heat, freezing or other exposure that may be harmful.

B. Any plants requiring sweating to break dormancy must have this procedure carried out before plants arrive onsite.

C. Labels: Prior to shipping, each plant or bundle of like variety and size shall be labeled with legible weatherproof tags indicating the correct name and size of plant.

D. Once on site, keep plants thoroughly watered and protected from sun, wind and mechanical damage; completely cover root balls with moistened topsoil or mulch. Water as often as necessary to maintain root systems in a moist, but not overly wet, condition.

E. Handle plants at all times in accordance with the best horticultural practices. Lift B&B materials from the bottom of the ball only; do not roll the plants. Plants handled otherwise will be subject to rejection. Balled and burlapped plants which have cracked or broken balls are not acceptable and shall not be planted. Plants with mechanical damage, deformation or breakage will not be accepted and are to be replaced at the Contractor's expense.

#### 8. Planting Season.

A. Materials shall be installed during planting seasons normally recognized in the job locality.

B. Planting season shall be from April 1 to June 15 and from October 1 until the prepared soil becomes frozen in USDA Hardiness Zone 5. Plant evergreen plants between April 1 and June 1. When unusual planting conditions exist or when container-grown material is used, the Engineer may alter these planting seasons.

C. If special circumstances warrant installation outside the normal planting season, submit a written request to the Engineer describing conditions and stating the proposed variance. Planting outside the planting season does not alter warranty obligations.

#### 9. Plants.

A. All planting stock shall be nursery-grown, sound, healthy and vigorous, of uniform growth, typical of the species and variety, with the minimum quality conforming to American Standard for Nursery Stock, free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, weak crotch angles, abrasions or disfigurement. Unless noted otherwise, trees shall have straight single leaders and evergreens shall be unsharped. Branching on all plants shall be well-developed, dense, uniformly distributed and characteristic of the species.

(1) Plants indicated as specimen shall be exceptionally heavy, symmetrical, and superior in form, branching, and symmetry.

(2) Plants shall originate from same USDA Hardiness Zone as project site, or lower (colder).

(3) Height is indicated with a tolerance. The smaller dimension is the minimum acceptable; the larger dimension represents the maximum permissible except with approval of the Engineer. The average dimension of all plants must, at least, equal the average of the tolerance figures shown on the drawings.

(4) Spread shall meet the minimum dimension specified in all directions and must be considered as pivoting on the center of plant. Where tolerance is shown between two spread dimensions, the smaller dimension is the minimum acceptable. Spreads shall at least average the median of the range indicated.

(5) Caliper is the trunk diameter taken at a specified distance above root collar as described in ANSI Z60.1.

(6) Branching height is the distance above ground where balanced branching occurs or where a dimension in trunk appears to form the head of the tree.

(7) Canes on shrubs shall arise at or just below the root crown. Multi-stem and clump form trees shall have branches that arise at the root crown or just above the root crown.

(a) Plant/ball sizing shall conform with the latest edition of ANSI Z60.1, American Standard for Nursery Stock, unless otherwise designated or modified in this section or on the plant list. Plants of a larger size may be used if acceptable to Engineer and at no additional cost, with a proportionate increase in size of roots or balls.

(b) Trees shall have straight single leaders. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will not be accepted.

(c) Root treatments on all plants shall conform to the requirements of ANSI Z60.1.

(d) Balled and burlapped ("B&B") plants shall have a firm, natural ball of earth securely wrapped with burlap, bound with cord and/or wire basket. Root flare shall be visible before planting.

(e) Containers shall be finished landscape grade material having their roots well established in the soil mass. Plants over-established in the container, as evidenced by pot-bound root ends, will not be accepted.

(f) Perennials and ornamental grasses shall have a well-established root system reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container.

(g) Stressed or damaged plants or those not conforming to the specifications shall be subject to rejection by the owner at any time during the term of the contract.

(h) All plants shall have a label securely attached bearing legible designation of plant's common and scientific name, including genus and species, and cultivar or variety, if applicable.

(i) Do not prune plants prior to delivery.

10. Topsoil. Refer to Topsoil and Prepared Soil Mixes Special Provision. Topsoil for planting will originate offsite.

11. Hardwood Bark Mulch. Organic mulch shall be well-composted, finely shredded processed hardwood bark, free from foreign material and fragments in excess of 2 inches in any dimension. Dyed red or colored mulch will not be accepted.

## 12. Staking and Anchoring Materials.

- A. Triple stake deciduous trees in lawn areas and in planting beds. Use subsurface root ball stabilizing (staple) system in plant pits with tree grates and tree guards.
- B. Tree support stakes shall be 2 inch x 2 inch hardwood posts 8 feet long.
- C. Wire stays for tree stakes shall be pliable, No. 12 to 14 gauge galvanized wire.
- D. Chafing guards shall be fiber-reinforced hose of not less than 1/2 inch inside diameter, color black.
- E. Subsurface anchoring system shall carbon steel, 48-inch long staples, 3 per tree.

13. Tree Wrap. Tree wrap shall be 4-inch wide, two-ply, waterproofed crepe Kraft paper with plies cemented together with asphalt. Twine used to secure wrap shall be natural fiber two-ply jute; plastic twine is not acceptable.

## 14. Soil Amendments.

- A. Peat shall be a product having at least 95% organic content consisting of sphagnum peat moss with a pH range of 3.0 – 4.0 and Von Post decomposition value of H1 – H3, or low-lime reed-sedge peat with a pH range of 4.0 to 5.0 and Von Post decomposition value of H4 – H6. Product shall be free of sticks, wood or other debris.
- B. Compost shall be a mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. The compost shall have a dark brown or black color, be capable of supporting plant growth without ongoing addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species). The compost shall be visually inspected and approved by the Engineer for physical contaminants. The compost moisture content shall be such that no visible free water or dust is produced when handling it.
- C. Sand shall be clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregates.

## 15. pH Adjusters:

- A. Lime shall be finely ground agricultural grade dolomitic limestone containing not less than 85% calcium and magnesium carbonates.
- B. Elemental sulfur shall be granular, biodegradable, horticultural grade material containing at least 90% sulfur, with a minimum of 99% passing through No. 6 sieve and a maximum of 10% passing through No. 40 sieve.

16. Mycorrhizal Inoculum. Mycorrhizal fungi in the inoculant shall be available as propagules, i.e., spores, root fragments and hyphae. The inoculant shall contain highly selected strains of low host specificity endo- and ectomycorrhizal fungi combined with other beneficial fungi (Trichoderma), humic acids, biostimulants, beneficial bacteria, soluble sea kelp, and yucca plant extracts.

#### 17. Fertilizer

A. The fertilizer to be used to amend the soil before planting shall be granular fertilizer that conforms to applicable state and federal regulations, and contain nitrogen (of which 50% shall be organic), available phosphoric acid, and potash. Use formulation recommended by soil tests to amend site soil.

