

Special Provisions

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SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for the Project Lakefront Gateway Local Roads Contract A, Milwaukee County, Wisconsin as the plans show and execute the work as specified in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2015 Edition, as published by the WisDOT, the City of Milwaukee Street Construction Specifications, dated July 1, 1992, and the following special provisions. In the event that there is a conflict between the State and City specifications; the more stringent of the two shall be used. The department considers only standard specifications, supplemental specifications and interim supplemental specifications issued directly from the department as valid for this contract.

If all or a portion of the plans and special provisions are developed in the SI metric system and the schedule of prices is developed in the US standard measure system, the department will pay for the work as bid in the US standard system.
100-005 (20150630)

2. Scope of Work.

The work under this contract shall consist of removals, grading, concrete sidewalk, granite pavers, decorative pavement, underground communications conduit, streetscaping items, and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.
104-005 (20090901)

3. Prosecution and Progress.

Begin work within five (5) business days after the engineer issues a written notice to do so.

The contract time for completion is based on an expedited work schedule and may require extraordinary forces and equipment.

Maintain all pedestrian access to adjacent properties and businesses, throughout the duration of the project.

The contractor shall notify the following businesses and/or individuals seven (7) calendar days prior to the start of work on this project:

Tim Gasperetti, PE
Irgens
833 E. Michigan Street
Milwaukee, WI 53202
(414) 750-9822

Gina Jaeckel
US Bank
777 East Wisconsin Avenue, Suite 3175
Milwaukee, WI 53202
(414) 765-4615

The City shall be given a written copy of the required starting notification to the above businesses and/or individuals.

Construct and maintain temporary sidewalks and driveways at locations as specified by the engineer, or shown in the plans. Provide gravel access to crosswalks where necessary or as directed by the engineer. Base aggregate for construction of temporary sidewalks and driveways will be paid under the items Base Aggregate Dense $\frac{3}{4}$ -Inch. Cost of labor and equipment necessary to place and remove temporary sidewalks and driveways shall be included in the contract unit price for Base Aggregate Dense $\frac{3}{4}$ -Inch.

Do not store equipment, vehicles, or materials on East Michigan Street or adjacent streets beyond the project limits without specific approval of the engineer. All equipment, vehicles, and materials shall not impede with traffic along East Michigan Street or Lincoln Memorial Drive.

Secure drums, buckets, and other containers related to construction operations in a secure location to prevent vandalism, and unwanted dumping. If an abandoned container is discovered in the project site notify the WDNR at (800) 943-0003.

Plate all trenches within the roadway resulting from construction activities that are not fully backfilled prior to the end of each construction work day, or as directed by the engineer. Steel plates shall be suitable for carrying vehicles and shall be in addition to the barricades and traffic control devices required for lane closures and traffic control. Cost for steel plates shall be included in the unit bid price for the related underground bid items that are under construction at each location.

Construct this project as shown in the plans and as described below.

Stage 1 work shall include all Stage 1 traffic control and work necessary to transition traffic to one lane in each direction along East Michigan Street from North Van Buren Street to Lincoln Memorial Drive and to close North Cass Street to through traffic.

Maintain southbound access along North Cass Street for the US Bank drive-thru during business hours while North Cass Street is closed to through traffic. Place and maintain a sign directing traffic to the US Bank drive-thru and note the maximum vertical clearance for entering the parking garage on this sign. Provide shop drawings for this sign to the engineer for approval prior to fabrication and placement. Costs for this work shall be included in the item Traffic Control and no additional payment will be made as part of this contract.

Assure that truck traffic not associated with this project is not allowed on North Cass Street.

Install all proposed conduit, make all necessary connections, and complete all restoration work located in the East Wisconsin Street and North Cass Street intersection during one consecutive weekend that does not conflict with any planned events or other closures as approved by the City. Provide a schedule and sequence of operations for completing this work to the engineer a minimum of five (5) business days prior to commencing work for approval. Use traffic control measures conforming to the MUTCD and as approved by the engineer. East Wisconsin Street may be reduced to one lane in each direction for a maximum duration of 72 hours.

If the contractor fails to reopen East Wisconsin Street to two lanes of traffic in each direction after 72 hours, the City will assess the contractor \$500 in interim liquidated damages for each calendar day that East Wisconsin Street is not open to two lanes of traffic in each direction. An entire calendar day will be charged for any period of time within a calendar day that the contract work remains incomplete beyond 12:01 AM.

Construct and complete all city underground communication from the North Cass Street and East Wisconsin Street intersection to the East Michigan Street and Lincoln Memorial Drive intersection during Stage 1. Work shall progress continuously once excavation has commenced to minimize roadway closure time and subsequent disruptions to local businesses. Construction may begin on sidewalk in front of 833 East Michigan Street during this stage.

Stage 2 work shall consist of all Stage 2 traffic control and work necessary to maintain two eastbound lanes and one westbound lane of traffic along East Michigan Street during peak hours. Construct and complete all remaining work during Stage 2.

Coordinate and schedule all construction activities with Irgens or their designee. Contact Timothy Gasperetti with Irgens or his designee at (414) 750-9822 at least five (5) business days prior to commencing work.

Complete construction operations along North Cass Street and East Michigan Street including the removal of traffic control devices to open four lanes of through traffic along East Michigan Street and two through lanes of traffic along North Cass Street prior to 12:01 AM November 20, 2015. Do not reopen North Cass Street and East Michigan Street until completing the following work: complete all city communications conduit, cable connections, manholes, restoration work, bollards, and traffic signal work.

Supplement standard spec 108.11 of the Wisconsin Department of Transportation Standard Specifications, 2015 Standard Specifications as follows:

If the contractor fails to complete the work necessary to reopen North Cass Street and open East Michigan Street to four lanes of traffic and remove all traffic control devices used as part of this project prior to 12:01 AM on November 20, 2015, the City will assess the

contractor \$1,000 in final liquated damages for each calendar day that these conditions are not met after 12:01 AM, November 20, 2015. An entire calendar day will be charged for any period of time within a calendar day that these conditions are not met beyond 12:01 AM.

Complete construction operations along East Michigan Street prior to 12:01 AM February 20, 2016. Complete the following work: all concrete and asphalt pavement work including decorative sidewalk and precast planter installation, permanent pavement markings, and finishing roadway items.

Supplement standard spec 108.11 of the Wisconsin Department of Transportation Standard Specifications, 2015 Standard Specifications as follows:

If the contractor fails to complete the work necessary as part of this project prior to 12:01 AM on February 20, 2015, the City will assess the contractor \$1,000 in final liquated damages for each calendar day that these conditions are not met after 12:01 AM, February 20, 2016. An entire calendar day will be charged for any period of time within a calendar day that these conditions are not met beyond 12:01 AM.

All remaining landscaping and incidental work shall be completed by May 1, 2016.

Supplement standard spec 305.7 of the City of Milwaukee Street Construction Specifications, date 1992 as follows:

The amount of the per diem charge for inspection as referred to in part two (2) shall be \$250.00. The contractor should be aware that work on each project is governed by the project work days, and a per diem inspectional charge of \$250.00 per day will be assessed for each work day after the allotted number of work days. An inspectional charge, in addition to the project work day charge, will be assessed if the number of work days for the overall contract exceeds the amount allotted.

4. Protection and Adjustment of City Electrical Facilities.

The existing lighting facilities will remain in service during the project. The contractor is to use CAUTION when working around these facilities.

After all of the excavation work around the lighting facilities is complete, the Contractor is directed to contact either Mr. Dennis Miller with the City at (414) 286-5942 (Office) or (414) 708-4251 (cell); or Mr. George Berdine with the City at (414) 286-5943 (Office) or (414) 708-4245 (cell). If neither Mr. Miller nor Mr. Berdine are available please contact the electrical services dispatcher at (414) 286-5944 during working hours or at (414) 286-3015 after hours or on weekends to have any exposed facilities inspected and repaired if needed.

