



Letter of Transmittal

Date:
Petition Map:

Type of Petition

- | | | |
|---|---------------------------------------|--|
| <input type="checkbox"/> Outright Vacation | <input type="checkbox"/> Dedication | <input type="checkbox"/> Berm Use |
| <input type="checkbox"/> Conversion to Easement | <input type="checkbox"/> Encroachment | <input type="checkbox"/> Temporary Closing |

Review Status

The above petition has been received and reviewed by this office. Please see below for the review status as marked.

- | | |
|--|--|
| <input type="checkbox"/> Approved Subject to Attached Provisions | <input type="checkbox"/> Revise and Resubmit |
| <input type="checkbox"/> Not Approved | |

Additional Comments (if applicable):

Attached is the DWSD provision related to the petition.

	Name	Title	Signature	Date
Reviewed by:			<i>Mohammad Siddique</i>	
Approved by:			<i>Mohammad Siddique</i> For Syed Ali	

PROVISIONS FOR CONVERSION TO EASEMENT

1. An easement, the full width of the existing right of way, is reserved for the Detroit Water and Sewerage Department (DWSD) for the purpose of installing, maintaining, repairing, removing, or replacing any sewers, water mains, fire hydrants and appurtenances, with the right of ingress and egress at any time to, and over said easement for the purpose above set forth. Any proposed fencing across the easement must have a gate installed to permit access for DWSD forces. The gate shall remain unlocked 24 hours a day, unless a guard is stationed near the gate to allow the DWSD ingress and egress at any time. The minimum dimensions of the gate or gates shall provide 15-foot vertical and 13 foot horizontal clearances for freedom of DWSD equipment movement.

Free and easy access to the sewers, water mains, fire hydrants and manholes and structures within the easement is required for DWSD equipment, including the use of backhoes, bull dozers, cranes or pipe trucks, and other heavy construction equipment, as necessary for the alteration or repair of the sewer and/or water main facilities.

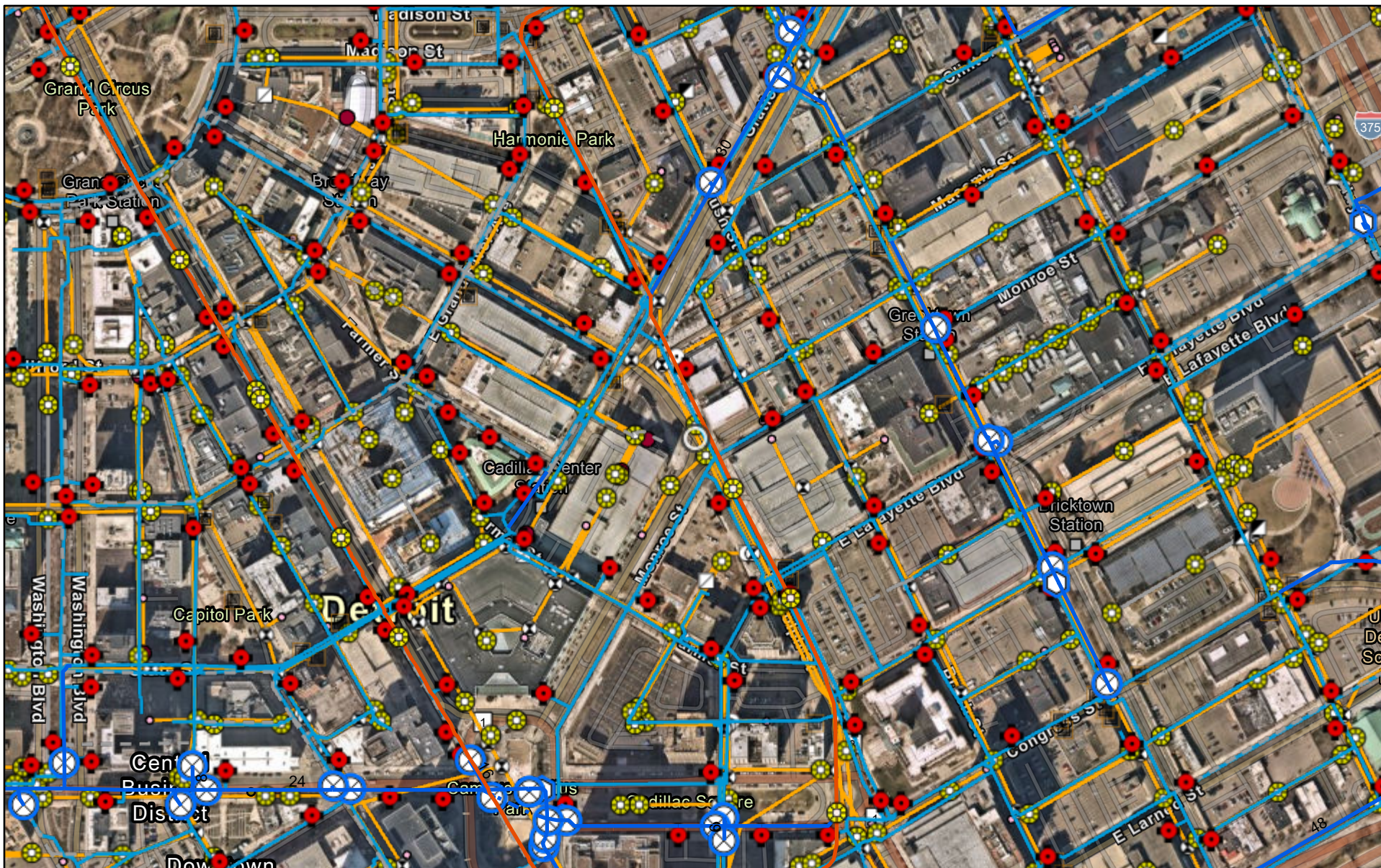
DWSD retains the right to install suitable permanent main location guide posts over its water mains at reasonable intervals and at points of deflection.

2. Said owners of the adjoining property, for themselves, their heirs and assigns, agree that no building or structure of any nature whatsoever, including fences, porches, patios, balconies, etc., shall be built upon or over said easement, or that no grade changes or storage of materials shall be made within said easement without prior written approval and agreement with DWSD.

DWSD prohibits the use of heavy construction equipment or the storage of building material directly over or near DWSD facilities. DWSD also prohibits the use of cranes and balls or hydraulic rams for pavement removal where DWSD facilities are involved. If the water main and/or sewer facilities are broken or damaged as a result of any action on the part of the contractor, the contractor shall be liable for any and all costs incidental to the repair of such broken or damaged water main and/or sewer facilities.

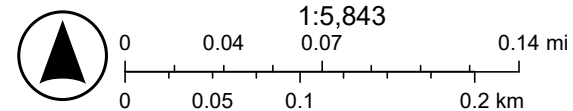
3. If at any time in the future, the owners of any lots abutting on said conversion to easement shall request the removal and/or relocation of the aforementioned utilities in said easement, such owners shall pay all costs incidental to such removal and/or relocation. It is further provided that if sewers, water mains, and/or appurtenances in said easement shall break or be damaged as a result of any action on the part of the owner, or assigns, then in such event, the owner or assigns shall be liable for all costs incidental to the repair of such broken or damaged sewers and/or water mains, and shall also be liable for any and all claims for damages resulting from his action.