B. Fertilizer to be used during the maintenance period shall be a complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, not less than 30% of the nitrogen from a slow release source. Fifty percent of the nitrogen shall be derived from natural organic sources.

18. Pesticides and Herbicides. Pesticides and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for project conditions and application. Do not use restricted-use pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

19. Antidesiccants. Water-soluble emulsion specifically manufactured for agricultural use that will provide a protective film over plant surfaces and be permeable enough to permit transpiration. Use according to manufacturer's written instructions.

#### **20. \_Planting Mixture, 24 inch Depth**

A. Standard planting mixture for all plant beds shall be 2 parts pre-approved off site topsoil, thoroughly blended with 1 part pre-approved peat or compost.

B. Standard planting mixture for all individual trees planted in lawn areas shall be 1 part existing, well pulverized soil excavated from planting pit thoroughly blended with 1 part pre-approved topsoil and 1 part pre-approved peat or compost.

#### **21. \_Geotextile, Separator**

A. Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

B. Survivability: Class 2; AASHTO M 288.

C. Apparent Opening Size: No. 60 (0.250-mm) sieve, maximum; ASTM D 4751.

D. Permittivity: 0.02 per second, minimum; ASTM D 4491.

E. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

**c. Construction.**

## 1. General.

A. Prior to beginning work, examine and verify the acceptability of the project site and notify the Engineer of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved.

B. Where planting occurs in close proximity to other site improvements, provide adequate protection to all features prior to commencing work. Promptly repair any items damaged during planting operations to their original condition.

C. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

D. Suspend spoil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

E. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

(1) Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.

(2) On-site sources of water for planting and maintenance will NOT be available and all sources provided by the contractor must be verified and approved for use by the Engineer.

2. Pesticides and Other Chemicals. Mixing or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Engineer at least 24 hours prior to any application. Post all pesticide and herbicide applications.

## 3. Coordination with Other Work.

A. The Contractor shall coordinate work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.

B. Work installed out of construction sequence which is disturbed by the completion of work by other trades shall be repaired at no additional cost.

C. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.

## 4. Preparation

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion control measures, if necessary, to prevent erosion or displacement of soils and discharge of soil-bearing water run-off or airborne dust to adjacent properties and walkways.

C. Accurately lay out plant locations according to the drawings, using clearly visible painted stakes. Prior to installation, all locations must be approved by the Engineer, who may field adjust locations at no additional cost. If layouts are not understood or if surface or subsurface obstructions are encountered that are not indicated, do not proceed with planting operations until alternative plant locations have been reviewed, selected, and approved in writing by the Engineer.

#### 5. Vegetation Removal

A. Apply non-selective herbicide per the manufacturer's label to eradicate unwanted vegetation per manufacturer's instructions. Do not proceed with vegetation removal until the manufacturer's specified effective treatment period has expired.

B. Remove and legally dispose of all woody vegetation including roots within 24 inches of the surface.

C. Till existing herbaceous debris into soil or, if fine grading is required, strip and dispose of organic debris and root mat.

#### 6. Excavation:

A. Remove rocks and other unclassified underground obstructions to at least 6 inches below the finished planting depth of the root ball. If underground utilities or other surface or subsurface obstructions are encountered, do not proceed with planting operations until alternate planting locations have been selected and approved by the Engineer.

B. Size and configure planting pits and beds in accordance with the planting details. If rotating augers or other mechanical diggers are used, scarify the side walls and bottom of the pit.

C. Excavate perennial and shrub beds to the depth shown on the drawings and replace with specified planting mixture, bringing the grades to a smooth and even surface which, when settled, will conform to established grades. When transitions to 4 inch deep topsoil for lawn areas, the depth transition shall occur outside the plant bed limits or landscape edging shown on the plans.

D. Remove excavated material that is not the specified planting soil from the site.

E. Where poor soil percolation is probable, test drainage by filling planting pits with 12 inches of water. Record the drainage time for each pit and if, in the opinion of the Engineer, the water does not adequately drain off within 24 hours, drill and shatter the substrate to a minimum depth of 3 feet below the bottom of the pit. Retest the drainage. If poor drainage persists, install drains as directed.

7. Fertilizing. Prior to or during planting, amend all backfill and bed mixes by incorporating fertilizer at rates specified by soil test reports.

8. Mycorrhizal Inoculum. Incorporate 3 pounds per 100 square feet into the top 8 inches of soil. For tree pits, incorporate 2 pounds per cubic yard of backfill.

## 9. Finish Grading

A. Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet grade.

B. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

## 10. Planting

A. Do not plant when the ground is frozen or saturated.

B. Balled and burlapped plants: Set the plant to the grade indicated on the details and face to give the best appearance or relationship to primary views. Cut away burlap, rope, wire or other wrapping materials from the top one-third of the ball, and remove from pit. If plastic wrap or other non-degradable materials are used in lieu of burlap, completely remove them from the root ball before backfilling. Cleanly cut off broken or frayed roots. Backfill planting pit approximately two-thirds full, add water and allow planting mixture to settle. After the water has been absorbed, complete backfilling and tamp lightly to grade, and form a watering basin of the size indicated on Plans.

C. Container-grown stock: Remove containers and make at least five vertical cuts 1 inch deep around the root ball; thoroughly loosen the roots on the outside of the ball. Plant as specified above for balled and burlapped plants, and as modified herein. All container-grown stock shall be planted so that the top of container soil is level with surrounding grade. Do not plant higher to account for mulch, as mulch should not cover plant crown.

D. If plants die or are rejected due to non-conformity to notes and/or specifications, that plant material must be removed from the site immediately and replaced before Substantial Completion.

## 11. Mulching

A. Uniformly install mulch on all trees and shrub beds to 2" depth in all planting beds and tree mulch rings, within 48 hours of planting.

B. Keep mulch out of the crowns of shrubs and perennials, at least 3 inches from all tree trunks, and off sidewalks and roadways.

## 12. Pruning Tree

A. Prune trees and shrubs to remove all dead, dying, broken, weakly attached and crossed limbs. Do not prune to shape. Retain natural form of the plant type. Do not cut the primary leader back. A maximum of 20% of live wood shall be removed. Selectively thin branches within crown to reduce load and wind resistance. All pruning work shall be conducted to maintain the character and health of the tree.

B. All pruning shall follow ISA's *Tree Pruning Guidelines* or most recent ANSI A300 Pruning Standards, and ANSI Z133.1 Safety Standards.

C. Do NOT treat cuts with wound dressing or paints.

- D. Remove and dispose of legally off-site all removed materials, trimmings, plant limbs, and other debris.
- E. Pruning shall be conducted by a certified arborist by the International Society of Arboriculture.
- F. Pruning of new trees and shrubs shall be provided as noted above and shall be incidental to the pay items for the respective plant materials.

### 13. Wrapping.

A. The trunks of deciduous trees shall be wrapped immediately after planting, but not before the condition of the trunks has been inspected and approved by the Engineer. Trim the margins of any abrasions or cuts with a sharp, sterile knife prior to applying wrap.