Any costs incurred by the City repairing damaged facilities will be incurred by the contractor.

If the contractor requests the removal or alterations of any lighting facilities for their convenience they will be responsible for all costs incurred by the City for fulfilling their request.

5. Traffic.

Perform this work in accordance to the requirements of standard spec 643, and as shown on the plans or as approved by the engineer, except as hereinafter modified.

Submit to the engineer for approval a detailed traffic control plan for any changes to the proposed traffic control detail as shown on the plans. Submit this plan ten days prior to the preconstruction conference.

Provide 24 hours-a-day availability of equipment and forces to expeditiously restore lights, signs, or other traffic control devices that are damaged or disturbed in accordance to standard spec 643.3.1. The cost to maintain and restore the above items shall be considered incidental to the item Traffic Control as bid and no additional payment will be made.

Supply the name and telephone number of a local contact person for traffic control repair prior to or at the preconstruction conference.

Have available at all times sufficient experienced personnel to promptly install, remove and reinstall the required traffic control devices to reroute traffic during the construction operations.

Provide access for emergency response including fire, police, and rescue vehicles and equipment to all properties including residential, business, parking, and transit entrances at all times during the project.

Maintain access for local, business, and emergency traffic at all times.

On-street parking will not be allowed during construction. All parking restriction postings required to facilitate construction operations will be provided by the City of Milwaukee, Traffic and Lighting Design Section, as directed by the engineer. Contact Jim Brown with the City of Milwaukee at (414) 286-3276 three (3) business days prior to the start of construction activities.

All construction vehicles and equipment entering or leaving the traffic lanes shall yield to through traffic.

6. Utilities.

There are underground and overhead utility facilities located within the project limits. There are known utility adjustments required for this construction project. Coordinate construction activities with a call to Diggers hotline or a direct call to the utilities which have facilities in the area as required per state statutes. Use caution to ensure the integrity

of underground facilities during all construction operations; protect utility facilities; and maintain code clearances from overhead facilities at all times.

Bidders are advised to contact each utility company listed in the plans, prior to preparing their bids, to obtain current information on the status of existing and any new utility relocation work.

Utilities will be performing utility work and adjustments within the limits and during the life of this project. Cooperate and coordinate activities with each respective utility.

Unless otherwise specified by the contract or authorized by the engineer, the existing utilities are to remain in service.

If a conflict with an abandoned utility is encountered, contact the appropriate utility owner/representative prior to disturbing any such abandoned facilities. Verify that utilities have been properly abandoned and do not necessitate any special requirements by the utility. The contractor shall not assume that unmarked facilities have been abandoned. At no time is it acceptable to push, pull, cut, or drill an unmarked facility without explicit consent from the utility.

AT&T – Communications has underground and above ground facilities along East Michigan Street and North Cass Street. No conflicts are anticipated as part of this project.

City of Milwaukee – Underground Conduits and Communications work is included in this contract. The existing communications conduit beginning at the intersection of Wisconsin Avenue, extended south along North Cass Street, and continuing east along East Michigan Street will be abandoned and replaced as part of this contract work.

City of Milwaukee – Street Lighting is located along the east side of North Cass Street and the North side of East Michigan Street. No street lighting work is anticipated as part of this project.

City of Milwaukee – Sanitary Sewer runs south along North Cass Street and continues east along East Michigan Street. No conflicts are anticipated as part of this project

City of Milwaukee – Water has facilities that extend along North Cass Street from Wisconsin Avenue and continue east along East Michigan Street. Water main work will be completed prior to and during this contract. An existing 8-inch water main extending east along the south side of East Michigan Street from North Cass Street to approximately Sta. 105+30 will be abandoned. A new connection between the existing 12-inch water main and the existing 16-inch water main located on the north side of Michigan Street will be added at approximately Sta. 105+25 and a new lateral will be placed from this location and will extend to the 833 East Michigan building. Work is anticipate to begin on September 21, 2015 or September 28, 2015 and will last eight (8) working nights. Contact Patrick Pauly at (414) xxx-8167 for additional information.

Level 3 Communications - Underground and overhead fiber optic cable is located along the project. Contact Mr. Brahim Gaddour at (414) 908-1027 for further information. No conflicts are anticipated as part of this project.

Midwest Fiber Networks – Underground and overhead fiber optic cable is located along the project. Contact Mr. Nik Ivancevic at (414) 226-2205 for additional information. No conflicts are anticipated as part of this project.

MMSD - Combined sewer runs south along North Cass Street and continue east along East Michigan Street. No sanitary sewer or combined sewer work is anticipated as part of this contract.

Time Warner Cable – Time Warner Cable has facilities along this project including overhead and underground fiber optic cable. Please contact Mr. Steve Cramer at (414) 277-4045 for additional information. No conflicts are anticipated as part of this project.

We Energies – Electric has underground facilities located along North Cass Street and East Michigan Street. We Energies has manholes located in the intersection of Michigan Street. No conflicts are anticipated as part of this project.

We Energies – Gas has facilities located along North Cass Street and East Michigan Street. A gas line will be relocated by we energies in advance of this contract. Contact we energies gas prior to bidding to determine project schedule. No conflicts are anticipated as part of this contract.

City of Milwaukee Utilities – To obtain additional City of Milwaukee utility information please contact Mr. Anthony Kotecki with the City of Milwaukee at (414) 286-3886.

7. Other Contracts.

The following projects will be under construction concurrently with the work under this contract. Coordinate all construction activities including work zone traffic control, roadway and lane closures, and other work items as required with other contracts.

City of Milwaukee Water Main

The City of Milwaukee will be installing water main improvements along East Michigan Street. Additional projects may be under construction concurrently with the work items under this contract. Contact Patrick Pauly with Milwaukee Water Works at (414) 286-8167 for additional information and to coordinate work.

833 East Michigan Street Development

Irgens Development is currently constructing the 833 East Michigan Street building. Coordinate all work with Tim Gassperetti with Irgens at (414) 750-9822 or their designees as part of this project. A weekly meeting shall be scheduled with Irgens and its designated contractors to schedule construction operations throughout the duration of this project.

Northwestern Mutual Development

Northwestern Mutual is currently construction a new campus along East Wisconsin Street. Coordinate any lane closures at the North Cass Street and East Wisconsin Street intersection with Northwestern Mutual and there designated contractors.

Hoan Bridge Construction

WisDOT is currently reconstructing the Hoan Bridge as part of roadway improvement project. As part of this WisDOT project East Michigan Street is currently designated as a detour route. Coordinate any road closures along East Michigan Street with the WisDOT construction Project Manager,Carolynn Gellings at (414) 750-3233.

8. Work by Others.

City of Milwaukee Street Lighting and Traffic Signals will install temporary overhead facilities and relocate permanent facilities, as needed, before and during roadway construction. City of Milwaukee forces will complete all above ground traffic signal work as part of the contract.

City of Milwaukee Sewers will relocate two catch basins along the south side of Michigan Street in front of the 833 East Michigan building. This work will be complete prior to or during construction. The Contractor shall notify John Schmidt at (414) 286-0467 with the City of Milwaukee at least five (5) business days prior to any proposed work adjacent to the existing and proposed storm sewer locations to coordinate and provide adequate notice for city forces to install the proposed structures.

9. Planting Soil Mix, Item SPV.0035.01.

A Description

This section describes the contract requirements for topsoil placement and grading.

A.1 General

A.1.1 References

Reference the following list of standards.

ASTM International (ASTM):

- a. D5268; Standard Specification for Topsoil Used for Landscaping Purposes.
- b. D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
- c. C33/C33M, Standard Specification for Concrete Aggregates.

A.1.2 Submittals

A.1.2.1 Imported Topsoil Data

Provide to the engineer the location(s) and name(s) of topsoil sources from which supplemental topsoil is to be obtained for the project, approximate quantities obtained at each site, depth at which soil was taken and indicate whether crops had grown on site(s).