MAP-24-122

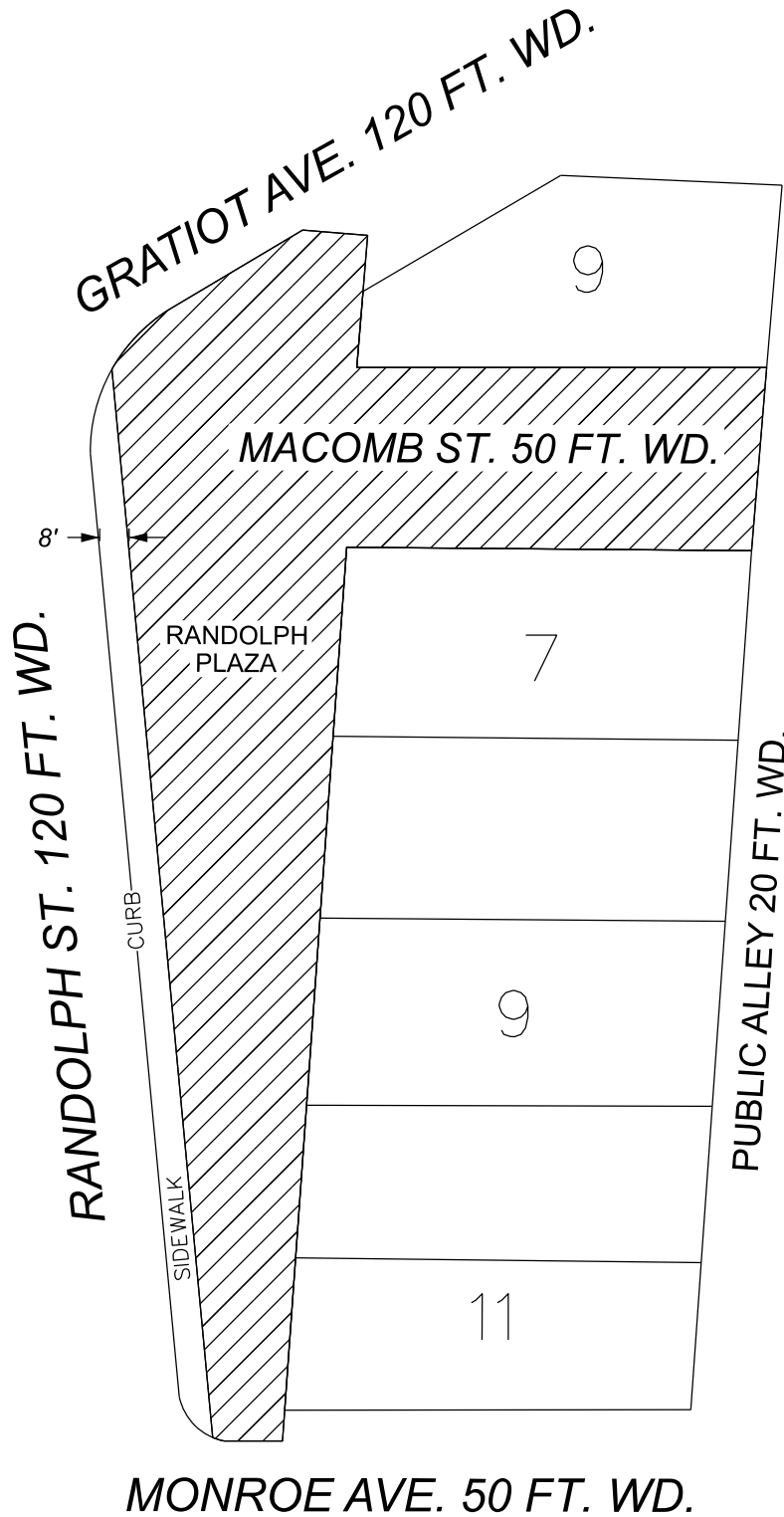


8/20/2024

- | | | | | |
|--|--|--|---|---|
| <ul style="list-style-type: none"> Manhole Manhole GLWA Gravity Main | <ul style="list-style-type: none"> Abandoned/Inactive Water Main Active Water Main Transmission System Valves - GLWA Blowoff | <ul style="list-style-type: none"> Gate Tapping Sleeve | <ul style="list-style-type: none"> Distribution System Hydrant Distribution System Main <ul style="list-style-type: none"> Active Abandoned Wastewater Catch Basin | <ul style="list-style-type: none"> Wastewater Manhole Wastewater Fitting <ul style="list-style-type: none"> Bend/Slope Change Blind Connection Bulkhead/Cap Material/Size Change Crown/Main Point Wastewater Lamp Hole Wastewater Gravity/Main <ul style="list-style-type: none"> Active Abandoned/Inactive/Retired |
|--|--|--|---|---|



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 - REQUEST VACATION WITH EASEMENT
(FOR RANDOLPH PLAZA REDEVELOPMENT PROJECT)

(FOR OFFICE USE ONLY)

CARTO 28 A

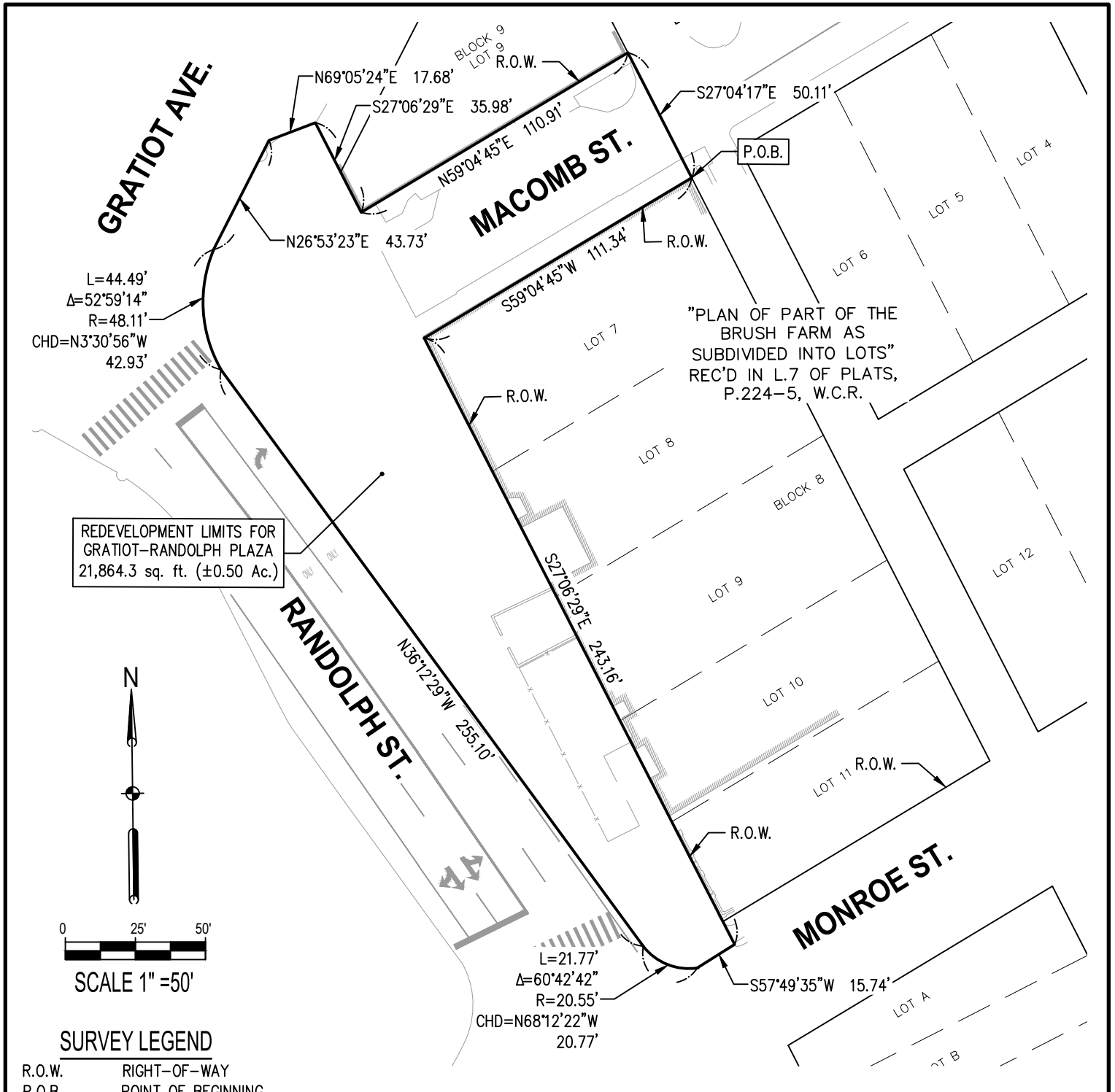
B					
A					
DESCRIPTION	DRWN	CHKD	APPD	DATE	
REVISIONS					
DRAWN BY	LC	CHECKED	AP		
DATE	08-16-2024	APPROVED	RW		

REQUEST VACATION WITH EASEMENT
OF MACOMB ST. AND A PORTION OF
RANDOLPH ST. BOUNDED BY
MONROE AVE., RANDOLPH ST.,
AND GRATIOT AVE.

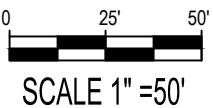
CITY OF DETROIT
CITY ENGINEERING DIVISION
SURVEY BUREAU

JOB NO. 24-122

DRWG. NO.



REDEVELOPMENT LIMITS FOR
GRATIOT-RANDOLPH PLAZA
21,864.3 sq. ft. (±0.50 Ac.)



SURVEY LEGEND

R.O.W. RIGHT-OF-WAY
P.O.B. POINT OF BEGINNING

LEGAL DESCRIPTION OF REDEVELOPMENT LIMITS FOR GRATIOT-RANDOLPH PLAZA:

Land situated in the City of Detroit, County of Wayne and State of Michigan, described as follows:

BEGINNING at the Northeast corner of Lot 7, Block 8, of "Plan of Part of the Brush Farm as Subdivided into Lots", as recorded in Liber 7 of Plats, Pages 224-225, Wayne County Records; thence along the North line of said Lot 7, also being the Southerly Right-of-Way line of Macomb Street, S59°04'45"W 111.34 feet; thence along the East line of said "Plan of Part of the Brush Farm as Subdivided into Lots", also being the East Right-of-Way line of Randolph Street, S27°06'29"E 243.16 feet; thence along the North, East and South concrete curb line of Monroe Street, Randolph Street, and Gratiot Avenue in the following five (5) courses: (1) S57°49'35"W 15.74 feet; (2) 21.77 feet along a non-tangential curve to the right having a radius of 20.55 feet, a central angle of 60°42'42", and a long chord bearing N68°12'22"W, 20.77 feet; (3) N36°12'29"W 255.10 feet; (4) 44.49 feet along a non-tangential curve to the right having a radius 48.11 feet, a central angle of 52°59'14", and a long chord bearing N03°30'56"W 42.93 feet; and (5) N26°53'23"E 43.73 feet; thence N69°05'24"E 17.68 feet; thence S27°06'29"E 35.98 feet; thence along the South line of Block 9, Lot 9 of said "Plan of Part of the Brush Farm as Subdivided into Lots", also being the Northerly right-of-way line of Macomb Street, N59°04'45"E 110.91 feet; thence S27°04'17"E 50.11 feet to the **POINT OF BEGINNING**.

Being a part of Private Claim No. 1, City of Detroit, Wayne County, Michigan and containing 0.50 acres of land, more or less. Subject to all easements, conditions and restrictions of record, if any.

CLIENT		GREEKTOWN NEIGHBORHOOD PARTNERSHIP	
LEGAL DESCRIPTION OF THE REDEVELOPMENT LIMITS FOR THE GRATIOT-RANDOLPH PLAZA. PART OF PRIVATE CLAIM NO.1, CITY OF DETROIT, WAYNE COUNTY, MICHIGAN			
JOB NO. 12799		PAGE 1 OF 1	
DRAWN: PK		DATE 2024-02-09	
SMITHGROUP 201 DEPOT STREET SECOND FLOOR ANN ARBOR, MI 48104 734.662.4457 www.smithgroup.com			

PROJECT MANUAL

RANDOLPH PLAZA REDEVELOPMENT PROJECT

Prepared for:

Greektown Neighborhood Partnership

100% CONSTRUCTION DOCUMENTS

Project No: 12799.001

Issue date: June 18, 2024

Prepared by:

SMITHGROUP

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NOT APPLICABLE

SECTION 311000 - SITE CLEARING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Removing above- and below-grade site improvements.
 - 2. Temporary erosion and sedimentation control.