B. Wrap trees beginning at the base and extending to the first branches in a spiral pattern with an overlap of half the width of the paper.

C. Secure the wrapping at the top, bottom and at 18-inch maximum intervals with twine.

### 14. Staking.

A. Install staking as shown on the details immediately after planting. Remove and dispose of stakes and guys at the end of the maintenance period.

B. For subsurface tree anchors, drive steel staples into the subsoil per manufacturer's instructions. Do not injure tree roots or damage rootball installing anchors. Anchors shall be permanently left in place.

### 15. Repair/Restoration.

A. Remove excess and waste material daily. When planting has been completed, clear the site of all debris, stockpiles and materials.

B. Repair any damage to existing landscape, paving or other such features as a result of work related to this contract to its original condition.

C. Protect landscape work and materials from damage due to landscape operations, operations by other Contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

### 16. Substantial Completion.

A. The Substantial Completion inspection for the landscape shall occur in phases based upon an approved phasing plan. Each area shall be 100% complete, (including all plantings, seeding, and clean-up), to be considered ready for inspection. Following the inspection, the Engineer will issue a punch list identifying all work requiring completion, replacement or correction.

B. Following this inspection complete all punch list items within two (2) weeks of its issuance except for plant replacements. All repairs and plant replacements shall occur at no additional cost.

C. After receiving a Notice of Substantial Completion maintain all plantings in a vigorous, well-kept condition until Final Acceptance.

D. The end of the maintenance period shall follow the completion of two seasons of **\_Watering and Cultivating, 2 Season, Min. \_\_, Modified.**

E. The Contractor will not be held responsible for defects resulting from unusual phenomena or incidents beyond landscape installer's control which result from hail storms, winds over 100 miles per hour, fires or vandalism, unless Contractor has not completed specified installation in a manner that could have protected the landscaping from these phenomena.

#### 17. Final Acceptance.

A. Approximately 2 weeks prior to the expiration of the maintenance period, the Engineer will conduct an inspection of all plantings, and seeding and review all previously submitted maintenance report forms to verify all completed maintenance activities. There shall be clear evidence through factual reporting by the contractor and field observations made by the Engineer that the specified maintenance has occurred. Following the inspection, the Engineer will issue a punch list identifying all work requiring completion, replacement or correction.

B. Following this inspection complete all punch list items within 1 week of its issuance except for plant replacements. All repairs and plant replacements shall occur at no additional cost.

C. Final Acceptance and the end of the maintenance period for the landscape will occur only after all punch list items have been satisfactorily completed.

#### 18. Replacements.

A. Prior to and during the maintenance period, replace any plants that are damaged, dead, or, in the opinion of the Engineer, are unhealthy, or have lost more than 25% of their natural shape due to dead branches, excessive pruning or improper maintenance. Rejected plant materials shall be removed from the site immediately after being rejected and legally disposed off-site. Replacement plants shall be installed within 30 days following the inspection unless otherwise agreed to in writing by the Engineer.

B. Make replacements in accordance with the original specifications, plant list, and notes. Fully restore areas damaged by replacement operations to their original and specified condition.

#### 19. Maintenance Watering and Cultivation

A. Provide all specified maintenance functions as defined herein.

B. Provide all maintenance under the supervision of a skilled employee of the landscape installer. The skilled maintenance supervisor shall be: conduct plant diagnostics to identify the presence of disease and insect problems, and be capable of directing a maintenance crew in the performance of horticultural maintenance practices identified below. Maintenance requirements identified below shall be the basis for information to be included in the Maintenance Schedule and Irrigation Plan and thoroughly documented under the required Maintenance Report Forms to verify the work has been properly performed. Failure to perform and submit factual Maintenance Report Forms could result in non-payment for said services.

C. Provide all equipment, materials, labor and services to maintain the landscape beginning immediately after each plant is installed and continuing until Final Acceptance and the end of the maintenance period. Perform all work under the direct supervision of a technician trained to recognize and treat conditions affecting the established and growth of the plants.

(1) Inspect the entire landscape at least once per week during the growing season and perform needed maintenance promptly.

(2) Water all plants to maintain optimum moisture within the root zone; reoccurring overly dry or wet conditions according to species shall be grounds for rejection of plant material. Hand watering will be required. Do not apply water with a force that displaces mulch or causes soil erosion. Supply all water at the Contractor's expense from a source approved by the Engineer.

(3) All pruning shall be performed by or under the supervision of a licensed arborist. Prune dead wood and broken limbs. Do not shear evergreens or any shrubs unless specifically required to be maintained as a sheared hedge. Maintain the natural shape of trees and shrubs. Certain tree limbs may need to be removed based on head clearance along the sidewalks and shall only be removed when directed by the Engineer.

(4) Maintain stakes and guys taut and in the specified condition. Repair tree wraps if loose, torn or untied.

(5) Maintain all plant beds and tree saucers weed free and litter free. Weeds shall not be allowed to go to seed and shall be fully removed (including root systems). Edge shrub and perennial beds and tree rings at least monthly during the growing season, keeping all tree rings to a uniform diameter. Hook mulch monthly and add mulch as needed Collect all trash, litter and miscellaneous debris monthly and dispose off-site.

(6) Deadhead perennials as necessary during maintenance visits to extend blooming periods.

(7) Cut ornamental grass seed heads flush with the ground only in the spring as plants break dormancy.

(8) Apply treatments as necessary to keep plants and planted areas free of insects, pests, and disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and herbicides. Treatments include utilizing physical and cultural controls.

- (9) All pesticides shall be applied by a licensed pesticide applicator. Apply pesticides and all other chemical products and biological control agents in accordance with the authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Engineer and others in proximity to the Work. Notify Engineer at least 24 hours before each application is performed. No mixing or disposal of chemicals is allowed onsite.
- (10) Apply antidesiccant to upright conifers December through February, at least once per month. In locations subject to high wind or salt spray, install burlap windscreens around spreading conifers and broadleaf evergreens but do not allow burlap to touch evergreen plants.
20. Mowing: Provide mowing per section 817 of the MDOT Standard Specifications for Construction and as noted below.
- A. Confirm limits of areas to mow with Engineer prior to proceeding with work.
  - B. Pick up, remove and dispose of litter prior to mowing.
  - C. Hand trim, if required, next to walls, fences, curbs, poles or other fixed objects within the area identified for mowing.
  - D. Mow MDOT TUF seed mix (turf) areas to 3 inches high unless directed otherwise by the engineer.
  - E. Confirm mowing frequency with Engineer.
21. Fertilization.
- A. Trees and shrubs and ornamental grasses: Fertilize once in the fall after the first hard freeze (usually October) but before the ground freezes; 1 pound of 4-1-2 (N-P-K) per 1,000 square feet of ground below the tree canopy or shrub bed.
  - B. Perennials: Fertilize twice, once in the early spring and again 8 weeks later with 1 pound of 5-10-5 (N-P-K) per 100 square feet.
  - C. Remove dead and unacceptable plants as their condition becomes apparent.
  - D. At the end of the maintenance period, but prior to Final Inspection, remove all guying, trunk wrap, watering saucers and re-mulch tree rings and beds as specified.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price for the following pay items:

<b>Pay Item</b> ( <i>Botanical Name, Size, Planted Condition</i> )	<b>Pay Unit</b>
_Ginkgo biloba 'Autumn Gold', 4 inch, B&B.....	Each
_Acer x freemanii, 4 inch, B&B.....	Each
_Ulmus 'Frontier', 4 inch, B&B.....	Each
_Gymnocladus dioicus 'Espresso', 4 inch, B&B.....	Each
_Platanus x acerifolia, 4 inch, B&B.....	Each
_Sporobolus heterolepis, #1 cont.....	Each
_Nepeta x faassenii 'Walker's Low', #1 cont.....	Each
_Allium 'Pinball Wizard', bulb.....	Each
_Helictotrichon sempervirens 'Sapphire', #1 cont.....	Each
_Spiraea japonica 'Yan', #1 cont.....	Each
_Hemerocallis 'Happy Returns, #1 cont.....	Each
_Pennisetum orientale 'Karley Rose', #1 cont.....	Each
_Mulch, Hardwood Bark, 2 inch Depth.....	Square Yard
_Planting Mixture, 24 inch Depth.....	Square Yard
_Geotextile, Separator.....	Square Feet
_Watering and Cultivating, ____ Season, Min. __, Modified.....	Lump Sum
_Mowing, Modified.....	Lump Sum

**\_Planting Mixture, 24 inch Depth**, will be paid for by the square yard based on plan quantities that are not identified as being incidental to another pay item. The contracted unit price shall include; herbiciding to kill herbaceous vegetation, existing soil excavation and disposal, submittals and soil testing, supplying, mixing and installing specified materials (off-site topsoil, peat moss or compost, mycorrhizal and fertilizer), and compaction.

Planting Mixture shall also be used as tree pit backfill. **\_Planting Mixture, 24 inch Depth** is incidental to the **\_Tree Grate and Frame, 4 foot x 12 foot** pay item and no additional payment will be provided.

**Plant Material (Botanical Name)** shall be paid for at the contract unit price for Each plant installed following acceptance of the work by the Engineer. The plant pit excavation and disposal of excavated materials to install the plant is included and shall be incidental to the pay item. The contacted unit price shall include; not paid for under **Planting Mixture, 24 Inch Depth**, plant material submittals, material supply, installation, backfill, staking, subsurface anchoring system for trees with tree grates, initial watering, mycorrhizal, trunk wrap and other necessary components specified herein and/or shown on the plans required to install the plant. The pay quantity will be determined by a field count of accepted plants installed. **\_Mulch, Hardwood Bark, 2 inch Depth**, and aggregate pea stone (MDOT 34R) below tree grates specified for the individual trees planted outside plant beds (seeded areas) shall also be incidental to the unit price.

**\_Mulch, Hardwood Bark, 2 inch Depth**, will be paid for by the square yard based on plan quantities for areas requiring mulch that are not identified as being incidental to another pay item. The contracted unit price shall include; submittals, material supply and installation.

**\_Watering and Cultivation, \_\_\_\_\_Season, Min. \_\_\_\_\_, Modified** shall be paid for at the contracted Lump Sum price for all maintenance work specified herein and as requested by the Engineer. The contracted lump sum price shall include all specified maintenance functions including but not limited to; maintenance schedule submittal, inspections, report forms, watering, cultivation, weed and litter control, fertilizing, pest controls, dead heading, dead plant removal and replacement, staking removal and mulching at the end of the maintenance period.

**\_Geotextile, Separator** shall include all labor, materials and equipment necessary to supply and install the **\_Geotextile, Separator** in the locations as shown on the plans and details. The pay quantity will be determined by field measurement of the area installed in square feet that are not identified as being incidental to another pay item.

**\_Geotextile, Separator** is NOT paid for separately when used in the tree pit for street trees and is incidental to the **\_Tree Grate and Frame, 4 foot x 12 foot** pay item and no additional payment will be provided.

Payment for **\_Watering and Cultivation, \_\_\_\_\_Season, Min. \_\_\_\_\_, Modified** shall be paid for monthly upon submission and approval of maintenance report forms that demonstrate completion of the specified activities. Work not approved shall not be paid for and subtracted from the Lump Sum price. The value of the monthly invoices shall be based on a 6 month payment plan that commences with May 1 and ends with November 1 for each season of maintenance.

**\_Mowing, Modified** shall be paid for at the contract price for all seed bed maintenance. The contracted Lump sum price shall include all specified maintenance functions including but not limited to: mowing, weed control, fertilizing, litter removal, and repairs as specified herein. Payment shall be paid for monthly upon submission and approval of maintenance report forms that demonstrate completion of the specified activities. Work not approved shall not be paid for and subtracted from the Lump Sum price. The value of the monthly invoices shall be based on a 6 month payment plan that commences with May 1 and ends with November 1 for two seasons of maintenance.

CITY OF DETROIT  
SPECIAL PROVISION  
FOR  
IRRIGATION SYSTEM

SMITHGROUP

1 of 17

06-18-2024

**a. Description.** This work consists of furnishing and installing an automatic irrigation system complete per plans, details and this special provision.

1. The irrigation design drawing shall be completed in strict compliance with this specification for review and approval by Owner's representative.
2. In no case shall any work be performed outside the City of Detroit property, easements, and right-of-way.
3. Coordination - Before any work is started, a conference shall be held between the Contractor and Owner's representative concerning the work under this Contract.
4. Inspection of Site. The Contractor shall be acquainted with all site conditions. Should utilities not shown on the plans be found during excavations, the Contractor shall promptly notify the Owner's representative for instructions as to further action. Failure to do so will make the Contractor liable for any and all damage thereto arising from his operations subsequent to discovery of such utilities not shown on plans.
5. The contractor shall engage an irrigation designer to complete construction drawings and details to completely define and detail the irrigation system and all its related components. The contractor is responsible to submit the irrigation construction documents to the Owner's representative for review and approval prior to proceeding with irrigation system construction activities. The contractor is responsible to provide the design modifications that are requested by the owner's representative at no additional cost. The irrigation designer shall be conversant with the design of irrigation systems including the design of drip irrigation and shall have a minimum of (10) ten years' experience in the successful design, construction, and operation of irrigation systems in the state of Michigan.
6. The sprinkler system shall be constructed using sprinklers, valves, piping, fittings, controllers, wiring, etc., of size and types as indicated in these specifications. The system shall be constructed to grades and conform to areas and locations as shown on the drawings.
7. The construction of the sprinkler system shall include the furnishing, installing and testing of all mains, laterals, risers and fittings, sprinkler heads, drip tubing, quick coupling valves, automatic control valves, manual valves, control timers, weather sensors, flow meters, controller remotes, and other necessary specialties and the removal and/or restoration of existing improvements, excavating and backfill, and all other work in accordance with plans and specifications as required for a complete system. **A new independent meter is required as part of this project.**

8. The entire system shall conform to local standards and requirements for landscape irrigation systems.
9. All crossings under roads, concrete pavement / paths / sidewalks and other hardscape must be sleeved.
10. Coordinate Work with other trades.