A.1.2.2 Certified Topsoil Analysis Reports

Indicate quantities of materials necessary to bring onsite topsoil into compliance with textural/gradation requirements.

Indicate quantity of time, quantity of analysis of fertilizer, and quantity and type of soil additive.

A.1.2.3 Soil Testing Results

Submit copies of the soil analysis reports and recommendations for imported topsoil. The results shall include a sample of data and reference the collection location. Complete the following soil analyses.

A.1.2.3.1 Chemical Analysis

Include existing major soil nutrients; soil pH value; Cation Exchange Capacity (CEC); soluble salts; percentage of organic matter; and any harmful chemicals.

A.1.2.3.2 Mechanical Analysis

Include soil texture and percentages of sand, silt and clay

A.1.2.3.3 Laboratory Recommendations

Include testing laboratory's nutrient recommendations and recommendations for soil amendments

A.1.2.4 Topsoil Sample

Provide one cubic foot sample of approved amended and/or imported topsoil to the engineer for review and inspection. Obtain written approval of soil from Engineer before procuring for site.

A.1.2.5 Planting Soil Mix Sample

Provide one cubic foot sample of prepared Planting Soil Mix to the engineer for review and inspection. Obtain written approval of soil from Engineer before procuring for site.

A.2 Soil Analysis

Contractor shall arrange and pay for services of an accredited testing laboratory to perform horticultural soil analysis on each source of topsoil supplied.

Contractor shall be responsible for ensuring all samples of imported soil are submitted for testing prior to commencing work. Imported topsoil shall not be placed on site until approved in writing by the Engineer.

Soil analysis for horticultural use shall include results for: existing major soil nutrients; soil pH value; total soluble salts (electrical conductivity); percentage of organic matter;

soil texture and percentage of sand, silt and clay; nutrient recommendations; and recommendations for soil amendments.

Perform and pay for additional soil tests to confirm compliance with recommendations of soil analysis for soil amendments, where applicable. Engineer reserves the right to randomly select various locations to be tested for compliance.

A.3 Topsoil Supply Source

Contractor shall amend existing topsoil and/or use imported topsoil meeting specified requirements for balance of topsoil required.

In accordance with section A.2 of this specification, the contractor shall test existing topsoil to determine if it can be amended to meet all specified requirements.

If determined from testing that amending the existing topsoil is not feasible, or does not produce enough volume to meet project needs, topsoil may be imported for balance of topsoil required.

Engineer reserves the right to inspect and evaluate amended topsoil and all sources of imported soil selected by Contractor.

B Materials

B.1 Topsoil

Topsoil shall be a natural, fertile, friable soil constituting the “A” horizon from naturally well drained areas. It shall not be excessively acidic or alkaline nor contain toxic substances that may be harmful to plant growth. Topsoil shall be without admixture of subsoil and shall be reasonably free from clay clods, stones, roots, or similar substances one inch or more in diameter, debris, or other objects that may be a hindrance to planting operations. Topsoil shall meet the following physical and chemical criteria

B.1.1 Soil Texture

Sandy Loam approximating the following particle size distribution:

Approximate Particle Distribution

a.	Gravel	Trace
b.	Coarse to medium sand	40 – 65%
c.	Fine to very fine sand	10 – 20%
d.	Silt	10 – 15%
e.	Clay	10 – 20%

B.1.2 Soluble Salt Level

Less than 844 ppm (0.67 mmho/cm)

B.1.3 Percent Organic Matter

4 – 8% by weight

B.1.4 Soil pH

6.5 – 7.5

B.1.5 Additional Soil Parameters

Topsoil brought from outside sources must be tested by the University of Wisconsin – Madison, Department of Soil Science laboratory to determine its suitability for landscape use. The following testing methodology and criteria are required:

- a. The specified physical and chemical properties of proposed topsoil shall be verified through a particle size (including % sand fractionation), physical and chemical analysis
- b. A particle size analysis from a minimum of three samples obtained randomly from the topsoil source pile shall be conducted to provide the particle size distribution, expressed as a percentage, in each of the following size classes:

Description	Average Diameter (mm)
Gravel	>2.0 mm
Very Course Sand	1.0 – 2.0 mm
Course Sand	0.5 – 1.0 mm
Medium Sand	0.25 – 0.5 mm
Fine Sand	0.10 – 0.25 mm
Very Fine Sand	0.05 – 0.10 mm
Silt	0.002 – 0.05 mm
Clay	<0.002 mm

- c. A physical analysis shall be conducted to include the following information:
 - 1) Percent organic matter by weight.
- d. A chemical analysis shall be conducted to include the following information:
 - 1) Soil pH
 - 2) Sulfur requirement to adjust soil pH to specified pH
 - 3) Nutrient content of the following nutrients, expressed in unit/area.
 - (a) Manganese, including fertilizer recommendations for woody plants and ornamental grasses.
 - (b) Sulfate-Sulfur
 - (c) Zinc
 - (d) Iron
 - 4) Soluble Salt Level (conductivity)
- e. Soil sampling procedures and submittal quantities shall meet specific laboratory requirements. All samples shall be clearly labeled to include the location of the source of the material. **Copies of all topsoil/soil mix test result submittals shall be forwarded to:**

**Jim Kringer, Urban Forestry Technician
City of Milwaukee Forestry Division
841 N. Broadway, Room 619
Milwaukee, WI 53202
414 -708-2428**

- f. If the soil test results of any topsoil or planting mix fail to meet the particle size distribution, physical and chemical properties specified, the topsoil or planting mix shall be adjusted and re-tested, or another source secured, tested and submitted for approval.
- g. All soil mixing shall be performed at the contractors yard using appropriate soil mixing and shredding equipment of sufficient capacity to assure proper quality control. No mixing of soils shall occur at the project site.
- h. All soil testing will be at the expense of the contractor. **Any soils delivered or installed on site without submittal approval shall be removed and replaced with approved soil at the Contractor's expense.**

B.2 Planting Soil Mix

The Contractor shall prepare planting soil for planting beds and pits by adding soil amendments to topsoil. The planting soil shall be 8 parts by volume of topsoil (2 parts by volume of blended mushroom compost as processed by GSO America, Crystal Lake, IL 60014, or an approved equal) and 5 lbs. of bone meal/cy of mix. Certification by the supplier is required.

B.2.1 Mixing the Planting Soil

The Contractor shall notify the Engineer as to site location, time and equipment necessary for mixing the planting soil a minimum of 1 week before processing. The method of mixing the components of the planting soil shall meet the approval of the Engineer. The planting soil shall be in a loose friable condition at the time of planting.

B.2.3 Sand

Use No. 2 torpedo sand, clean coarse, ungraded, meeting ASTM C33-55 requirements for concrete sand.

B.2.4 Lime

Ground limestone with not less than 85 percent total carbonates, ASTM C602:

- 1. Gradation:
 - a. Minimum 50 percent passing No. 100 sieve.
 - b. Minimum 90 percent passing No. 20 sieve.
- 2. Coarser material acceptable provided rates of application are increased proportionately on basis of quantities passing No. 100 sieve.

B.3 Soil Additives

B.3.1 Sawdust of Ground Bark

Nontoxic, of uniform texture, and subject to slow decomposition when mixed with soil. Nitrogen-treated, or if untreated mix with minimum 0.15 pound of ammonium nitrate or 0.25 pound of ammonium sulfate per cubic foot of loose material.

B.3.2 Peat Composition

Natural residue formed by decomposition of reeds, sedges, or mosses in a freshwater environment, free from lumps, roots, and stones.

B.3.3 Organic Matter

Not less than 90 percent on a dry weight basis as determined by ASTM D2974.

B.3.4 Moisture Content

Maximum 65 percent by weight at time of delivery.

B.3.3 Fertilizer

B.3.3.1 Natural

Manure

1. Well-rotted, stable or cattle manure, free from weed seed and refuse.
2. Maximum 50 percent sawdust or shavings by volume.
3. Age: Minimum 4 months; maximum 2 years.

B.3.3.2 Commercial

Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.