1.2 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify Call Before You Dig for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control[and plant-protection] measures are in place.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

- A. Locate, identify, and disconnect utilities indicated to be abandoned in place.

3.4 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.5 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 312000 - EARTH MOVING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Excavating and filling for rough grading the Site.
 - 2. Preparing subgrades for slabs-on-grade walks plants.
 - 3. Drainage course for concrete slabs-on-grade.
 - 4. Subbase course for concrete walks pavements.
- B. Related Requirements:
 - 1. Section 329300 "Exterior Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.2 DEFINITIONS

- A. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- C. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- D. Fill: Soil materials used to raise existing grades.
- E. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.
 - 2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.
- F. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.
- G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- H. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

1.3 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
 - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Utility Locator Service: Notify "Call Before You Dig" for area where Project is located before beginning earth-moving operations.

- D. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 311000 "Site Clearing" are in place.
- E. The following practices are prohibited within protection zones:
 1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- C. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- D. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- E. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Drainage Course: Narrowly graded mixture of [**washed**] crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.
- H. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.
- I. Sand: ASTM C 33/C 33M; fine aggregate.
- J. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 1. Survivability: Class 2; AASHTO M 288.
- B. Separation Geotextile: 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:
 1. Survivability: Class 2; AASHTO M 288.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.4 SUBGRADE INSPECTION

- A. Notify Architect when excavations have reached required subgrade.
- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.5 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.6 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.7 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.

4. Under building slabs, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.8 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.9 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.10 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.

3.11 SUBSURFACE DRAINAGE

A. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.
2. Place and compact impervious fill over drainage backfill in 6-inch- thick compacted layers to final subgrade.

3.12 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Shape subbase course to required crown elevations and cross-slope grades.
2. Place subbase course 6 inches or less in compacted thickness in a single layer.
3. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

C. Pavement Shoulders: Place shoulders along edges of subbase course[and base course] to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.13 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Place drainage course 6 inches or less in compacted thickness in a single layer.
 - 2. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 3. Compact each layer of drainage course to required cross sections and thicknesses to not less than [95] <Insert number> percent of maximum dry unit weight according to ASTM D 698.

3.14 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION

SECTION 321400 - UNIT PAVING**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Brick pavers set in aggregate sand setting beds (on concrete).
- B. Related Requirements:
 - 1. Section 321313 "Concrete Paving" [for concrete base under unit pavers] [and] [for cast-in-place concrete curbs and gutters serving as edge restraints for unit pavers].

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For materials other than water and aggregates.
- B. Product Data: For the following:
 - 1. Pavers.
 - 2. Mortar and grout materials.
- C. Samples for Verification: For full-size units of each type of unit paver indicated.[Assemble no fewer than five Samples of each type of unit on suitable backing and grout joints.][Include Samples of the following:]
 - 1. Joint materials.
 - 2. Brick pavers.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For unit pavers. Include statements of material properties indicating compliance with requirements, including compliance with standards. Provide for each type and size of unit.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for unit pavers, indicating compliance with requirements.
 - 1. For solid interlocking paving units, include test data for freezing and thawing according to ASTM C 67.

1.5 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquids in tightly closed containers protected from freezing.

1.7 FIELD CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- B. Weather Limitations for Mortar and Grout:
 - 1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6. Provide artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and higher.
 - a. When ambient temperature exceeds 100 deg F, or when wind velocity exceeds 8 mph and ambient temperature exceeds 90 deg F, set pavers within 1 minute of spreading setting-bed mortar.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 BRICK PAVERS

- A. Brick Pavers: Light-traffic paving brick; ASTM C 902, Class SX , Type I, Application PS. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Brick Tech Architectural
 2. Thickness: 2-1/4 inches .
 3. Face Size: 3-5/8 by 7-5/8 inches.
 4. Style: Wire cut.
 5. Color: Match Architect's sample.
 - a. Dark Ironspot
 - b. Manganese Ironspot
 - c. Medium Ironspot 46
 - d. Medium Ironspot 77

2.3 AGGREGATE SETTING-BED MATERIALS

- A. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33/C 33M for fine aggregate.
- B. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.
- C. Drainage Geotextile: Nonwoven needle-punched geotextile fabric, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 1. Survivability: Class 2, AASHTO M 288.
 2. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
 3. Permittivity: 0.5 per second, minimum; ASTM D 4491.
 4. UV Stability: 50 percent after 500 hours' exposure, ASTM D 4355.

2.4 MORTAR SETTING-BED MATERIALS

- A. Regional Materials: Aggregate for mortar and grout shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.
- B. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
- C. Sand: ASTM C 144.
- D. Latex Additive: [Manufacturer's standard] [acrylic resin] [or] [styrene-butadiene-rubber] water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed, and not containing a retarder.

2.5 MORTAR AND GROUT MIXES

- A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimal performance characteristics. Discard mortars and grout if they have reached their initial set before being used.

- B. Mortar-Bed Bond Coat: Mix neat cement and to a creamy consistency.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive unit paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Where unit paving is to be installed over waterproofing, examine waterproofing installation, with waterproofing Installer present, for protection from paving operations, including areas where waterproofing system is turned up or flashed against vertical surfaces.
- C. Proceed with installation only after unsatisfactory conditions have been corrected[and waterproofing protection is in place].

3.2 PREPARATION

- A. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.
- B. Sweep concrete substrates to remove dirt, dust, debris, and loose particles.

3.3 INSTALLATION, GENERAL

- A. Do not use unit pavers with chips, cracks, voids, discolorations, or other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- D. Handle protective-coated brick pavers to prevent coated surfaces from contacting backs or edges of other units. If, despite these precautions, coating does contact bonding surfaces of brick, remove coating from bonding surfaces before setting brick.
- E. Joint Pattern: **[Running bond] [Herringbone] [Basket weave] [Grid] [As indicated] [Match and continue existing unit paver joint pattern].**
- F. Pavers over Waterproofing: Exercise care in placing pavers and setting materials over waterproofing so protection materials are not displaced and waterproofing is not punctured or otherwise damaged. Carefully replace protection materials that become displaced and arrange for repair of damaged waterproofing before covering with paving.
- G. Tolerances: Do not exceed 1/32-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet from level, or indicated slope, for finished surface of paving.
- H. Tolerances: Do not exceed[1/16-inch **unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and] 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.**
- I. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
 - 1. Where pavers set in mortar bed are indicated as edge restraints for pavers set in aggregate setting bed, install pavers set in mortar and allow mortar to cure before placing aggregate setting bed and remainder of pavers. Cut off mortar bed at a steep angle so it will not interfere with aggregate setting bed.
 - 2. Where pavers embedded in concrete are indicated as edge restraints for pavers set in aggregate setting bed, install pavers embedded in concrete and allow concrete to cure before placing aggregate setting bed and remainder of pavers. Hold top of concrete below aggregate setting bed.
- J. Provide steps made of pavers as indicated. Install paver steps before installing adjacent pavers.
 - 1. Where pavers set in mortar bed are indicated for steps constructed adjacent to pavers set in aggregate setting bed, install steps and allow mortar to cure before placing aggregate setting bed and remainder of pavers. Cut off mortar bed at a steep angle so it will not interfere with aggregate setting bed.

3.4 AGGREGATE SETTING-BED APPLICATIONS

- A. Compact soil subgrade uniformly to at least [95] <Insert number> percent of [ASTM D 698] [ASTM D 1557] laboratory density.
- B. Place aggregate[subbase and] base, compact by tamping with plate vibrator, and screed to depth indicated.
- C. Place drainage geotextile over compacted base course, overlapping ends and edges at least 12 inches.
- D. Place leveling course and screed to a thickness of 1 to 1-1/2 inches, taking care that moisture content remains constant and density is loose and uniform until pavers are set and compacted.
- E. Treat leveling course with herbicide to inhibit growth of grass and weeds.
- F. Set pavers with a minimum joint width of 1/16 inch and a maximum of 1/8 inch, being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed [3/8 inch] <Insert dimension> with pieces cut to fit from full-size unit pavers.
 - 1. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
- G. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf compaction force at 80 to 90 Hz. Use vibrator with neoprene mat on face of plate or other means as needed to prevent cracking and chipping of pavers. Perform at least three passes across paving with vibrator.
 - 1. Compact pavers when there is sufficient surface to accommodate operation of vibrator, leaving at least 36 inches of uncompacted pavers adjacent to temporary edges.
 - 2. Before ending each day's work, compact installed concrete pavers except for 36-inch width of uncompacted pavers adjacent to temporary edges (laying faces).
 - 3. As work progresses to perimeter of installation, compact installed pavers that are adjacent to permanent edges unless they are within 36 inches of laying face.
 - 4. Before ending each day's work and when rain interrupts work, cover pavers that have not been compacted and cover leveling course on which pavers have not been placed with nonstaining plastic sheets to protect them from rain.
- H. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.
- I. Do not allow traffic on installed pavers until sand has been vibrated into joints.
- J. Repeat joint-filling process 30 days later.

3.5 MORTAR SETTING-BED APPLICATIONS

- A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.
- B. Apply mortar bed over bond coat; spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.
- C. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Before placing pavers, cut back, bevel edge, and remove and discard setting-bed material that has reached initial set.
- D. Wet brick pavers before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- E. Place pavers before initial set of cement occurs. Immediately before placing pavers on mortar bed, apply uniform 1/16-inch- thick bond coat to mortar bed or to back of each paver with a flat trowel.
- F. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.

- G. Spaced Joint Widths: Provide [3/8-inch] [1/2-inch] [3/4-inch] nominal joint width with variations not exceeding plus or minus [1/16 inch] [1/8 inch] [3/16 inch].
- H. Grouted Joints: Grout paver joints complying with ANSI A108.10.
- I. Grout joints as soon as possible after initial set of setting bed.
 - 1. Force grout into joints, taking care not to smear grout on adjoining surfaces.
 - 2. Clean pavers as grouting progresses by dry brushing or rubbing with dry burlap to remove smears before tooling joints.
 - 3. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
 - 4. If tooling squeezes grout from joints, remove excess grout and smears by dry brushing or rubbing with dry burlap and tool joints again to produce a uniform appearance.
- J. Cure grout by maintaining in a damp condition for seven days unless otherwise recommended by grout or liquid-latex manufacturer.