A. Job Conditions

- 1) Report to the Owner's representative any deviations between Drawings, special provisions and the site. Failure to do so prior to the installation of equipment and which results in the replacement or relocation of equipment shall be at the Contractor's expense.
  - 2) The exact location of existing utilities, structures and underground utilities may not be indicated; their locations shall be field verified prior to starting Work, and installation of Work shall proceed so as to prevent interruption of service or damage to them. Protect existing structures and utility services and replace at no cost to the Owner if damaged. Where conflicts occur, notify Owner's representative of relocations required to complete the Work.
11. Permitting and Approvals.
    - A. Contractor shall prepare, submit, and secure all permits and approvals required for the Irrigation System. This includes the applicable permits and subsequent coordination / approvals by Detroit Water and Sewerage Department (DWSD) for any water taps.
  12. Related Work Specified Elsewhere:
    1. Exterior Plantings.

**b. Materials**

A. General:

1. All materials to be incorporated in this system shall be new and without flaws or defect and quality and performance as specified. All material overages at the completion of the installation are the property of the Contractor and are to be removed from the site.
  2. The Contractor shall use materials as specified. Material other than specified will be permitted only after written application by the Contractor and written approval by the Owner's representative. Substitutions will only be allowed when in the best interest of the Owner.
- B. Submittals

- A. Provide documentation validating the irrigation designer has a minimum of (10) ten years' experience in the successful design, construction, and operation of irrigation systems in the State of Michigan. Provide certification documents confirming certification with the Irrigation Association and applicable irrigation licenses.
  - B. Submit specific product information including make and model number to the owner's representative on backflow devices, valves, valve boxes, two-wire cable (as applicable), two-wire decoders (as applicable), emitters, drip tubing, drip valve kits, controller, weather sensors, flow meters, wire connectors and wire, all pipe and fittings, clamps, enclosures, to be used on the project prior to purchasing materials. Submittals are subject to the Owner's representative approval.
  - C. Upon irrigation system acceptance, submit written operating and maintenance instructions. Provide format and contents as directed by the Owner's representative. Include instruction sheets and parts lists for all operating equipment.
  - D. Provide a reproducible irrigation system record drawing including an electronic Autocad copy on a cd showing drip tubing, valves, field splices, drains and pipelines including quick coupler and automatic valves. Drawing is to be given to the Owner or the Owner's representative at the final irrigation system walkthrough. Also include zone chart in each control timer along with colored drawing indicating extent of zones.
    - 1) Legibly mark drawings to record actual construction.
    - 2) Indicate horizontal locations, with a minimum of two dimensions to permanent surface improvements.
    - 3) Identify field changes of dimension and detail and changes made by Change Order.
- C. Quality Assurance
1. The Contractor shall maintain continuously a competent superintendent, satisfactory to the Owner, with authority to act for him in all matters pertaining to the work.
  2. Superintendant shall hold certification as a Certified Irrigation Contractor with the Irrigation Association. Owner's representative reserves the right to waive this certification requirement.
  3. Contractor shall hold valid licensing in states where irrigation contractors must be licensed to install commercial irrigation systems.
  4. The Contractor shall coordinate his work with the other trades.

5. The Contractor shall confine his operations to the area to be improved and to the areas allotted him by the Owner's representative for material and equipment storage.
6. The Contractor shall have a minimum of 10 years' experience installing irrigation systems of comparable size and complexity.
7. It shall be the Contractor's responsibility to ensure and guarantee satisfactory operation of the entire system and the workmanship and restoration of the area. The entire system shall be guaranteed to be complete and perfect in every detail for a period of one year from the date of its acceptance and he hereby agrees to repair or replace any such defects occurring within that year, free of expense to the Owner. Contractor shall winterize the system the first year.

#### D. Irrigation Plan Requirements

##### General

1. The Contractor's submitted irrigation plan(s) shall conform to all design parameters set forth in this document. Plans submitted which do not conform to all irrigation plan requirements are to be regarded as incomplete and will not be accepted.

##### Information Requirements

1. All plans shall be submitted at the same scale as the landscape plans, and shall contain appropriate scale designations and north arrows.
2. The irrigation Designer's name and phone number shall appear on the plans.
3. The irrigation plan shall include a run time chart which indicates the precipitation rate for that zone and the length of time each zone must operate to apply .2" of water.
4. Show proposed weekly watering schedule, conforming to water window as described elsewhere in this document.
5. Each plan shall include a key indicating all equipment to be used on the project.
6. Key shall differentiate between different sprinkler types, nozzle sizes, and arcs.
7. All zones must be identified with control timer designation, station number, gallonage, and automatic control valve size.

##### Design Parameters

1. The irrigation design shall be adapted to work in harmony with the landscape plan, grading plan, and other site features.
2. Sprinklers shall be used for all planting bed areas.
3. All trees shall have three bubblers installed at each and set on a separate tree bubbler zone.
4. Protecting public safety and consideration of site aesthetics shall be incorporated into the design.
5. Overspray is prohibited on buildings, roads, drives, site furnishings and other site features where overspray would be deemed objectionable.
6. Sprinklers shall be zoned into like groups based on the following:
  - a. Zone based on differing types of plant materials: In all cases, lawns are to be zoned separately from shrub bed areas. Small flower beds may be zoned with lawn areas or zoned separately. Tree bubblers shall be zoned separate from lawn and shrub zones.
  - b. The design shall have separate zoning for sprinklers with different precipitation rates.
  - c. Zone according to exposure. South and west exposures may be zoned together; north and east exposures may be zoned together.
  - d. Zone based on terrain where significant and/or reasonable to do so.
7. Conform to all codes and regulations, including State Health Codes as they apply to backflow prevention.
8. The irrigation design shall include the following system hydraulic design parameters.
  - a. A maximum pressure differential within the mainline between the water source and furthest point on the mainline shall not exceed 20% of the static pressure downstream of the backflow preventer.
  - b. Mainline pipe shall be sized to keep velocities below 5' per second. Lateral pipe shall be sized to keep velocities below 6' per second.
9. Water window to be a maximum of 8 hours, commencing at 10:00 p.m. and complete by 6:00 a.m.
10. Sprinkler shall be spaced per manufacturer's recommendation, allowing for 8 MPH wind. In no case shall sprinklers be spaced more than 60% of effective diameter.