Contain the following minimum percentage of plant food by weight:

1. Summer Mix:
 - a. Nitrogen: 20 percent
 - b. Phosphoric Acid: 10 percent
 - c. Potash: 10 percent
2. Winter mix:
 - a. Nitrogen: 16 percent
 - b. Phosphoric Acid: 8 percent
 - c. Potash: 0 percent

B.4 Sand

Fine Aggregates: Clean, coarse, well-graded, ASTM C33/C33M.

C Construction

C.1 Sub-base Conditions

Notify the City for written approval of condition of sub-base prior to installation of topsoil and planting soil mix. Failure to obtain approval may result in Contractor's having to remove topsoil or planting soil mix for inspection at no additional cost to the City.

The sub-base should be in a dry state and slightly scarified to allow moisture interaction with the topsoil.

The sub-base should be prepared so as to eliminate rough and low areas to ensure positive drainage. Maintain levels, profiles and contours of sub-grades during spreading and application of topsoil.

Remove foreign material, debris, roots, branches, stones in excess of 1-1/2-inch diameter, and other deleterious materials including concrete spoils, gravel, over burden, and rubble. Remove subsoil contaminated with toxic materials or petroleum products. Remove foreign debris that protrudes above subsoil surface. Dispose of removed materials off site as directed by the engineer. Do not bury any foreign material beneath areas to be landscaped.

Prior to final placement of topsoil or planting soil mix, cultivate subgrade areas to a minimum 6 inches deep where topsoil or planting soil mix will be placed. Scarify or till subsoil using discs, harrows or other suitable equipment that will loosen subsoil before placing any topsoil. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subgrade soil. Manually cultivate soil around existing trees, plants and surface obstacles as required to prevent damage.

Limit preparations to areas which will receive topsoil or planting soil mix within two days of preparation.

C.2 Topsoil and Planting Soil Mix Placement

Do not place or spread topsoil or planting soil mix until the Engineer has approved subgrade preparation.

When conducting grading operations with topsoil on site, use lightweight hand-operated equipment.

Place approved topsoil and planting soil mix in dry weather on loose, friable, and graded subgrade surface. Do not place or spread topsoil or planting soil mix when the subsoil or topsoil is excessively wet, too dry, frozen, or otherwise detrimental to work.

Uniformly distribute topsoil and planting soil mix throughout areas to receive seeding and shrubs in quantity sufficient to provide a rough grade and according to depths shown on drawings or as specified.

Imported Topsoil and Planting Soil Mix Thicknesses:

1. Seeded Areas: 6 Inches (150 mm)
2. Shrub Beds: 18 inches (450 mm)
3. Perennial Beds: 12 inches (300 mm)

4. Streetscape Planters: 36 inches (900mm)

Place and spread topsoil and planting soil mix in 6-inch thick lifts, cultivating and lightly compacting to reduce future settlement. Do not mechanically compact topsoil or planting soil mix; water in to assist natural soil settlement. Allow for complete drainage and drying out prior to working.

Manually spread topsoil and planting soil mix around existing trees, plants and surface obstacles as required to prevent damage.

C.3 Preparation of Final Grade

Remove all surface debris, stones in excess of 1 inch diameter, soil clods, vegetation, roots, grass and weeds, litter and other foreign debris. Dispose of collected materials off site as directed by engineer.

Fine grade and loosen topsoil. Eliminate rough spots and low areas to ensure positive drainage away from structures and walkways. Prepare a loose friable bed by means of cultivation and subsequent raking. Maintain levels, profiles and contours of subgrade.

Float and leave surfaces smooth, uniform, and sufficiently firm against deep foot printing with a fine loose texture. Finish surface shall be clean, even and free from irregular surface changes.

Keep topsoil 1 inch below finish grade for planted areas, adjacent to walkways, curbs, edging materials, other hard surfaces and crown of adjacent existing turf. Elsewhere, bring topsoil up to finished grade.

Do not cover catch basins, valve covers or manholes. Cut smooth falls to catch basin rim, finish flush. Provide smooth transitions at top and bottom of slopes.

Grading work shall not be performed when moisture content of soil is such that excessive compaction will occur, or when soil is so dry that clods will not break readily or dust will form in the air. Apply water as required to prevent the formation of an airborne dust nuisance and to provide ideal soil moisture content for tilling.

Finished grade shall meet existing grade at Contract limits. The Contractor shall continue to correct finished grade until Project Acceptance.

C.4 Soil Amendments

Apply and evenly spread soil amendments at specified rate as recommended in soil analysis report.

Mix soil amendments, lime, and other soil additives, recommended in analysis reports with existing topsoil surface and mix thoroughly into entire 6 inch depth of topsoil before planting or seeding. Delay mixing of fertilizer if planting or seeding will not occur within 3 days. Retest amended topsoil to confirm compliance with soil analysis report.

C.5 Protection

Protecting Graded Areas: Protect newly graded areas from over compaction, traffic, freezing, and erosion, and from disturbances caused by operations of other trades and trespassers. Keep free of trash and debris.

Repair and reestablish grades finished grades where completed or partially completed surfaces become eroded, rutted, settled, or washed out due to subsequent construction operations or weather conditions.

Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional topsoil material, and reconstruct surfacing.

Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

Protect existing structures, fences, sidewalks, utilities, paving and curbs. Any damage to existing conditions meant to remain shall be repaired at Contractor’s expense.

C.6 Acceptance

Engineer will inspect and test topsoil in place and determine acceptance of material, depth, and finish grading.

C.7 Clean-Up

Clean up, immediately, any soil or debris spilled onto roads, walkways and other finished surfaces. Keep site clean and tidy at all times.

Excess topsoil not required for landscape use on site shall be removed off site by Contractor or spread on site by Contractor as directed by Engineer

D Measurement

The department will measure Planting Soil by the cubic yard acceptably completed. The quantity measured for payment shall equal the actual number if cubic yards placed as measured by the engineer.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0035.01	Planting Soil Mix	CY

Payment is full compensation for submittals, testing, and analysis; for excavating, loading, hauling and placing material; for preparing the site; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

10. Precast Concrete Planter Curb Unit 1, Item SPV.0060.01; Precast Concrete Planter Curb Unit 2, Item SPV.0060.02; Precast Concrete Planter Curb Unit 3, Item SPV.0060.03; Precast Concrete Planter Curb Unit 4, Item SPV.0060.04; Precast Concrete Planter Curb Unit 5, Item SPV.0060.05

A Description

This special provision describes furnishing and installing the precast concrete planter assemblies including metal reglets and embedments, and leveling grout and accessories.

B Materials

B.1 Concrete

B.1.1 Concrete Materials

Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source. Portland Cement shall conform to ASTM C 150, Type I or Type III, of same type, brand, and source. Match color to approved final design initial sample. Use Normal-Weight aggregates except as modified by PCI MNL 117, ASTM C 33 with coarse aggregates complying with Class 5S. Face-Mix aggregates shall be selected hard and durable and free of material that reacts with cement or causes staining. Face-Mix aggregates shall have a gap graded gradation. Face-Mix fine aggregates shall be selected natural or manufactured sand of the same material as coarse aggregate unless otherwise approved by the engineer. Lightweight aggregates shall conform to ASTM C 330. Coloring admixtures shall conform to ASTM C 979 and be synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant. Water shall be potable and free from deleterious material that may affect color stability, setting, or strength of concrete and shall comply with chemical limits of PCI MNL 117. Air entraining admixtures shall comply with ASTM C 260 and be certified by the manufacturer to be compatible with other required admixtures.

B.1.2 Concrete Mixes

Prepare design mixes for each type of concrete required. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast architectural concrete fabricator's option. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318 (ACI 318M) or PCI MNL 117 when tested in accordance with ASTM C1218/C1218M. Normal-Weight Concrete Mixes: Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete having 28-day compressive strength of 5000psi and a maximum water-cementitious material ratio of 0.45. Water absorption shall be 6% by weight or 12% to 14% by volume tested according to PCI MNL 117. When included in design mixes, add other admixtures to concrete mixes according to manufacturer's written instructions.