3.6 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout. Point joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.
- C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.
 - 1. Remove temporary protective coating as recommended by coating manufacturer and as acceptable to paver and grout manufacturers.
 - 2. Do not allow protective coating to enter floor drains. Trap, collect, and remove coating material.

END OF SECTION

SECTION 323300 - SITE FURNISHINGS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Seating.
 - 2. Bicycle racks.
 - 3. Formed metal planter.
 - 4. Movable planters.
 - 5. Bollards.

1.2 ACTION SUBMITTALS

- A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required . Ensure compliance with requirements included in Product Data: For each type of product.
- B. Product Schedule: For site furnishings..

1.3 QUALITY ASSURANCE

- A. Provide the following upon request:
 - 1. Material Certificates: For site furnishings manufactured with preservative-treated wood.
 - a. Indicate type of preservative used and net amount of preservative retained.[For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.]

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For site furnishings to include in maintenance manuals.

PART 2 - PRODUCTS**2.1 SEATING**

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Landscape Forms.
- B. Bench, Backed.
 - 1. Product: Generation 50 Bench.
 - a. Style: Top of Wall, Embedded.
 - b. Back: Backed.
 - c. Arms: No arms.
 - d. Faceboard: Curved cut.
 - e. Color: FSC Ipe with No Finish.
- C. Bench, Backless.
 - 1. Product: Generation 50 Bench.
 - a. Style: Top of Wall, Embedded.
 - b. Back: Backless.
 - c. Arms: No arms.
 - d. Faceboard: Curved cut.
 - e. Color: FCS Ipe with No Finish.

2.2 BICYCLE RACKS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Landscape Forms.
- B. Product: Ride Bike Rack.
 - 1. Material: Powdercoated Metal.

2.3 FORMED METAL PLANTER

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Planterworx.
- B. Product: XP Edging System.

1. Overall Height: 12 inches.
2. Overall Length: 426 feet.
3. Material: Powdercoated Aluminum.
4. Color: As selected by Architect from manufacturer's full range.

2.4 MOVABLE PLANTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Kornegay Design.
- B. Style 1.
1. Product: Cirque Series, #CS-44.
 - a. Overall Height: 44 inches.
 - b. Overall Diameter: 22 inches.
 - c. Color: As selected by Architect from manufacturer's full range.
 - d. Quantity: Five.
- C. Style 2.
1. Product: Cirque Series, #CS-34.5.
 - a. Overall Height: 34.5 inches.
 - b. Overall Diameter: 36 inches.
 - c. Color: As selected by Architect from manufacturer's full range.
 - d. Quantity: Five.
- D. Style 3.
1. Product: Cirque Series, #CS-30.
 - a. Overall Height: 30 inches.
 - b. Overall Diameter: 25.5 inches.
 - c. Color: As selected by Architect from manufacturer's full range.
 - d. Quantity: Five.
- E. Color: .

2.5 BOLLARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Urban Accessories, Inc.
- B. Product: DG-2.
1. Product: Cirque Series, #CS-44.
 2. Overall Height: 44 inches.
 3. Overall Diameter: 22 inches.
 4. Color: As selected by Architect from manufacturer's full range.

2.6 MATERIALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:
1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B211.
 2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B221.
 3. Structural Pipe and Tube: ASTM B429/B429M.
 4. Sheet and Plate: ASTM B209.
 5. Castings: ASTM B26/B26M.
- B. Steel and Iron: Free of surface blemishes and complying with the following:
1. Plates, Shapes, and Bars: ASTM A36/A36M.
 2. Steel Pipe: Standard-weight steel pipe complying with ASTM A53/A53M, or electric-resistance-welded pipe complying with ASTM A135/A135M.
 3. Tubing: Cold-formed steel tubing complying with ASTM A500/A500M.
 4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A513/A513M, or steel tubing fabricated from steel complying with ASTM A1011/A1011M and complying with dimensional tolerances in ASTM A500/A500M; zinc coated internally and externally.
 5. Expanded Metal: Carbon-steel sheets, deburred after expansion, and complying with ASTM F1267.
 6. Malleable-Iron Castings: ASTM A47/A47M, grade as recommended by fabricator for type of use intended.
 7. Gray-Iron Castings: ASTM A48/A48M, Class 200.

- C. Stainless Steel: Free of surface blemishes and complying with the following:
 1. Sheet, Strip, Plate, and Flat Bars: ASTM A240/A240M or ASTM A666.
 2. Pipe: Schedule 40 steel pipe complying with ASTM A312/A312M.
 3. Tubing: ASTM A554.
- D. Fiberglass: Multiple laminations of glass-fiber-reinforced polyester resin with UV-light stable, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat, and with manufacturer's standard finish.
- E. Plastic: Color impregnated, color and UV-light stabilized, and mold resistant.
 1. Polyethylene: Fabricated from virgin plastic HDPE resin.
 2. Polyethylene with Recycled Content: Fabricated from HDPE and other resins with postconsumer recycled content plus one-half of preconsumer recycled content not less than <Insert number> percent.
- F. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality, tamperproof, vandal and theft resistant.
- G. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:
 1. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent zinc pigmented coating, not less than 0.3 mil thick.
 2. Hot-Dip Galvanizing: According to ASTM A123/A123M, ASTM A153/A153M, or ASTM A924/A924M.

2.7 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment: Pressure-treat wood according to AWPA U1, Use Category UC3b, and the following:
 1. Use preservative chemicals acceptable to authorities having jurisdiction and containing no arsenic or chromium. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 2. Kiln-dry lumber and plywood after treatment to a maximum moisture content, respectively, of 19 and 15 percent. Do not use materials that are warped or do not comply with requirements for untreated materials.

2.8 FABRICATION

- A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.
- B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended, so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.
- C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- D. Preservative-Treated Wood Components: Complete fabrication of treated items before treatment if possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces.
- E. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.
- F. Factory Assembly: Factory assemble components to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.9 GENERAL FINISH REQUIREMENTS

- A. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 ALUMINUM FINISHES

- A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.11 STEEL AND GALVANIZED-STEEL FINISHES

- A. Powder-Coat Finish: Manufacturer's standard polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.
- B. PVC Finish: Manufacturer's standard, UV-light stabilized, mold-resistant, slip-resistant, matte-textured, dipped or sprayed-on, PVC-plastisol finish, with flame retardant added; complying with coating manufacturer's written instructions for pretreatment, application, and minimum dry film thickness.

2.12 IRON FINISHES

- A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.13 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run directional finishes with long dimension of each piece.
 - 2. Directional Satin Finish: ASTM A480/A480M, No 4.
 - 3. Dull Satin Finish: ASTM A480/A480M, No. 6.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and **[securely anchored]** **[positioned]** at locations indicated on Drawings.
- D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
- E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with , mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION

SECTION 329100 - SOIL PREPARATION (TOPSOIL)

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies all soil materials designated as "Topsoil" on the drawings or in the specifications. Supply topsoil for landscape work (seeding and planting) from , off-site sources .
- B. Related Requirements:
 - 1. Section 329300 "Exterior Planting" for soil mixtures that include topsoil.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. US Department of Agriculture (USDA) Handbook No. 60 – Diagnosis and Improvement of Saline and Alkali Soils.

1.3 ACTION SUBMITTALS

- A. Source Quality Control:
 - 1. Material Test Reports: Conduct Topsoil testing for imported topsoil from off-site sources.
 - 2. Sample: Provide 1 quart samples for each topsoil test unit (including source).
 - 3. Conduct all topsoil sampling and testing prior to delivery from off-site sources, .

1.4 INFORMATIONAL SUBMITTALS

- A. Field Quality Control:
 - 1. Obtain samples, test materials and submit field test reports as described under Articles 2.1 and 3.1 below.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Soil-Testing Laboratory Qualifications: The contractor shall engage an independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil:
 - 1. Topsoil for landscape work shall be a fertile, friable, sandy loam or loam surface soil without admixture of subsoil screened to be free of stones, stumps, root, trash, debris, and other materials deleterious to plant growth.

Sieve Designation	Percent Passing
1 inch screen	100
1/4 inch screen	97 - 100
No. 10 U.S.S. mesh sieve	95 - 100
No. 140 U.S.S.	15 – 35

- 2. The pH range shall be 6.5 to 8.4. Topsoil that does not meet this pH range shall not be approved by the Architect.
- 3. Organic content shall not be less than 4 percent and not greater than 20 percent.
- 4. Clay content determined by Bouyoucous Hydrometer Test: between 5 percent and 15 percent.
- 5. Base percentages on dry weight of the sample

2.2 SOURCE QUALITY CONTROL:

- A. Laboratory Test Reports:
 - 1. Conduct topsoil testing for each soil test unit as follows:
 - a. Plant mixture: Plant mixture shall be tested twice. First - test topsoil as indicated above. Second - test plant mixture after integrating mixture ingredients as identified under Part 2 of Exterior Planting specification.