## E. Pipe and Fittings:

1. Pipe sizes shall conform to those shown on the drawings. No substitutions of smaller pipe sizes will be permitted, but substitutions of larger size may be approved. All pipe damaged or rejected because of defects shall be removed from the site at the time of said rejection.
2. Provide pipe continuously and permanently marked with manufacturer's name or trademark, size schedule and type of pipe working pressure at 73 degrees F. and National Sanitation Foundation (NSF) approval.
3. All mainline piping and underground piping under continuous pressure plus all pipe 3" or larger whether a lateral or mainline, shall be rigid, unplasticized polyvinyl chloride pipe extruded from virgin parent material, ASTM D-2241. Provide pipe homogeneous throughout and free from visible cracks, holes, foreign materials, blisters wrinkles and dents.
4. PVC Pipe and sleeving shall be SDR 21, Class 200 unless stated otherwise on the drawing.
5. PVC pipe four inches (4") and larger shall be ring-tite type with push on joint having integral bell end and rubber gasket.
6. PVC Pipe 3" and smaller and all sleeving shall be solvent weld type.
7. PVC pipe fittings for sizes 3" and smaller and all sleeving shall be ASTM D-2466 schedule 40 PVC molded fittings suitable for solvent weld.
8. All fittings for PVC pipe 4" and larger shall be ductile iron as manufactured by Harco.
9. All threaded PVC pipe-fittings shall be ASTM D-2467, Schedule 80 PVC.
10. Saddle and cross fittings are not permitted. Use male adapters for plastic to metal connections. Hand-tighten male adapters plus one turn with a strap wrench.
11. Areas using polyethylene lateral pipe: All pipe downstream from zone valves sized 2" and smaller, shall be flexible non-toxic polyethylene pipe. Polyethylene pipe shall be PE 3408, ASTM rated at 100 PSI minimum working pressure, and in conformance with ASTM D-2239, NSF approved or as noted on the drawing. Pipe larger than 2" size shall be PSI as specified for mainlines. PE 2306 fittings for polyethylene pipe shall be ASTM D-2609 insert type fittings. Saddle and cross fittings not permitted. All joints shall be secured with stainless steel band and screw clamps.
12. Areas using PVC lateral pipe: All pipe downstream from zone valves sized 2" and smaller, shall be schedule 40 PVC pipe.

13. Primer and solvent for use with PVC pipe to conform to ASTM D-2564. Primer to be purple in color. Solvent to be appropriate for pipe and fitting type and weather conditions.
14. All above grade pipe shall be type 'L' copper. Fittings shall be cast brass or wrought copper.
15. Systems using reclaimed water as the irrigation system water source shall use pipe that is lavender in color or of a specific color as deemed acceptable by the local water purveyor for reclaimed water.

F. Control System:

1. The automatic controllers and valves shall be as of the same manufacturer.
2. All controllers shall be locally available and have local trouble shooting representatives.
3. All controllers shall have a proven record of successful performance in the project area. No controller will be approved for use that has not been available in the project area for less than one year from the final approval date on the irrigation design drawings.
4. All controllers shall be accompanied by a weather or soil moisture sensor manufactured by the controller manufacturer.
5. Controllers shall be grounded per manufacturer's recommendations.
6. All controllers and sensors shall be acceptable to the local water purveyor for landscape irrigation systems.
7. Include, as applicable, phone, Ethernet, radio, or cellular card depending on potential controller/off-site monitoring communication desired.
8. Include hand-held remote, model as recommended by controller manufacturer, to allow maintenance persons to operate individual zones without direct access to the controller.

G. Control Wire, Decoders, Flow Meters, and Connections:

1. Control wire and two-wire cable shall be Type UL approved, for direct burial and shall be Size 14 or larger, as recommended by the manufacturer for the conditions of the project. Conductor to be single strand soft annealed copper.
2. 24 volt control wires to be red in color. Common wire to be white in color.
3. Two-wire cable shall be manufactured by the controller manufacturer for specific use by that controller.

4. Two-wire decoders shall be manufactured by the controller manufacturer for specific use by that controller.
5. Two-wire cable and decoders shall be grounded per manufacturer's recommendations.
6. Flow meters shall be installed at all watersources. Flow meters shall be manufactured by the controller manufacturer.
7. Low voltage wire connectors to be made using 3M DBR/Y connectors.
8. 120 volt or heavier splices made underground to be made using 3M DBR/Y connectors.

H. Sprinkler Heads:

1. Sprinkler equipment shall be manufactured by Hunter (Pro-S), Rainbird (1800), or Toro (570Z) and include check valve and pressure regulating feature.
2. Sprinkler nozzles shall be matched precipitation variety as manufactured by the sprinkler body manufacturer or Toro Precision Nozzles with threads to match the sprinkler body
3. Stream rotary nozzles for spray sprinklers shall be as manufactured by the sprinkler body manufacturer.
4. Rotary sprinklers,  $\frac{3}{4}$ " shall be manufactured by Hunter (I-20), Rainbird (5000 series) or Toro (T5) and are to include check valve.
5. Rotary sprinkler nozzles shall be as manufactured for the sprinkler by the sprinkler body manufacturer. Minimum GPM output to be 2.0 GPM, maximum GPM output 6.0 GPM. Suggested nozzling shall be: 2.0 GPM, 90 degrees, 3.0 GPM, 180 degrees, 6.0 GPM 360 degrees.
6. Sprinklers fed from a reclaimed watersource shall have lavender caps.

I. Clamps (polyethylene lateral pipe):

1. Clamps to be stainless steel, worm gear hose clamps with stainless steel screw.

J. Automatic Valves and Quick Coupling Valves:

1. Valves shall be manufactured by Hunter, Rainbird, or Toro.
2. Models shall be Hunter ICV, Rainbird PEB, and Toro P-220. Size per manufacturer's recommendation for specific zone flow.
3. Valves shall be installed inside 11" x 14' valve box.

4. Valves shall have zone identification tag attached to the valve stem.
5. Valves installed on systems fed from a reclaimed water source shall have lavender handles.
6. Install brass ball valve upstream of all automatic valves.
7. Quick coupler valves shall be manufactured by Hunter, Rainbird, or Toro and be 1" size.
8. Quick couplers shall have one piece body with locking lid and stabilized.
9. Quick couplers shall be installed inside 10" round valve box.
10. Quick couplers installed on systems fed from reclaimed water shall have lavender lids.
11. Quick couplers shall be spaced a maximum of 50' o.c. and as requested by the owner's representative.

K. Manual Valves

1. Manual valves shall be manufactured by Nibco, Matco-Norca, or Red white.
2. Valves 2" and larger shall be gate valves, 200 #WOG, with solid wedge disc, conforming to federal specifications for its class.
3. Valves three inches (4") and larger shall be iron body bronze mounted, non-rising stem, with end connections for PVC pipe and have a two inch (2") square operating nut which turns to the left to open. Provide thrust block support.
4. Manual valves shall be installed inside 11"x14" valve box.