B.1.3 Batch Proportions

Batch concrete with the following proportions and properties:

- Cement: Lehigh White, 16.1-percent

- Coarse Aggregate: Vulcan Sycamore CM 16 3/8 Chips, 44.9-percent
- Fine-Mix Aggregates: Vulcan Sycamore FM 21, 30.7-percent
- Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117, 6.8-percent
- Entrained Air: BASF RSA-10, 0.1654-percent
- Water-Reducer: BASF Glenium 7700, 1.4-percent

B.2 Reinforcing Materials

Steel reinforcement shall be ASTM A 615/A 615M, Grade 60 (Grade 420), deformed. Reinforcing bars shall be galvanized conforming to ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending. Plain-steel wire shall conform to ASTM A 82 galvanized with welded wire fabric conforming to ASTM A 185 and be fabricated from galvanized steel into flat wire sheets. Deformed-steel wire shall conform to ASTM A 496 with wire fabric conforming to ASTM A 497 for flat sheets. Supports shall be manufacturer's bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place according to CRSI's "Manual of Standard Practice," PCI MNL 117. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

B.3 Mold or Form Materials

Provide molds and, where required, form-facing materials of metal, plastic, wood, or another material that is nonreactive with concrete and dimensionally stable to produce continuous and true precast concrete surfaces within fabrication tolerances and suitable for required finishes. Use approved non-absorptive panel materials that will provide continuous, true, and smooth architectural concrete surfaces. Apply mold-release agent that is a commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete. Molds shall become the property of the client and be delivered to Engineer's designated area upon completion of the work.

B.4 Grout Materials

Grout shall be nonmetallic nonshrink Grout and be premixed, nonmetallic, noncorrosive, nonstaining containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of a consistency suitable for application within a 30-minute working time. Epoxy-resin grout shall be a two-component mineral-filled epoxy-resin conforming to ASTM C881 of type, grade, and class to suit requirements.

B.5 Stainless Steel Connection Material

Stainless-Steel Plate shall conform to ASTM A 666, Type 304, of grade suitable for application. Stainless-Steel Bolts and Studs shall conform to ASTM F 593, alloy 304 or 316, hex-head bolts and studs; stainless-steel nuts; and flat, stainless steel washers. Stainless-Steel Headed Studs shall conform to ASTM A 276. Provide cast-in-place metal reglets to receive and accommodate flashing system indicated and be stainless steel, type

304, 0.02-inch thick. Use pre-approved manufacturers of either Frey Reglet Corp., Cheney Flashing Co., or engineer approved equal. Reglet Wedges shall be soft lead, crimp sheet metal, or lead wool wedges spaced approximately 12-inches apart. Do not use wood wedges. Welding electrodes shall comply with AWS standards. Contractor shall provide clips, hangers, plastic shims, and other accessories required to install precast architectural concrete units.

B.6 Submittals

B.6.1 Field Measurements

Take field measurements prior to fabrication of the work and preparation of shop drawings, to ensure proper fitting of the work. Show recorded measurements on final shop drawings. Notify the engineer of any dimensions found which are not within specified dimensions and tolerances in the Contract Documents, prior to proceeding with the fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the work.

B.6.2 Shop Drawings

Submit drawings shall conform to the contract plans and consist of detail fabrication and installation of precast architectural concrete units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, limits of each finish, and types of reinforcement, including special reinforcement. Indicate welded connections by AWS standard symbols. Detail loose and cast-in hardware, inserts, connections, anchorage devices, embedded devices, and joints, including accessories. Indicate locations and alignments of reglet in the longitudinal and traverse sections of the precast concrete units at each planter. Incorporate anchorage details prepared by the contractor's structural engineer. If design modifications are necessary to meet the performance requirements and field conditions, submit design drawings to the engineer for approval prior to fabrication. Modifications shall not adversely affect the appearance, durability or strength of units when modifying details or materials and maintain the general design concept.

The contractor shall submit to the engineer, for placing on file before commencing fabrication, one set of shop drawings that the contractor has checked. In addition, provide 2 sets to the City or its designee and one set to the City's representative for inspection purposes. Only then may fabrication begin without awaiting the results of any review the engineer may make. The engineer may refuse prints of shop drawings not clear and legible. If the engineer requests, submit one additional copy of drawings for review. After review, the contractor shall furnish as many copies of shop drawings as required.

The shop drawings become a part of the contract, provided any differences between sections on shop drawings and sections on the plans show are made only if the engineer approves and if the substitution is made at no additional expense to the City or its designee.

After initial submittal and review, make no deviation from the shop drawings or changes to them without the engineer's further review.

The engineer's review of shop drawings means only a review of the character and sufficiency of the details and does not relieve the contractor from responsibility in regard to errors or omissions on those drawings.

B.6.3 Concrete Mix Design

Submit to the engineer a mix design for each mix including compressive strength and water-absorption test results.

B.6.4 Product Sample

Submit to the engineer a reglet for each of the curve and straight panels. Reglet should be long enough to show the curve. Submit anchorage and connection materials, both embedded and loose, required as detailed by the contractor's structural engineer.

Submit initial samples for verification of design intent, 12-inches by 12-inches by 2-inches, representative of finishes, color, and textures of exposed surfaces of architectural precast concrete units installed at precast concrete planters. Deliver (4) copies of the approved initial sample with the following information indicated on the back: age of concrete prior to acid-etched finishing in hours; setting time prior to removal of forms in hours; forms used; form release agent used, if any; mix design.

Following initial sample approval but before fabricating precast concrete planters, produce (3) 18-inch by 18-inch by 2-inch mock samples representing anticipated range of color and texture on project's units. Mock samples shall remain at fabricator's plant for acceptability reference following engineer's acceptance. If not accepted by the engineer, provide additional samples upon request until satisfactory aesthetic expectations are met and approved by the engineer. Provide a second sample of full unit size representing the range of colors, textures, and profiles for engineer's approval. Approved mockups may become part of the completed work at the direction of the engineer.

B.6.5 Repair Procedure

Submit detailed written repair procedures and list of materials for damages including, but not limited to, chips, surface spalls, and cracks. The repair procedures shall be approved by the precast engineer. Repairs are deemed acceptable if the structural adequacy, serviceability and the appearance of the product are not impaired. Engineer may request contractor to damage a sample and verify repair methods in the presence of the engineer to verify finish, color, texture, and materials comply with the approved samples.

B.6.6 Product Data Sheet

Submit to the engineer a product data sheet for each type of product indicated. Retain quality control records and certificates of compliance for five (5) years or period of warranty, whichever is greater.

B.6.7 Welding Certificate

Submit to the engineer two (2) copies of certificates for welding procedure specifications (WPS) and names of personnel performing welds.

B.6.8 Qualification Data

Submit to the engineer firms and persons involved with the fabricating and installing of similar precast concrete planters to demonstrate capabilities and experience. Include a list of completed project names, locations, associated personnel, and other relevant information.

B.6.9 Material Certificates & Test Reports

Submit to the engineer material certificates signed by the manufacturer certifying that concrete and reinforcing materials, admixtures, and bearing pads are in compliance with contract and design requirements.

Submit to the engineer material test reports from a qualified testing agency indicating and interpreting that concrete and reinforcing material, admixtures, and bearing pads are in compliance with design and contract requirements.

B.6.10 Warranty Data

Submit to the engineer all available warranty documents for each component listed in the construction of the precast concrete benches.