2. Submit all test reports for approval. Topsoil units that do not meet the soil requirements specified under this section will not be permitted for use as Topsoil.
3. Fertility: For each unamended soil type, test topsoil for organic materials, pH, phosphate, potash content, calcium, magnesium, zinc, iron, and manganese.
4. Physical Properties: Determine percent sand, silt and clay and textural classification (USDA) by hydrometer method. Identify all foreign materials such as rock, roots, and vegetation.
5. Supplemental Testing: Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action. If any heavy metal exceeds state listed background levels for human contact, soils will not be approved for use on site.
6. Recommendations: Based on the test results, the independent testing laboratory shall state recommendations for soil treatments and soil amendments to be incorporated prior to seeding and planting. List recommendations in weight per 1000 square feet for lawn area and cubic yard of plant mixture. Recommendations shall include; nitrogen, phosphorus, and potash nutrients and all soil amendments required for the long-term growth of the specified plants and turf.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Sampling: Each soil test unit shall be a composite of five to seven subsamples taken the full depth of proposed source for each acre of surface area. For on-site stockpiles, discard upper 6 inches of soil before sampling. For large stockpiles, partial excavation will be required for collection of representative samples. Include site plan verifying the locations of all topsoil sampling. Topsoil test reports shall be accompanied with each sample unit for review and approval by the Architect.
- B. Testing methods and written recommendations when not references elsewhere, shall comply with USDA's Handbook No. 60. Nutrient data to be given in parts per million (ppm) dry soil.
- C. Topsoil shall be as defined in ASTM D5268.
- D. Soil pH shall be tested in accordance with ASTM D4972.
- E. Test for organic material by using ASTM D2974.

END OF SECTION

SECTION 329300 – EXTERIOR PLANTINGS**PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 1. Tree and shrub plantings.
 2. Herbaceous perennials, ornamental grasses, groundcover and vine plantings.
 3. Annual plantings.
 4. Plant procurement.
 5. Planting mixtures.
 6. Plant mulch.
 7. Aggregate maintenance edge.
 8. Metal edging.
 9. Staking and guying.
 10. Maintenance.
 11. Warranty replacements.
- B. Related Requirements:
 1. Section 311000 "Site Clearing" for stripping on-site topsoil.
 2. Section 312000 "Earth Moving" for mass grading of the site.
 3. Section 328400 "Planting Irrigation" for turf and planting irrigation systems.
 4. Section 329100 "Soil Preparation (Topsoil)" for lawns and plant mixture amendment.

1.2 REFERENCES AND REGULATORY REQUIREMENTS

- A. Hortus Third, The Staff of the L.H. Bailey Hortorium. 1976. MacMillan Publishing Co., New York.
- B. ASTM International, as referenced herein as ASTM.
- C. American Standard for Nursery Stock, as referenced herein as ANSI Z60.1-2004.
- D. United State Department of Agriculture (USDA), Plant disease and insect control Phytosanitary and Export Certifications.
- E. United States Composting Council, Seal of Testing Assurance (STA), Procedures for sampling and testing as outlined in the Test Methods for the Examination of Composting and Compost (TMECC) protocols.

1.3 DEFINITIONS

- A. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- B. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.
- C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- D. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- E. Finish Grade: Elevation of finished surface of planting soil.
- F. Mycorrhizal Inoculum: Fungi either introduced or naturally occurring in the soil that greatly increased plant roots growth and ability to absorb nutrients and water.
- G. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

- H. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- I. Planting Area: Areas to be planted.
- J. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- K. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, annuals, perennials, bulbs, corms, tubers, or herbaceous vegetation.
- L. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- M. Root Production Method (RPM): A trademark technology referred to as root production method for a variety of tree and shrub species resulting in a dense fibrous root system for small sized plants.
- N. Single Central Leader: A single central dominant leader branch, free of secondary co-dominant stems that would compete with the central leader, either naturally occurring or professionally trained in the nursery with no stem deformities or residual woody stubs from original leader.
- O. Specimen Plant: Exceptionally heavy, symmetrical, and tightly knit, growth, superior in form, with properly spaced branching.
- P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- Q. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- R. Sheared Evergreen: Any evergreen tree or shrub that has been heavily trimmed or pruned to remove the natural shape of the plant. An evergreen tree grown at a "Christmas" tree farm is typically sheared.
- S. Young Plants: Lining out stock, seedlings generally sold within the wholesale trade for continued cultivation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data:
 1. Plant procurement verification:
 - a. Within 4 weeks following the execution of the Agreement between the Owner and Contractor, submit vendor purchase order, invoice 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 Landscape Architect to provide nursery visits for the purpose of reviewing and tagging plant materials. The Contractor shall compensate the Landscape Architect for said services.
 - d. Substitutions shall not be permitted without written approval from the Landscape Architect.
 2. Metal edging and accessories.
 3. Jute mesh.
 4. Tree wrap.
 5. Soil amendments: Provide information on composition and source of all soil amendments. Include test results for compost and peat.
 6. Mycorrhizal inoculum.
 7. Fertilizer.
 8. Pesticides and Herbicides: Include product label and manufacturer™™s application instructions specific to the project site.
 9. Antidesiccants: Include product label and manufacturer™™s application instructions.

10. Maintenance edge aggregate gradation analysis.
 11. Maintenance edge aggregate separation fabric.
 12. Predator barrier fencing, tree guard, staking material and ties.
- B. Source Quality Control:
1. Samples:
 - a. Organic and Mineral Mulch: 1 quart by volume in sealed plastic bag labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
 - b. Staking and/or guying materials.
 - c. Maintenance edge aggregate: 1 quart by volume in sealed plastic bag. Provide an accurate representation of color, texture and size.
 2. Test Report:
 - a. Topsoil: Test reports including fertilization recommendations for lawns and plant materials. Refer to Section [329100]-Soil Preparation (Topsoil).
 3. Certifications/Licenses:
 - a. Phytosanitary Certification: Plant material Inspection Certificates required by Federal, State or other governing authority at the time of plant material verification identified above.
 - b. License certificate(s) for pesticide applicator.
 4. Nursery Requirements:
 - a. Plants shipped to the site as B&B must originate from a licensed plant nursery with a current Phytosanitary certification. Field collected plants will not be permitted.
 - b. Wrap tree trunks with protective material in advance of digging.
- C. Field Quality Control:
1. Project Work Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a project work schedule to the Landscape Architect indicating dates for delivery, installation, and Substantial Completion for all landscape work. The Schedule shall be comprehensive and address procurement, delivery, and installations of irrigation, planting and seeding areas of the site. For large site, the schedule shall reflect a phased installation and shall include support graphics required to identify this phased approach. Refer to below for a complete list of schedule requirements.
 2. Maintenance Schedule: Prior to the issuance of Substantial Completion, submit a detailed typewritten approach and schedule for the warranty maintenance of all landscape activities outlined under this section. Coordinate landscape maintenance with other applicable Sections () and combine all maintenance activities into one plan of action. The schedule shall be comprehensive .
 3. Irrigation Plan: Within 4 weeks following the issuance of the Notice to Proceed, submit a detailed typewritten approach and schedule that outlines watering requirements for maintaining the landscape as described herein. The Irrigation Plans shall be submitted in conjunction with the Maintenance Schedule. The plan shall address how the irrigation system will be operated during the warranty period, frequencies and durations that will be established to provide the correct watering rates for plants and lawns, inspection protocols and frequencies and winterization procedures. In locations where no automatic irrigation system has been installed, describe means, methods and frequencies for hand watering. If the automatic irrigation system is inoperative or not present, provide an approved temporary irrigation system or hand water from a source approved by the Landscape Architect. The system shall have the ability to be operated without moving hoses or sprinklers around the site between seeded/planted areas (i.e. system can be set to water one area for the required maintenance period), and may be automated with a timer. Supply all water and equipment at the Contractor™™s expense from a source approved by the Landscape Architect. 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].
 4. Maintenance Report Forms: Using the approved Maintenance Schedule and Irrigation Plan as the framework for all maintenance activities (plant maintenance, and irrigation operations). 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 made by the Owner when proof of completed specified maintenance has been provided. Each report shall include the following:
 - a. Date of activity.
 - b. Length of time on site (start time and finish time).
 - c. Name and signature of the maintenance superintendent.

- d. Number of personnel performing the work.
- e. Site climatic conditions (rain, wind, temperature, etc.)
- f. Detailed description of maintenance activities performed by area.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
 - 1. Include list of at least three similar projects completed in the last 5 years by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
 - 2. Provide resumes of field technician (foreman) responsible for managing the purchase and installation of all materials. Separate resumes shall be provided for the planting, seeding, irrigation and maintenance technicians.
 - 3. License certificates for arborist.

1.7 QUALITY ASSURANCE

- A. Substitutions:
 - 1. It is the Contractor™™s responsibility to locate and secure all plant materials and to verify their availability through the timely Action Submittal process identified above. Failure to comply with this requirement shall not be a reason for making substitutions. Furthermore, it may be necessary to purchase specified plants from multiple nurseries and from out-of-state sources providing said sources are within the same hardiness zone as the site.
 - 2. Substitutions of plant materials will not be permitted unless authorized in writing by the Landscape Architect. If proof is submitted in writing that a plant specified is not obtainable, the Landscape Architect may assist in identifying alternate sources or substitutions.
 - 3. Plants of larger size may be used if approved and if root balls meet ANSI Z60.1 standards for the increased size. Adjustments will be made at no additional cost to the Owner. Approval of smaller size plant materials shall require a corresponding of the contract price subject to owner approval.
 - 4. Container plants may be substituted for those designated "B&B• • if approved by the Landscape Architect.
- B. Measurements: Measure plants according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 - 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
 - 3. Plants pruned to compensate for transplanting shock will not be accepted if overall height and spread does not meet the specified dimensions after pruning.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. General:
 - 1. 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.
 - 2. Store materials only in locations approved by the Owner.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk materials with appropriate certificates.
- C. Plant Materials:
 - 1. During shipment, do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. 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.
 - 2. 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. Schedule shipping to minimize on-site storage of plants. Closed vehicles shall be adequately ventilated/refrigerated.

3. Stock shall not be shipped until the planting preparations have been completed. If planting is delayed more than 24 hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - a. Heel-in bare-root stock. Pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Soak roots that are in less than moist condition in water for two hours. Plants with dry roots will be rejected. Any bare-root plants requiring sweating to break dormancy must have this procedure carried out before plants arrive onsite.
 - b. Set balled stock on ground and cover ball with soil, or bark mulch.
 - c. Do not remove container-grown stock from containers before time of planting.
 - d. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.
4. Schedule shipping aquatic tubers and plugs to result in on-site storage time of less than one day prior to installation. If delays beyond the contractor's control occur after delivery, store plants to ensure viability. All aquatic plants that are in a state of decay at the time of planting shall be rejected regardless of its condition at the time of delivery to the site.
5. 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. Label aquatic plants (tubers, plugs, and/or bare-root) individually or in bundles of like variety.
6. Aquatic plant container bags shall be opened upon arrival to allow air flow, but stored in a cool shaded location with ample moisture to maintain the plants in their natural wet habitat condition.
7. Store bulbs, corms, and tubers in a dry place at 60 – 65 degrees F until planting.
8. 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.