L. Valve Boxes:

1. Valve access boxes shall be manufactured by Carson, Pentek, NDS, or Rainbird.
2. Valve Access Boxes to be tapered enclosure of rigid plastic material comprised of fibrous components chemically inert and unaffected by moisture corrosion and temperature changes. Provide lid of same material black in color.
3. Provide lavender lid for systems fed from reclaimed water.
4. Boxes to be 10" (quick couplers and wire splices) or 11" x 14" (automatic and manual valves) and of minimum size required to permit access to the valve. Side walls to extend at least 2" below the bottom of valve body; use extension as necessary.

5. Valve access boxes shall have filter fabric liner and gravel or pea stone sump.

M. Backflow Preventer:

1. Backflow preventers shall be reduced pressure zone type as manufactured by Watts, Febco, or Wilkins-Zurn.
2. Backflow preventers shall have air-gap discharge to floor drain.

N. Watersource Tap:

1. Refer to DWSD watersource detail for 1" tap.
2. Installation shall conform to all applicable codes.

O. Accessories:

1. Drainage fill: 1/2" x 3/4" washed pea gravel.
2. Fill shall be clean soil free of stones larger than 2" diameter, foreign matter, organic material and debris.
3. Provide imported fill material as required to complete the work. Obtain rights and pay all costs for imported materials.
4. Suitable excavated materials removed to accommodate the irrigation system work may be used as fill material subject to the Owner's representative's review and acceptance.

**c. Construction**

A. DELIVERY, STORAGE AND HANDLING

1. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.
2. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends, both threaded or plain.
3. Store and handle materials to prevent damage and deterioration.
4. Provide secure, locked storage for valves, sprinkler heads and similar components that cannot be immediately replaced, to prevent installation delays.

B. PROJECT CONDITIONS

1. The bidder acknowledges that he has examined the site and specifications, and prepared appropriate irrigation plans to correspond to the site conditions and landscape design. The submission of a proposal shall be considered evidence that examination has been made.
2. It shall be the contracting installer's responsibility to report to the Owner's authorized representative any deviations between drawings, specifications and the site. Failure to do so prior to the installing of equipment and resulting in replacing and/or relocation equipment shall be done at the Contractor's expense.
3. The exact location of all existing utilities and structures and underground utilities are not indicated on the drawings; their locations shall be determined by the Contractor, and he shall conduct his work so as to prevent interruption of service or damage to them. The Contractor shall protect existing structures and utility services and be responsible for their replacement if damaged by construction activities.
4. Minor adjustments in system layout will be permitted to clear existing fixed obstructions. Final system layout shall be acceptable to owner's representative.

#### C. CODES AND STANDARDS

1. The entire installation shall fully comply with all local and state laws and ordinances and with all established codes applicable thereto.
2. Any permits for the installation of construction of the work included under this contract which are required by any of the legally constituted authorities having jurisdiction, shall be obtained and paid for by the Contractor, each at the proper time. He shall also arrange for and pay all costs in connection with any inspections and examinations required by these authorities.
3. In all cases where inspection of the sprinkler system work is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Owner's authorized representative, the Contractor shall notify the Owner's authorized representative at least 24 hours in advance of the time and such inspection and/or direction is required.
4. Any necessary re-excavation or alterations to the system needed because of failure of the Contractor to have the required inspections shall be performed at the Contractor's own expense.

#### D. PREPARATION

1. Layout and stake the location of each pipe run and all sprinkler heads and sprinkler valves. Obtain Owner's representative's acceptance of layout prior to excavating, unless specifically waived by the owner's representative.

#### E. EXCAVATING AND BACKFILLING

1. Excavating shall be considered unclassified and shall include all materials encountered, except materials that cannot be excavated by normal mechanical means. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings. Excavate to depths required to provide 2" depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.
2. Install sleeves for irrigation piping prior to paving. Minimum depth of bury for sleeves beneath roadways and drives, 36" and 18" beneath walks. A sleeve shall be required at all locations where irrigation lines are placed below pavement, roads, walks, curbs, plaza, and any other surface features identified by the owner's representative. Provide a spare sleeve with closed ends and pull string at all sleeve locations.
3. Sleeves needing to be installed beneath existing paving shall be installed by directional bore method. Minimum depth of bury for sleeves beneath roadways and drives, 36" and 18" beneath walks.
4. Locations of all underground sleeves shall be physically marked on the closest point on the concrete curb on both ends of the sleeve. Review and obtain approval from owner's representative on an acceptable method for marking the underground sleeves prior to proceeding with work. Document and reference the as-built locations of all sleeves on the as-built documents.
5. Pipe pulling will be allowed for lateral pipe only, provided soil moisture content and other conditions are suitable to allow for full depth of bury with a minimum of stretching and scraping of the pipe. Owner's representative reserves the right to determine suitability or conditions. If the pulling method is used, the pipe "plow" shall be a vibratory type.
6. Fill to match adjacent grade elevation with approved earth fill material. Place and compact fill in layers not greater than 8" depth.
7. Provide approved fine-grained earth fill or sand to point 4" above the top of pipe, where soil conditions are rocky or otherwise objectionable.
8. Fill to within 6" of final grade with approved excavated or borrow fill materials free of lumps or rocks larger than 2" in any dimension.
9. The top 6" of backfill shall be topsoil, free of rocks, subsoil or trash. Any special soil mixture shall be replaced to the original condition it was prior to irrigation installation.
10. Except as indicated, install irrigation mains with a minimum cover of 24" based on finished grades. Install irrigation laterals with a minimum cover of 14" based on finished grades.

11. Excavate trenches and install piping and backfill during the same working day. Do not leave open trenches or partially filled trenches open overnight.

#### F. UNDERGROUND PIPE

1. Install plastic pipe in accordance with manufacturer's installation instructions as ASTM D- 2274. Provide for thermal expansion and contraction.
2. Saw cut plastic pipe. Use a square-in-sawing vice, to ensure a square cut. Remove burrs and shavings at cut ends prior to installation. Clean foreign material from inside of pipe before placing in trench; once pipe is in place, keep open ends plugged to prevent contamination.
3. Minimum depth of cover: 12 inches
4. Make PVC plastic-to-plastic joints with solvent weld joints. Use only primer and solvent recommended by the pipe manufacturer for the pipe and fittings being installed. Prime coat all solvent weld connections. Snake solvent welded lines in trench to accommodate expansion and contraction.
5. Install plastic fittings in accordance with pipe manufacturer's instructions and ASTM D-2855. Contractor shall make arrangements with pipe manufacturer for all necessary field assistance.
6. Allow joints to set at least 24 hours before pressure is applied to the system.
7. Uncoil poly-pipe and insert fitting full depth. Secure poly-pipe to insert fittings with stainless steel clamps. Double clamp pipe 1-1/2" diameter and larger.
8. All mainline and continuously pressurized pipe is to be installed using open trenches. Lateral pipe may be installed by "Plowing" if soil conditions permit, and soils do not contain gravel, rock, construction debris or other potential damaging material.
9. Install thrust blocks on the mainline pipe work in accordance with pipe manufacturer's written instructions.