B.7 Quality Assurance

Installer shall be experienced and have completed precast architectural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

Fabricator shall be a firm that complies with the requirements herein and is experienced in manufacturing precast architectural concrete units similar to those indicated for this project and with a record of successful in-service performance. Fabricator shall assume responsibility for engineering architectural precast concrete units to comply with performance requirements. Responsibilities includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer. Fabricator shall have Professional Engineer qualifications including a professional engineer who is licensed to practice and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of architectural precast concrete that are similar to those indicated for this Project in material, design, and extent. Fabricator shall be a participate in PCI's Plant Certification program and is designated a PCI-certified plant for Group A, Category A1--Architectural Cladding and Load Bearing Units, or in APA's Plant Certification Program for Production of Architectural Precast Concrete Products and is designated an APA-certified plant. Fabricator shall have sufficient production capacity to produce required units without delaying work.

An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

B.7.1 Design & Production Procedures

Fabricator shall comply with ACI 318 (ACI 318M) and the design recommendations of PCI MNL 120, "PCI Design Handbook--Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated. For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products." Drawings indicate size, profiles, and dimensional requirements of precast concrete units and are based on the specific types of units indicated. Other fabricators' precast concrete units complying with requirements may be considered. Refer to Division 1 Section "Substitutions." Welders shall qualify with the procedures of AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.4, "Structural Welding Code--Reinforcing Steel."

B.8 Delivery, Storage, Handling

Deliver precast architectural concrete units to project site in such quantities and at such times to ensure continuity of installation. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and identification markings are visible. Lift and support units only at designated lifting and supporting points as shown on Shop Drawings. Upon receipt to the site, materials shall be checked to ensure no damage occurred during shipping and handling. Once at the site, the contractor shall be responsible for ensuring product remains undamaged.

B.9 Fabrication

Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

Cast-in reglets, slots, holes, and other accessories in precast architectural concrete units to receive cramps, dowels, reglets, waterstops, flashings, and other similar work as indicated on contract drawing.

Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement and vibration operations and temperature changes. Place form liners

accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during concreting. Coat form liner with manufacturer recommended form-release agent. Maintain molds to provide completed precast architectural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified. If necessary, apply pressure sensitive compressible form joint tape that is a minimum of 1/4-inch thick between forms as to eliminate the presence of dark lines from the finished product. Do not use through concrete form ties.

Reinforcement shall comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces. Place reinforcement to maintain at least 3/4-inch (19-mm) minimum coverage. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

Reinforce precast architectural concrete units to resist handling, transportation, and erection stresses.

Mix concrete according to PCI MNL 117 and requirements in this Section. After concrete batching, no additional water may be added.

Place face mix to a minimum thickness after consolidation of the greater of 1-inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover.

Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units. Comply with requirements in PCI MNL 117 for measuring, mixing, transporting, and placing concrete.

Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with PCI MNL 117.

Comply with ACI 306.1 procedures for cold-weather concrete placement and ACI 305R recommendations for hot-weather concrete placement.

Identify pickup points of precast architectural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast architectural concrete unit on a surface that will not show in finished structure.

Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture.

Discard precast architectural concrete units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by Engineer.

B.10 Fabrication Tolerances

Discard precast architectural concrete units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by Engineer. Tolerance for height and width shall be as follows: plus or minus 1/8-inch of plan details measured at the face of exposed to view; plus or minus 1/4-inch of plan details measured at the face of not exposed to view. Tolerance for thickness shall be as follow: plus 1/4-inch to minus 1/8-inch of plan details. Tolerances for location of reglet at edge of panel shall be plus or minus 1/8-inch of plan details.

B.11 Finishes

Panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight and sharp. Finish all surfaces of precast architectural concrete units to be exposed to match colors and textures within the Range Sample Panels and Field Mockups.

Finish unexposed surfaces of precast architectural concrete, not indicated to receive waterproof membrane, units by float finish. Finish exposed surfaces with a medium sandblast.

Concrete indicated to receive waterproof membrane shall have a wood-float or wood troweled finish equal to ACE 301-11.7.3.

Apply water-repellant to surfaces of the precast concrete units to be exposed as per manufacturer's specifications.

B.12 Surface Defects

Upon completion of all processes described under Finishing, above, the exposed surface shall conform to the requirements below, in addition to all other requirements stated herein.

Small cracks, under 0.010 in. (0.25 mm), may not need repair unless failure to do so can cause corrosion of reinforcement. The precast engineer shall confirm cracks which have to be repaired to maintain structural integrity.

The surface shall have a maximum of 20 bugholes per 10-sf. No bughole shall be larger than 3/16" in diameter. Bugholes shall be evenly distributed across the surface of the concrete, such that their visual impact is considered by the engineer to be minimal.

Properly repair surface spalls, corner and edge chips, ragged or irregular edges, adjacent flat and return surfaces with greater texture and/or color differences than the approved samples or mockups, casting and/or aggregate segregation lines evident from different concrete placement lifts and consolidation, visible mold joints or irregular surfaces, and rust stains on exposed surfaces if obvious when viewed at a distance of 20-ft.

Blemishes beyond the limits of variations as established by the quality of the pre-construction mock-up must be repaired. Blemish repair work shall proceed as soon as possible after form removal, using the materials and methods already accepted on the approved mockup.

The Engineer shall make the final decision on whether conditions in excess of, or nominally in accordance with, the above requirements are acceptable to the work.

C Construction

C.1 Preparation

Deliver anchorage devices that are embedded in or attached to the building structural frame or foundation before start of such work. Provide locations, setting diagrams, and templates for the proper installation of each anchorage device.

C.2 Examination

Examine substrates and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

Do not install precast concrete units until supporting concrete has attained minimum design compressive strength.

C.3 Installation

Install clips, hangers, and other accessories required for connecting precast architectural concrete units to supporting members and backup materials.

Install precast architectural concrete. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected. Install bearing pads as precast concrete units are being erected. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses. Remove projecting hoisting devices and use sand-cement grout to fill voids within recessed hoisting devices flush with surface of concrete.

Anchor precast architectural concrete units in position by bolting, welding, grouting, or as otherwise indicated. Remove temporary shims, wedges, and spacers as soon as possible after anchoring and grouting are completed.

Perform welding in compliance with AWS D1.1 and AWS D1.4, with qualified welders. Protect precast architectural concrete units and bearing pads from damage by field welding or cutting operations and provide noncombustible shields as required. Repair damaged

steel surfaces by cleaning and applying a coat of galvanizing repair paint to galvanized surfaces. Repair damaged steel surfaces by cleaning and repriming damaged painted surfaces.

At bolted connections, use lock washers or other acceptable means to prevent loosening of nuts.

Grout connections where required or indicated. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.

C.3.1 Installation Tolerances

Erect architectural precast concrete units level, plumb, square, and true, without exceeding the following noncumulative erection tolerances:

- Plan Location from Building Grid Datum: Plus or Minus 1/2 inch (13 mm).
- Plan Location from Centerline of Steel: Plus or Minus 1/2 inch (13 mm).
- Top Elevation from Nominal Top Elevation: As follows:
- Exposed Individual Panel: Plus or Minus 1/4 inch (6 mm).
- Nonexposed Individual Panel: Plus or Minus 1/2 inch (13 mm).
- Exposed Panel Relative to Adjacent Panel: 1/4 inch (6 mm).
- Nonexposed Panel Relative to Adjacent Panel: 1/2 inch (13 mm).

Support Elevation from Nominal Support Elevation as follows:

- Maximum Low: 1/2 inch (13 mm).
- Maximum High: 1/4 inch (6 mm).
- Maximum Plumb Variation over the Lesser of Height of Structure or 100 Feet (30 m): 1 inch (25 mm).
- Plumb in Any 10 Feet (3 m) of Element Height: 1/4 inch (6 mm).
- Maximum Jog in Alignment of Matching Edges: 1/4 inch (6 mm).
- Joint width (Governs over Joint Taper): Plus or Minus 1/4 inch (6mm).
- Maximum Joint Taper: 3/8 inch (10 mm).
- Joint Taper in 10 Feet (3 m): 1/4 inch (6 mm).
- Maximum Jog in Alignment of Matching Faces: 1/4 inch (6 mm).