1.9 SCHEDULING

- A. Work Schedule:
 1. Upon authorization to proceed with the work, submit a project work schedule indicating the dates of each of the following items:
 - a. Submittal schedule.
 - b. Tagging of plants in nurseries.
 - c. Delivery of other materials to the site.
 - d. Staking of plant locations on the site.
 - e. Delivery of plant material to the site.
 - f. Planting.
 - g. Substantial Completion of the work.
 - h. Maintenance period.
 2. Update schedule monthly to reflect progress of the work.
- B. Planting Season:
 1. Materials shall be installed during planting seasons normally recognized in the job locality.
 2. USDA Hardiness Zone 4:
 - a. B&B and container grown plants, planting season shall be from April 15 through June 15 and from October 1 until the prepared soil becomes frozen.
 - b. Evergreen plants from April 15 through June 15 and from September 1 through September 15.
 - c. Bare root woody plants and aquatic tuber and root stock only in spring from April 15 through approximately June 15 but no later than full leaf-out of existing woody and aquatic plants.
 - d. Bulbs, corms and tubers from September 15 through October 15 and from April 15 through June 15. Spring vs. fall planting is species dependent and Contractor shall comply with seasonal limitations identified on the plant list included on the drawings.
 3. USDA Hardiness Zone 5:
 - a. B&B and container grown plants, planting season shall be from April 1 through June 1 and from October 1 until the prepared soil becomes frozen.
 - b. Evergreen plants from April 1 through June 1 and from September 15 through October 15.
 - c. Bare root woody plants and aquatic tuber and root stock only in spring from April 1 through approximately June 1 but no later than full leaf-out of existing woody and aquatic plants.

- d. Bulbs, corms and tubers from September 15 through November 1 and from April 1 through June 1. Spring vs. fall planting is species dependent and Contractor shall comply with seasonal limitations identified on the plant list included on the drawings.
- 4. USDA Hardiness Zone 6:
 - a. B&B and container grown plants, planting season shall be from March 15 through May 15 and from October 1 until the prepared soil becomes frozen.
 - b. Evergreen plants from March 15 through May 15 and from October 1 through November 1.
 - c. Bare root woody plants and aquatic tuber and root stock only in spring from March 15 through approximately May 15 but no later than full leaf-out of existing woody and aquatic plants.
 - d. Bulbs, corms and tubers from October 1 through November 15 and from March 15 through May 15. Spring vs. fall planting is species dependent and Contractor shall comply with seasonal limitations identified on the plant list included on the drawings.
- 5. If special circumstances warrant installation outside the normal planting season, submit a written request to the [Landscape Architect] describing conditions and stating the proposed variance. Planting outside the planting season could extend warranty obligations and will be dependent upon the extent of the variance.
- 6. Weather limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- 7. Coordination with lawn installation: Plant trees, shrubs, and other plants after finish grades are established but before seeding/sodding unless otherwise indicated. When planting trees, shrubs, and other plants after seeding/sodding, protect completed areas, and promptly repair damage caused by planting operations.

1.10 WARRANTY, MAINTENANCE AND ACCEPTANCE

- A. Substantial Completion:
 - 1. The Substantial Completion inspection shall occur for the entire project and only one Notice of Substantial Completion will be issued. Phased approvals will not be permitted. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion or correction.
 - 2. The Substantial Completion inspection for the landscape shall occur in phases based upon the phasing plan approved at the beginning of the work by the Landscape Architect. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
 - 3. The Contractor shall complete all punch list items within 2 weeks of its issuance. All repairs and plant replacements shall occur at no additional cost to the Owner.
 - 4. Substantial Completion will be provided for all planting areas complying with the following:
 - 5. Landscape Architect approval of all specified submittals.
 - 6. The work shall be 100 percent complete (including all site preparation , earthwork , plant mixture installation , plantings , , irrigation, and clean-up), and ready for inspection.
 - 7. After receiving a Notice of Substantial Completion warrant and maintain all plantings in accordance with 3.13 of this Section in a vigorous, well-kept condition until Final Acceptance.
- B. Final Acceptance:
 - 1. Prior to plant dormancy and the expiration of the warranty and maintenance period, the Landscape Architect will conduct an inspection of all plantings , irrigation system 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 Owner or Landscape Architect that the specified maintenance has occurred. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
 - 2. The contractor shall complete all punch list items within 2 week of its issuance. All repairs and plant replacements shall occur at no additional cost to the Owner.
 - 3. Final Acceptance will be based upon Landscape Architect, approval and the work having:
 - a. Been well maintained with all landscape plantings in a healthy growing condition free of disease and insect problems.
 - b. All maintenance items completed and documented by Contractor through maintenance report forms.

- 4. Final Acceptance and the end of the warranty period for the landscape will occur only after all punch list items have been satisfactorily completed and the site is left in the condition specified under Cleanup and Protection.
- C. Warranty and Maintenance Period:
- 1. The end of the warranty and maintenance period shall be:
 - a. October 31 – one year following fall Substantial Completion.
 - b. June 30 – one year following spring Substantial Completion.
 - 2. Prior to and during the warranty and maintenance period, replace any plants that are damaged, dead, or, in the opinion of the Landscape Architect, are unhealthy, or have lost more than 25 percent 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 2 weeks following the inspection unless otherwise agreed to in writing by the Owner.
 - 3. Only one replacement of any plant is required after Substantial Completion, except for losses due to failure to comply with specified installation and/or maintenance requirements.
 - 4. 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.
 - 5. The Contractor will not be held responsible for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents beyond landscape installer's control which result from floods, 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.
 - 6. If, in the opinion of the Landscape Architect, it is advisable to extend the warranty and maintenance period for an additional growing season, the contractor will be notified of such requirement by the Owner. Improper planting and/or failure to perform and document the specified maintenance in accordance with contract requirement shall be the basis for extending the period of establishment for a second growing season. All specified maintenance and warranty requirements will be required during this extended period and all costs shall be the responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 PLANT MATERIALS

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in the Plant Legend shown on Drawings and with the minimum quality conforming to American Standard for Nursery Stock, ANSI Z60.1. Branching on all plants shall be characteristic of the species, well-shaped, full, sound, healthy, vigorous stock of uniform growth and densely foliated when in leaf. All plants shall be free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 - 1. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
 - 2. Plants shall originate from the same USDA Hardiness Zone as project site, or lower (colder).
 - 3. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Where plant height or spread is indicated with a tolerance, the smaller dimension is the minimum acceptable; the larger dimension represents the maximum permissible. The average dimension of all plants must, at least, equal the average of the tolerance figures shown on the drawings. Spread shall meet the minimum dimension specified in all directions and must be considered as pivoting on center of plant.
 - 4. Plants of a larger size may be used if acceptable to the Landscape Architect and at no extra cost to Owner, with a proportionate increase in size of roots or balls.
 - 5. All plants shall have a waterproof legible label securely attached to each plant bearing designation of plant's common and scientific name, including genus, species, and cultivar or variety, when applicable.
 - 6. Do not prune plants prior to delivery.
 - 7. Stressed or damaged plants or those not conforming to the specifications shall be subject to rejection by the Landscape Architect at any time during the term of the contract.
- B. Root treatments on all plants shall conform to the following requirements:
 - 1. Balled and burlapped ("B&B") plants shall have a healthy root systems developed by transplanting or root pruning with a firm, natural ball of earth securely wrapped with burlap, bound with cord and wire basket. Root flare shall be visible before planting. Plants with damaged or broken root balls or multiple layers of burlap will not be accepted.

- 2. 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.
 - 3. Except when designated as seedlings, bare root (BR) plants shall be finished landscape grade material having a well-branched fibrous root system characteristic of the species. Roots are to be kept continuously moist with wet straw, moss, or other materials. Remove broken and injured roots prior to planting.
 - 4. Root Production Method (RPM) for plants shall have a well-developed fibrous system superior in mass to BR plants of comparable size and age.
 - 5. Annuals, perennials and ornamental grasses shall have well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery. [annuals and biennials shall be in bud but not yet in bloom].
- C. Trees: Evergreen and deciduous 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. Evergreens shall be unsharpened.
- 1. Trees indicated as specimen shall be exceptionally heavy, symmetrical, and superior in form, branching, and symmetry.
 - 2. Caliper is the trunk diameter taken at a specified distance above root collar as described in ANSI Z60.1.
 - 3. Branching height is the distance above ground where balanced branching occurs.

2.2 MULCH

- A. Organic Mulch: Well-composted, finely shredded processed hardwood bark, free from foreign material and fragments in excess of 2 inches in any dimension.
 - 1. Dyed mulch or mulch that is predominantly wood chips will not be accepted.
- B. Filter Fabric: Synthetic, non-woven, needle-punched geotextile fabric weighing 2 to 4 oz per square yard with a minimum grab tensile strength of 35 pounds and permeability of 0.03 cm/second.