#### G. SPRINKLER INSTALLATION

1. Install fittings and sprinkler heads in accordance with manufacturer's instructions, except as otherwise indicated.
2. Set sprinkler heads perpendicular to finished grades, except as otherwise indicated, and position to prevent contact with grounds maintenance equipment. Install sprinklers 6" off walks and curbs. Locate sprinkler heads to assure proper coverage of indicated sprinkler heads to assure

proper coverage if indicated areas. Do not exceed sprinkler head spacing distances indicated in the manufacturer's manual for the nozzles installed and pressure available.

3. Provide pop-up spray heads and rotary sprinklers  $\frac{3}{4}$ " IPS or smaller with two elbow poly swing joint riser using "funny pipe", minimum length 12".
4. Provide all rotary sprinklers, 1" IPS, with pre-fabricated three elbow swing joint, schedule 80 PVC.
5. Fittings and pre-fabricated swing joint manufacturers shall be Spears, Lasco, or Dura.

#### H. VALVE INSTALLATION

1. All zone control valves and manual valves shall be enclosed in a minimum 11" x 14" valve box. Quick couplers shall be installed inside 10" round valve boxes. Add extensions as required to prevent soil settlement around the valve. Set box flush with finish grade and aligned with adjacent boxes and/or adjoining site-work.
2. Install filter fabric inside valve box and install valve boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box. Support box with block or notch box to protect pipe under box.
3. Provide all quick coupler valves with pre-fabricated three elbow swing joint, schedule 80 PVC.
4. Fittings and pre-fabricated swing joint manufacturers shall be Spears, Lasco, or Dura.

#### I. BACKFLOW PREVENTER AND METER

1. Backflow installation shall meet all applicable plumbing and health department codes.
2. All pipe to and from backflow preventers until the discharge pipe reaches 24" bury, shall be type 'L' hard copper.
3. Install tap meter, meter pit, backflow preventer, and all piping and enclosures as coordinated with DWSD.
4. All work associated with providing a water source for the irrigation system is part of the irrigation scope of work.
5. Do not initiate installation work without approval of location by owner's representative.

#### J. WATERSOURCE TAP

1. Refer to DWSD detail for installation requirements.

#### K. DRAINS

1. Although it is intended that some systems will be winterized using compressed air. Contractor to install manual drain valves at low points in the system to assist in winterization and service.

#### L. ELECTRICAL AND CONTROLLER INSTALLATION

1. Install electrical control wire and two-wire cable in the piping trenches wherever possible. Place wire or cable in trench adjacent to or underneath mainlines but not above. Install wire with slack to allow for thermal expansion and contraction. Expansion joints in wire may be provided at 200 foot intervals by making 5-6 turns of the wire around a piece of 1/2" pipe instead of slack. Where necessary to run wire or cable in a separate trench, provide a minimum cover of 24".
2. Provide minimum 24" slack at remote control valves and at all wire splices to allow raising the valve bonnet or splice to the surface without disconnecting the wires for repair.
3. Connect each remote control valve to one station of a controller except as otherwise indicated. Where there is to be more than one valve per station, make required splice at the control timer.
4. Make splices only at valves. Locate all field splices on the as-built drawing.
5. For two-wire systems, ground cable at each valve location and every 600' or as recommended by the manufacturer.
6. Hard wire 110 volt power to controller. All connections and installations shall meet applicable electrical codes. All wire not buried to be installed in conduit.
7. Connect data line, cellular, radio, or phone line to controller and test for successful communication link.
8. Accurately label zones inside the controller. Include color sketch of approximate zone limits.

#### M. FLUSHING AND TESTING

1. After all new sprinkler piping and risers are in place and connected for a given section and all necessary division work has been completed, and prior to the installation of sprinkler heads, all control valves shall be opened and a full head of water used to flush out the system.

2. Pressure Testing: perform system testing upon completion of each section. Pressure test all liens to static pressure plus 50 percent for a one-hour period with no loss in pressure. If leaks occur, repair and repeat the test. Give Owner's representative 24-hour notice prior to testing. Perform testing of the entire system after installation is complete.
3. After completion and testing of the system, submit operating manuals and record drawings, and provide instruction in the operation and maintenance of the system.

#### N. CLEAN UP

1. Contractor shall keep the premises free from rubbish and debris at all times and shall arrange his material storage so as not to interfere with other construction activities and as directed by the Owner's Representative. Contractor shall remove and legally dispose of all unused material, rubbish and debris, including unsuitable excavated material from the site.

#### O. SERVICE AND MAINTENANCE

1. The Contractor shall service the system at the request during the guarantee period and shall be paid for work performed which is not covered by the guarantee. Contractor shall winterize the system the first year as part of this contract, and will provide written instructions to the Owner for future service and maintenance.
2. Return to the site during the subsequent spring season and demonstrate to the Owner the proper procedures for the system start-up, operation and maintenance.
3. After completion, testing and acceptance of the system, the Contractor will instruct the Owner's personnel in the operation and maintenance of the system.

#### P. ACCEPTANCE

1. The completion of the contract will be accepted and Notice of Completion recorded only when the entire contract is completed to the satisfaction of the Owner's authorized representative.
2. As-built Plans: after completion of the system, the Contractor must provide instruction sheets, including a maintenance and operations manual and parts lists covering all operating equipment, which must be bound into a folder and furnished to the owner's representative. The Contractor must also provide all necessary special tools for maintaining the system.
3. After completion and testing of the system provide instruction to the personnel identified by the Owner's representative in the operation and maintenance of the system.

4. Within ten (10) days of the Contractor's notification that the installation is complete, the Owner's Representative will inspect the installation and if a final acceptance is not given, will prepare a "Punch List" which, upon completion by the Contractor, will signify acceptance by the Owner.

**Q. WARRANTY**

1. It shall be the Contractor's responsibility to ensure and guarantee satisfactory operation of the entire system and the workmanship and restoration of the area. The entire system shall be guaranteed to be complete and perfect in every detail for a period of one year from the date of its acceptance and he hereby agrees to repair or replace any such defects occurring within that year, free of expense to the Owner.
1. Contractor to guarantee that all trenches and other disturbed areas to be free from heaving or settling more than one-quarter (1/4"). Should it become necessary to adjust the grade, re-grade the trench and re-sod. This no-settlement clause shall extend over the entire period of guarantee of the job.
2. One month prior to the conclusion of the warranty period, the Contractor and Owner's representative shall meet at the site and adjust the zone watering times on the controller to reflect run times for established plant material.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price. **Irrigation System** shall be paid for at the contract unit price as a lump sum. Contract unit price shall consist of supplying and installing all irrigation components specified herein and shown on the plans, including all submittals, permits, excavation and properly compacted backfill, water and electrical taps/hook-ups, and other work incidental to complete installation of a fully operational system. The pay quantity will be a lump sum based on acceptance of the completed installation.

<b>Pay Item</b>	<b>Pay Unit</b>
Irrigation System .....	Lump Sum