C.4 Field Quality Control

Remove and replace work that does not comply with specified requirements. Additional testing and inspecting, at contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

Repair exposed exterior surfaces of precast architectural concrete units to match color, texture, and uniformity of surrounding precast architectural concrete if permitted by engineer. Remove and replace damaged precast architectural concrete units if repairs do not comply with requirements.

C.4 Finishing

Clean exposed surfaces of precast concrete units after erection to remove weld marks, other markings, dirt, and stains. Wash and rinse according to precast concrete fabricator's written recommendations. Protect other work from staining or damage due to cleaning operations. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes.

D Measurement

The department will measure Precast Concrete Planter Curb by each unit that is acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.01	Precast Concrete Planter Curb Unit 1	Each
SPV.0060.02	Precast Concrete Planter Curb Unit 2	Each
SPV.0060.03	Precast Concrete Planter Curb Unit 3	Each
SPV.0060.04	Precast Concrete Planter Curb Unit 4	Each
SPV.0060.05	Precast Concrete Planter Curb Unit 5	Each

Payment is full compensation for providing all materials for planters including precast concrete with reinforcement; for furnishing all necessary hardware; for engineering services; for any required fabricator supervision; for surveying; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

11. Bench - Custom, Item SPV.0060.06.

A Description

This special provision describes furnishing and installing custom benches in accordance to the locations as shown on the plans and provided in the contract.

B Materials

B.1 General

The custom bench is a basis-of-design product and shall be a Forms+Surfaces Vector Seating System manufactured by Forms+Surfaces; 30 Pine Street; Pittsburgh, PA 15223; phone 847-636-6651; fax 412-781-7840; website www.forms-surfaces.com. Items specified are to establish a standard of quality for design, function, material, and appearance. Equivalent products must be evaluated and approved by the engineer.

B.2 Submittals

Submit complete engineered shop drawings conforming to the contract plans for each type of product indicated. Shop drawings shall include construction details, material descriptions, dimensions of individual components and profiles, finishes, filed-assembly

requirements, installation details and maintenance instructions. Coordinate fabrication schedule with construction progress to avoid delaying the work.

Submit materials related to metal and wood of size, color, and finish for approval. Samples shall be sized accordingly for architect to provide accurate review and approval.

Submit maintenance data for each product indicated to include in maintenance manuals.

B.3 Quality Assurance

Obtain each type of custom bench through one source from a single manufacturer.

Manufacturer shall be engaged in the manufacturing of custom benches of various types and sizes and whose products have been in satisfactory use in a similar service for a minimum of fifteen (15) years. Manufacturer shall provide a list of at least ten (10) major transportation authorities, municipalities, universities, or other high-use public environments currently using a similar product.

Installer shall be an experienced firm who has completed similar work utilizing similar products. Previous install work shall be similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

B.4 Delivery, Storage, Handling

Deliver, handle, and store products in accordance with manufacturer's instructions. Products shall be stored in original packaging until ready for installation and protected from impacts or abrasions during storage.

B.5 Components, Materials, and Procedures

The custom bench frame will be aluminum with FSC 100% Jatoba hardwood (FSC License code: FAC-C004453) bench slats.

The custom bench frame will be finished with polyester powdercoat and bench slats will be treated with Penofin hardwood formula "Transparent Natural".

The custom bench will be a 6-foot custom vector bench seat with no back and overall dimensions of 72-inches long by 34-inches deep.

The custom bench will be mounted using a custom wall mount bracket. The contractor will provide threaded anchors and stainless steel mounting screws.

B.6 Warranty

The contractor will provide a warranty one year from the date of invoice against defects in materials and workmanship.

C Construction

C.1 Examination

Examine areas and conditions in which the product is to be installed, and notify the engineer of any conditions that would impact the installation, integrity, or timely completion of the work.

Verify that substrates are stable and capable of supporting the weight of the product and that the substrate has been adequately prepared to securely anchor the product.

Examine areas and conditions, with the Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

Proceed with installation only after installer accepts the construction area and conditions as satisfactory or after all unsatisfactory conditions have been corrected.

C.2 Installation

Comply and install products with manufacturer’s written installation instructions unless more specific requirements are indicated. Complete field assembly of site and street furnishings where required.

Unless otherwise indicated, install custom bench after landscaping and paving have been completed. Install the custom bench level, plumb, true, and securely anchored at locations indicated on the drawings.

Install in accordance with ADA guidelines and End User’s established Accessibility policies.

D Measurement

The department will measure Bench - Custom by the unit completed in place as each individual installation acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.06	Bench - Custom	Each

Payment is full compensation for providing all submittals; for furnishing, delivering, storing, and installing the custom benches; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

12. Bike Rack, Item SPV.0060.07.

A Description

This special provision describes furnishing and installing bike racks in accordance to the locations as shown on the plans and provided in the contract.

B Materials

B.1 General

The bike rack specified shall be a Madrax Model UX200-LB-SF-ES with square tubing manufactured by Madrax, a division of Graber Manufacturing, Inc; 1080 Uniek Drive; Waunakee, WI 53597; phone 800-448-7931; fax 608-849-1081; website www.madrax.com. Items specified are to establish a standard of quality for design, function, material, and appearance. Equivalent products must be evaluated and approved by the engineer.

B.2 Submittals

Submit complete engineered shop drawings conforming to the contract plans for each type of product indicated. Shop drawings shall include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, installation details and maintenance instructions. Coordinate fabrication schedule with construction progress to avoid delaying the work.

Contractor shall submit powdercoat color and finish samples for approval.

Contractor shall submit maintenance data for each product indicated to include in maintenance manuals.

B.3 Quality Assurance

Manufacturer shall be engaged in the manufacturing of bike rack systems of various types and sizes and whose products have been in satisfactory use in a similar service for a minimum of fifteen (15) years. Manufacturer shall provide a list of at least ten (10) major transportation authorities, municipalities, universities, or other high-use public environments currently using a similar product.

Installer shall be an experienced firm who has completed similar work utilizing similar products. Previous install work shall be similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

B.4 Delivery, Storage, Handling

Deliver, handle, and store products in accordance with manufacturer's instructions. Products shall be stored in original packaging until ready for installation and protected from impacts or abrasions during storage.

B.5 Components, Materials, and Procedures

The product shall be constructed of E-Coat Epoxy/Powder Coated tubing to resist corrosion, chipping, abrasion, cracking, and UVA damage. The steel substrate shall be mechanically and chemically etched to insure proper finish adhesion, followed by a zinc phosphate bath for corrosion resistance.

The bike rack shall then be primed by immersion into a non-chrome seal rinse to enhance and supplement the corrosion resistance.

The bike rack shall then be immersed into an environmentally friendly e-coat epoxy liquid bath to insure that all surfaces, joints and crevices are covered. (The use of silicone caulk for gap filling of joints shall not be allowed.)

The bike rack shall be powder coated after complete fabrication with triglycidyl isocyanurate (TGIC) powder, a polyester coating that is electrostatically applied and baked at 400 degrees for 20 minutes. The Powder Coated Stainless Steel rack shall be constructed of ASTM A554, 2" Square, TP 304 stainless steel tubing (2" x 0.120" thick wall (50.8mm x 3.0mm)). The lean bar shall be constructed of ASTM A276 stainless steel bar (3/8" x 3" (9.5mm x 76.2mm)).

C Construction

C.1 Examination

Examine areas and conditions in which the product is to be installed, and notify the engineer of any conditions that would impact the installation, integrity, or timely completion of the work.

Verify that substrates are stable and capable of supporting the weight of the product and that the substrate has been adequately prepared to securely anchor the product according to the manufacturer's recommendations.

Examine areas and conditions, with the Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

Proceed with installation only after installer accepts the construction area and conditions as satisfactory or after all unsatisfactory conditions have been corrected.

C.2 Installation

Comply and install products with manufacturer's written installation instructions unless more specific requirements are indicated. Complete field assembly of site and street furnishings where required.

Unless otherwise indicated, install bike racks after landscaping and paving have been completed. Install the bike rack level, plumb, true, and securely anchored at locations indicated on the drawings.