2.3 STAKING AND GUYING

- A. Staking:
 - 1. Tree support stakes shall be 2 inch x 2 inch hardwood posts free of bark or 3 inch diameter hardwood or cedar posts with bark intact. Posts shall be minimum 8 feet long. Metal fence posts are not permitted unless approved in advance by the Landscape Architect.
 - 2. Tree support stakes for Root Production Method trees (RPM) shall be 1 inch x 1 inch hardwood posts free of bark.
 - 3. Wire stays for tree stakes shall be No. 12 to 14 gauge galvanized wire. Polypropylene strapping will not be permitted.
 - 4. Chafing guards shall be fiber-reinforced hose of not less than 1/2 inch inside diameter, color black. Multi-colored hose will not be permitted.
- B. Guying:
 - 1. Tree support stakes for guying shall be 2 x 4 hardwood posts 30 inches long or metal fence posts 48" long. Guying stakes shall be driven below grade and not visible.
 - 2. Cable for guying trees shall be 3/16 inch diameter, five strand, galvanized steel wire. Green polypropylene strapping will not be permitted.
 - 3. Cable clamps and turnbuckles shall be galvanized, forged steel. Turnbuckles shall be 3/8-inch eye with 6-inch minimum opening.
 - 4. Chafing guards shall be fiber-reinforced hose of not less than 1/2 inch inside diameter, color black. Multi-colored hose will not be permitted.

2.4 TREE WRAP

- A. Tree wrap for deciduous trees 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. Tape or plastic twine will not be permitted as a substitution for the jute twine.
- B. Tree guards for Root Production Method trees (RPM) shall be vinyl, wraparound, 36 inch long, vented and UV stabilized. Delete tree guards if RPM trees are not used. Do not delete this if using RPM trees since this serves as a rodent guard.

2.5 WATER

- A. Water shall be free of wastewater effluent or other hazardous chemicals. On-site sources of water may be available from the creek at no cost or from City hydrant with appropriate metering. Confirm prior to commencing work.

2.6 TOPSOIL

- A. Refer to Section 329100.

2.7 PLANTING MIXTURES

- A. General: All planting mixtures shall be well pulverized, blended materials, free of rocks, debris of any type, tree roots, and other extraneous materials that will impede plant growth. When blending off-site amendments (peat, compost, etc.) with topsoil, the topsoil shall be pulverized and screened to remove all non-soil materials greater than ½ inch diameter. On-site sub-soils will not be permitted for use in plant mixtures.
- B. Standard planting backfill for individual tree and shrub pits shall be: 1 part existing, well pulverized soil excavated from planting pit or from site topsoil stockpile thoroughly blended with 1 part off-site topsoil and 1 part compost or peat.
- C.
- D.
- E. Plant bed mixture for beds comprising a mix of shrubs, perennials, annuals, ornamental grasses and groundcover shall be 2 parts off-site topsoil thoroughly blended with 1 part compost or peat.

2.8 SOIL AMENDMENTS

- A. Peat shall be a product having at least 95 percent 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 heavily decomposed mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. Manure is not suitable for use. 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).
 - 1. pH: 5.5 to 8.
 - 2. Moisture content: 35 to 55 percent by weight. No visible free water or dust is produced when handling it.
 - 3. Sieve analysis: 100 percent passing ¾ inch screen.
 - 4. Soluble salt content: Less than 5 percent.
 - 5. Organic matter content: Minimum 60 percent.
- C. Sand shall be clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregates.
- D. pH Adjusters:
 - 1. Lime shall be finely ground agricultural grade dolomitic limestone containing not less than 85 percent calcium and magnesium carbonates conforming to ASTM C602, Class T or O.
 - 2. Elemental sulfur shall be granular, biodegradable, horticultural grade material containing at least 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
- E. Mycorrhizal Inoculum
 - 1. 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 bacteria (Trichoderma), humic acids, biostimulants, beneficial bacteria, soluble sea kelp, and yucca plant extracts, as manufactured by Horticultural Alliance or approved equal.

2.9 FERTILIZER

- A. Fertilizers are required at the time of installation and during the warranty/maintenance period. The fertilization program shall be based on soil testing and formulations and rates of application shall be based on test reports provided by the independent testing laboratory.
- B. The independent testing laboratory shall also prepare a custom formulation and rate for each category of plants to be installed and maintained; i.e. trees, shrubs, perennials/ornamental grasses, annuals and bulbs.
- C. Fertilizers shall include organic and inorganic, slow release and water-soluble nitrogen and the percentages shall be based on soil types and the time of year being applied. Fertilizers shall not be applied during the hot summer months unless specific to blooming plants or in the late summer when plant growth will not harden off prior to the first killing frost.
- D. The fertilizer to be used to amend the soil before planting shall be granular fertilizer that conforms to applicable state and federal regulations, and contains no less than 60 percent slow-release nitrogen.
- E. Fertilizer to be used during the year warranty maintenance period shall be a complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, not less than 30 percent of the nitrogen from a slow release source. Fifty percent of the nitrogen shall be derived from natural organic sources. The formulations shall be as outlined in 3.13B.12 of this Section.

2.10 PESTICIDES AND HERBICIDES

- A. 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.
 - 1. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
 - 2. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.11 ANTIDESICCANTS

- A. 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.

2.12 METAL EDGING

- A. Metal edging shall comply with ASTM A1011/A1011M, sized 3/16 inch thick x 4 inches wide x 16 feet length, made of steel, colored black, fabricated in sections with stake pockets stamped, punched, or welded to face of sections approximately 30 inches apart, with 3/16 inch x 16 inch stakes, as manufactured by J.D. Russell Co., or approved equal.
 - 1. Accessories shall be from same product line and manufacturer.

2.13 MAINTENANCE EDGE AGGREGATE

- A. Aggregate for maintenance edges shall be: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color:
 - 1. Type: Slate chips.
 - 2. Size Range: 1-1/2 inches maximum, 3/4 inch minimum.
 - 3. Color: Readily available natural color range.
- B. Filter Fabric: Synthetic, non-woven, needle-punched geotextile fabric weighing 2 to 4 oz per square yard with a minimum grab tensile strength of 35 pounds and permeability of 0.03 cm/second.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. General:
 - 1. Prior to beginning work, examine and verify the acceptability of the project site and notify the Landscape Architect of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved.
 - 2. Verify that no foreign or deleterious material has been deposited in soil within a planting area.

3. 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.
 4. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 5. 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.
 6. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
 7. If plants die or are rejected due to non-conformity to contract requirements, they must be removed from the site immediately and replaced before Substantial Completion.
- B. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.
- C. On-site sources of water will not be available for use by the landscape installer.
- D. Pesticides and Other Chemicals:
1. General: All plants delivered to the site shall be free of disease, pests, eggs, and larvae. Promptly remove all plants that do not conform to this requirement.
 - a. Insecticides should only be used to control pests when present in quantities that will be detrimental to plant vigor.
 - b. Applying foliar herbicides to control weeds in plant beds after installation will not be permitted unless approved in advance by the Landscape Architect. Approval will only be granted if plants to be controlled cannot be effectively removed by hand pulling. Foliar herbiciding will only be permitted as part of the weed control program developed by the Contractor in advance of planting.
 - c. All chemical shall be stored and mixed off-site. No chemicals of any type shall remain on site at the end of each work day.
 - d. Do not apply over water or dispose of used container on-site.
 - e. Post all pesticide and herbicide applications.
 2. Pre-emergent application:
 - a. Apply granular chemicals in accordance with Manufacturer's instruction.
 - b. Apply in early spring just prior to targeted species breaking dormancy. Do not apply too early in the spring.
 - c. Do not apply when weather conditions will prevent an effective application or will result in in-effective control of targeted species.
 - d. Spread granular chemical only in areas intended to be treated. Promptly remove all granular material spread over pavement and in areas not intended to be treated.
 3. Post-emergent application :
 - a. Protect all landscape plantings outside of target areas.
 - b. Mixing, cleaning or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Owner at least 24 hours prior to any application.
 - c. Do not spray chemicals when wind exceeds 5 MPH.
 - d. Repeat procedures until desired effect is achieved.
 - e. Mixing, application and clean-up procedures shall be in accordance with manufacturer's instructions.
- E. Coordination with Other Work:
1. 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.
 2. Completed work installed out of construction sequence which is subsequently disturbed by the completion of work by other trades shall be repaired by the landscape installer at no cost to the Owner.
 3. Maintain grade stakes and layout controls set by others until removal is mutually agreed upon by all parties concerned.

3.2 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, natural resources and walkways.
- C. Vegetation Removal: Strip and dispose of organic debris and root mat.

3.3 LAYOUT

- A. Accurately lay out each plant location and planting bed edges according to the drawings, using clearly visible painted, labeled stakes or plastic flags. Spray paint continuous lines on bare soil delineating plant bed boundaries. When scaling locations on the drawings, use at least 2 known reference points as layout controls to determine plant locations. Do not proceed with planting operations until locations have been reviewed and approved in writing by the Landscape Architect.
- B. Prior to installation, all plant locations and bed edges must be approved by the Landscape Architect, who may field adjust locations at no additional cost to Owner. Plants installed without layout approval are subject to relocation by the Contractor at their expense.

3.4 PLANT INSTALLATION

- A. General: Complete all plantings, metal edging and mulching prior to fine grading adjacent seed beds.
 - 1. For plant beds, complete rough grading.
- B. Planting Pit Excavation:
 - 1. For individual plant pits in seeded areas, spread seed bed topsoil to the uniform depth and rough grade prior to layout and planting pit excavation.
 - 2. Remove rocks and other unclassified underground obstructions to at least 6 inches below the finished planting depth of the root ball. Trim perimeter of planting pit leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Ensure that root ball will sit on undisturbed base soil to prevent settling. If plant pits are initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 3. If underground utilities or other surface or subsurface obstructions are encountered that cannot be removed, do not proceed with planting operations until alternate planting locations have been selected and approved by the Landscape Architect.
 - 4. Size and configure planting pits in accordance with the planting details. If rotating augers or other mechanical diggers are used, scarify the side walls and bottom of the pit.
 - 5. 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 Landscape Architect, the water does not adequately drain off within 24 hours, install drains or raise plant pits as directed.
 - 6. Keep excavations covered or otherwise protected after working hours and when unattended by Installer's personnel.
- C. Planting Bed Excavation:
 - 1. Refer to Section 312000 – Earth Moving for earthwork requirements.
 - 2. In locations where plant beds are shown on the drawings and earth moving is not required other than achieving the specified plant bed subgrades, excavate plant beds to the depth shown on the planting details. Remove surplus excavated subsoil material that is not part of the specified planting soil to an area designated by the Owner and legally dispose off-site.
 - 3. Grade subgrade smooth and uniform. Slope to perimeter of plant bed when underdrains are required to collect accumulated water within the bed.
 - 4. Transition from plant bed subgrade to adjacent seed bed subgrade outside the limits of the plant bed to ensure full depth plant bed mixture is provided.
 - 5. Where plant beds terminate next to pavement surfaces, subgrade transitions shall be 12 inches wide within the plant bed to protect pavement base material from being undermined.
 - 6. Obtain approval from the Landscape Architect for all subgrades prior to placing plant mixtures. Notify the Landscape Architecture at least 48 hours in advance of placing plant mixture.
 - 7. Keep excavations covered or otherwise protected after working hours and when unattended by Installer's personnel.
- D. Mixing and Placing Planting Mixtures:
 - 1. Install planting bed and planting pit mixtures to the specified proportions and depths. On-site mixing of existing topsoil with off-site materials shall result in a homogenous blend of all ingredients. Screen all mixture to remove foreign debris and rocks greater than ½ inch diameter prior to placement.
 - 2. Place planting bed mixture in 6 inch lifts and lightly compact to prevent settlement after planting. Settlement that occurs after planting will require plant removal and the addition of additional plant mixture at the Contractor's expense. When placing mixture in raised planters, set finish grade elevations 2 inches low for mulch placement.
 - 3. Grade planting areas to a smooth, uniform surface plane. Roll and rake, remove ridges, and fill depressions to meet grade.

- E. Fertilizing:
1. Prior to or during planting, amend all planting pit and bed mixes by incorporating fertilizer at rates specified by soil test reports as specified under Section 329100 – Soil Preparation (Topsoil). Do not broadcast fertilize over the surface of the soil or onto any plant root ball.
 2. For individual plant pits, incorporate fertilizer into back fill during planting operations. For plant beds, pre-mix fertilizer prior to installation.
- F. Planting and Backfill:
1. Do not plant when the ground is frozen or saturated.
 2. Balled and burlapped plants: Do not use planting stock if root ball is cracked or broken before or during planting operation. Set the plant in the center of planting pit with the crown set between 1 inch above adjacent soil for shrubs and 2 inches above adjacent soil for trees. Plant root flares shall not be set below adjacent finish grade. Face plant 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 root 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. Backfill planting pit approximately two-thirds full, add fertilizer, water and allow planting mixture to settle. After the water has been absorbed, complete backfilling and tamp lightly to grade to prevent future settlement, and form a watering basin with plant mixture of the size indicated on Plans.
 3. Container-grown plants: Remove containers and make at least five vertical cuts one-half to one inch deep around the root ball and 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 top of container soil is level with surrounding grade. Do not plant higher to account for mulch, as mulch should not cover plant crown.

3.5 SPECIAL PLANTING CONSIDERATIONS:

- A. Mycorrhizal Inoculum:
1. Rototill 2 granular pounds per 1000 square feet into the top 8 inches of soil for plant beds or as recommended by supplier. Incorporate 1 pound per cubic yard of plant pit backfill as backfill is being placed.
- B. Sloped Plantings:
1. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball. Complete planting as specified under 3.4 F above.
- C. Root Production Method (RPM) Trees:
1. Complete plantings as specified for container grown plants above. Install tree guard and staking in accordance with planting detail.
- D. Bare-Root Plants:
1. Prior to planting, remove damaged roots and those running beyond the general root mass. Place bare-root stock in center of plant pit and plant so that the roots are arranged in a natural position, uniformly distributed around the crown of the plant. Carefully work soil mix in around the roots in several layers, watering until puddled and allowing the soil to settle between layers. Maintain plumb while working backfill around roots. Complete planting as specified for balled and burlapped plants above.
- E. Mechanized Tree Spade Planting
1. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
 2. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
 3. Cut exposed roots cleanly during transplanting operations.
 4. Use the same tree spade to excavate the planting pit as was used to extract and transport the tree.
 5. Fill all voids between the planting pit and root ball with off-site topsoil tamping or watering soil in place until all voids are filled.
 6. Deep root water and fertilize immediately following installation.
 7. Where possible, orient the tree in the same direction as in its original location.

3.6 MULCHING

- A. Uniformly install mulch on all trees and shrub beds to depth shown on Plans 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.

3.7 PRUNING

- A. After planting, prune trees and shrubs to remove all dead, dying, broken, or crossed limbs flush with the ground or main stem leaving no stubs. Do not prune to shape or to compensate for transplanting shock without prior approval from the Landscape Architect. Retain natural form of the plant type. Prune using standard professional horticultural and arboricultural practices. Remove trimmings from the site.
- B. Employ workers experienced in this type of work.

3.8 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 Landscape Architect. 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.

3.9 STAKING AND GUYING

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

3.10 EDGING

- A. Metal Edge:
 - 1. Install edging as detailed and at all locations shown on Plans, keeping the alignment smooth and continuous without visible deviation from the line or arc being set.
- B. Trench Edge:
 - 1. Install trench edge between all planting beds and lawn in the manner shown on the plans.

3.11 MAINTENANCE EDGE

- A. Excavate areas receiving maintenance edge to the cross section shown on the details.
- B. Level and compact subgrade and install filter fabric as detailed, overlapping ends by 6 inches.
- C. Install aggregate, leveling material with the top of edging.

3.12 CLEANUP AND PROTECTION

- 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.

3.13 MAINTENANCE

- A. Provide all maintenance under the supervision of a skilled employee of the landscape installer. The skilled maintenance supervisor shall be: capable of operating the automatic irrigation system controller, 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.
 - 1. Failure to perform and submit factual Maintenance Report Forms could result in non-payment for said services and require the extension of the warranty and maintenance period an additional year at the Contractor's expense.

- B. 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 warranty period. Perform all work under the direct supervision of a technician trained to recognize and treat conditions affecting the establishment and growth of the plants and perform the following:
1. Inspect the entire landscape at least once per week during the growing season and perform needed maintenance promptly.
 2. Irrigation:
 - a. Irrigate all plants to maintain optimum moisture within the root zone. Reoccurring overly dry or wet conditions shall be grounds for rejection of plant material. When using an automatic sprinkler system, the landscape installer responsible for maintenance shall bear full responsibility to set each zone to the correct frequency and duration.
 - b. If the automatic irrigation system is inoperative or not present, provide an approved temporary irrigation system or hand water from a source approved by the Landscape Architect. The system shall have the ability to be operated without moving hoses or sprinklers around the site between seeded/planted areas (i.e. system can be set to water one area for the required maintenance period), and may be automated with a timer. Supply all water and equipment at the Contractor's expense from a source approved by the Landscape Architect.
 - c. The soil of the upland plug planting zones shall be kept moist to a depth of four-inches throughout the first growing season. The soils of the wetland plug/tuber and root stock planting zones shall be kept saturated throughout the first growing season. Irrigate the remainder of the plant material to maintain optimum moisture within the root zone (minimum once per week).
 3. All pruning shall be performed by or under the supervision of a licensed arborist. Prune dead wood and broken limbs as identified, in accordance with [3.7] - Pruning. 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.
 4. Maintain stakes and guys taut and in the specified condition. Repair trees wraps if loose, torn or untied.
 5. Maintain all plant beds and tree saucers weed free. 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.
 6. Deadhead perennials as necessary during maintenance visits to extend blooming periods.
 7. In spring – prior to the start of the growing season, cut all ornamental grasses and flush with the ground and remove cuttings from the site.
 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 Owner's operations and others in proximity to the Work. Notify Owner 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.
 11. Collect all litter and debris from plant beds and dispose off-site.
 12. Fertilization:
 - a. Trees, 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. Annuals and bulbs: For bed plantings, use high phosphorous granular fertilizer 10-20-10 (N-P-K) monthly during the growing season applied at a rate identify on the package label. For potted annuals, use high phosphorous water-soluble fertilizer 10-20-10 (N-P-K) every 2 weeks applied at a rate identified on the package label.
 13. Remove dead and unacceptable plants as their condition becomes apparent.
 14. At the end of the warranty period, but prior to Final Inspection, remove all guying, trunk wrap, watering saucers and top dress tree rings and beds 1 inch deep with the specified mulch product.

END OF SECTION

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

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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

CITY OF DETROIT

UTILITY COORDINATION

SMITHGROUP

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06-18-24

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 3rd 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

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
 Kirit Patel – Traffic Signals
 (313)628-5641
patelki@detroitmi.gov
 Johathan Flint – Pavement Markings
 (313) 224-4493
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
 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

Police Call Boxes

DTE/Detroit Edison
 One Energy Plaza
 Detroit, MI 48226
 Customer Service: (800) 477-4747
 Jake Hermann
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
 Kurt Weitzmann
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
 or
 Michael Kryz
 Phone: (248) 972-0143
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

or

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

Mike Diederich
National Const. & Engineering
AT&T Corp
Phone 216-212-8556
Md4145@att.com

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

Bill Taggart
Utility Coordination
AT&T Corp
wt2462@att.com

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

James Schneider
Metropolitan Communications Group
Field Engineer
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

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

Water

Sigma Network Services (Comcast CATV)

Tiffany Forbes

27096 Oakmead Drive

Perrysburg, OK 35551

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

tforbes@teamsigma.com

or

25626 Telegraph

Southfield, MI 48034

Craig Pudas

Phone: (248) 809-2715

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

Cable

ITC Holding Corp

27175 Energy Way

Novi, MI 48377

Adelaide Pascaris

Phone: (248) 469-2131

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,

Pay Item	Pay Unit
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

1 of 3

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:

Pay Item	Pay Unit
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:

Pay Item	Pay Unit
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):

Pay Item	Pay Unit
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:

Pay Item	Pay Unit
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:

Pay Item (<i>Botanical Name, Size, Planted Condition</i>)	Pay Unit
_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. Superintendent 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.

Pay Item	Pay Unit
Irrigation System	Lump Sum