Install in accordance with ADA guidelines and End User's established Accessibility policies.

D Measurement

The department will measure Bike Rack by the unit completed in place as each individual installation acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0600.07	Bike Rack	Each

Payment is full compensation for all submittals; for furnishing, delivering, storing, and installation of the bike rack; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

13. Litter Receptacle, Item SPV.0060.08.

A Description

This special provision describes furnishing and installing litter receptacles in accordance to the locations as shown on the plans and provided in the contract.

B Materials

B.1 General

The litter receptacle is a basis-of-design product and shall be a Forms+Surfaces Apex Receptacle manufactured by Forms+Surfaces; 30 Pine Street; Pittsburgh, PA 15223; phone 847-636-6651; fax 412-781-7840; website www.forms-surfaces.com. Items specified are to establish a standard of quality for design, function, material, and appearance. Equivalent products must be evaluated and approved by the engineer.

B.2 Submittals

Submit complete engineered shop drawings conforming to the contract plans for each type of product indicated. Shop drawings shall include construction details, material descriptions, dimensions of individual components and profiles, finishes, filed-assembly requirements, installation details and maintenance instructions. Coordinate fabrication schedule with construction progress to avoid delaying the work.

Submit materials related to metal and wood of size, color, and finish for approval. Samples shall be sized accordingly for engineer to provide accurate review and approval.

Submit maintenance data for each product indicated to include in maintenance manuals.

B.3 Quality Assurance

Obtain each type of litter receptacle through one source from a single manufacturer.

Manufacturer shall be engaged in the manufacturing of litter receptacles of various types and sizes and whose products have been in satisfactory use in a similar service for a minimum of fifteen (15) years. Manufacturer shall provide a list of at least ten (10) major transportation authorities, municipalities, universities, or other high-use public environments currently using a similar product.

Installer shall be an experienced firm who has completed similar work utilizing similar products. Previous install work shall be similar in material, design, and extent to that

indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

B.4 Delivery, Storage, Handling

Deliver, handle, and store products in accordance with manufacturer's instructions. Products shall be stored in original packaging until ready for installation and protected from impacts or abrasions during storage.

B.5 Components, Materials, and Procedures

The liter receptacle will have a solid corrosion-resistant aluminum body frame and lid with heavy corrosion-resistant aluminum walls. The container walls will be inset with FSC Jatoba hardwood slats (FSC License code: FSC-C004453). The internal liner will be black low-density polyethylene (LLDPE) with US94HB fire rating. The latch and hardware will be stainless steel. The rain cover will be a heavy corrosion-resistant aluminum.

The body will be finished with polyester powdercoat and have a standard aluminum texture. The inset will be finished with FSC 100% Jatoba hardwood slats. The rain cover will be finished with a standard aluminum texture. The latch will be a standard lift latch.

The receptacle will be 36-gallon, top opening, freestanding with rain cover: 32-inches wide by 15-inches deep by 40.5-inches high. The lid opening will be a split-stream for a 36-gallon container with two 12.4-inch wide by 5-inch deep openings.

Graphics will be applied to the lids as specified to indicate the intended waste or recycling stream. The graphic will be a back-printed polycarbonate with white letters and symbols and black graphics background.

The receptacle shall be freestanding and tethered using Stainless Steel Aircraft Cable to Stainless Steel Eyebolt.

C Construction

C.1 Examination

Examine areas and conditions in which the product is to be installed, and notify the engineer of any conditions that would impact the installation, integrity, or timely completion of the work.

Verify that substrates are stable and capable of supporting the weight of the product and that the substrate has been adequately prepared to securely anchor the product.

Examine areas and conditions, with the Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

Proceed with installation only after installer accepts the construction area and conditions as satisfactory or after all unsatisfactory conditions have been corrected.

C.2 Installation

Comply and install products with manufacturer’s written installation instructions unless more specific requirements are indicated. Complete field assembly of site and street furnishings where required.

Unless otherwise indicated, install litter receptacle after landscaping and paving have been completed. Install the litter receptacle level, plumb, true, and securely anchored at locations indicated on the drawings.

Install in accordance with ADA guidelines and End User’s established Accessibility policies.

D Measurement

The department will measure Litter Receptacle by the unit completed in place as each individual installation acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.08	Litter Receptacle	Each

Payment is full compensation for furnishing, delivering, storing, and installing the litter receptacle; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

14. Tree Taxodium distichum ‘Mickelson’, Item SPV.0060.09.

A Description

This section describes furnishing and planting trees of the species, varieties and sizes specified and includes furnishing all necessary materials, excavating plant holes, backfilling, fertilizing, watering, heeling in, disposing of surplus and waste materials, and as necessary, care and required replacements pending acceptance at the locations shown on the plans, in accordance to section 632 of the standard specification, and as hereafter provided.

B Materials

Provide healthy, disease-free plants of species and variety shown or listed, with 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.

All plant material shall conform to subsection 632.2 of the standard specifications. All plants shall be from within the states of Wisconsin, Minnesota, Michigan or parts of northern Illinois located within Zone 4 of the “plant hardiness zone map” produced by the US Department of Agriculture, unless otherwise approved by engineer.

Conform to subsection 632.2.2.4 of the standard specifications regarding plant substitutions.

B.1 Measurements

Measure trees according to ANSI Z60.1. Do not prune to obtain required sizes. 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 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-inches caliper size, and 12-inches above the root flare for larger sizes

B.1 Submittals

Submit product data for each type of tree indicated. Submit tree materials including quantities, sizes, quality, and sources for plant materials. Submit tree photographs in color digital 3-inch by 5-inch print format for each required species and size of plant material as it will be furnished to the project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

Maintain approved samples on-site as a standard for comparison.

Submit product certificates for each type of manufactured product, from manufacturer, and with manufacturer's certified analysis of standard products.

Submit maintenance instructions with recommended procedures to be established by owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

B.2 Quality Assurance

Installer shall be a qualified landscape installer whose work has resulted in successful establishment of plants. Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association and have five (5) years of experience in landscape installation. Installer shall be supervised by an experienced full-time supervisor on project site when work is in progress. Field supervisor shall have certification from the Professional Landcare Network as a Certified Landscape Technician with installation and maintenance specialty area(s), designated CLT-Exterior.

Pesticide applicator shall be state licensed commercial personnel.

B.3 Delivery, Storage, and Handling

Deliver trees in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants. 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. Accompany each delivery of bulk soil amendments with appropriate certificates. Provide protective covering of trees during shipping and delivery. Do not drop plants during delivery and handling. Handle planting stock by root ball or containers. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

Do not prune trees before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

B.4 Warranty

Installer shall provide a 12-month warranty for trees from the date of planting completion. Installer shall provide a special warranty to agree to repair or replace plantings that fail in material, workmanship, or growth within the specified warranty period. Failures include, but not limited to, death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by owner or incidents that are beyond installer's control; or structural failures including plantings falling or blowing over.

Installer's remedial plan shall include immediately removing dead plants and replace unless required to plant in the succeeding planting season; replace plants that are more than 25 percent dead or in an unhealthy condition at the discretion of the engineer at end of warranty period. Provide extended warranty for period equal to original warranty period, for replaced plant material.

B.5 Maintenance Service

Installer shall provide maintenance by skilled employees of landscape installer. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than 12-months from date of planting completion. Installer to provide a continuing maintenance proposal to the owner in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

C Construction

C.1 Examination

Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work. Do not interrupt services or utilities to facilities unless permitted by the engineer under the following conditions and then only after arranging to provide temporary services or utilities according to requirements

indicated. Notify engineer no fewer than three (3) days in advance of proposed interruption of each service or utility. Do not proceed with interruption of services or utilities without engineer's written permission.

C.2 Placement

Prior to placing trees, lay out placement area by staking locations as specified by the contract and plan details. Obtain engineer's approval before installing trees.

Plant trees during one of the following periods: spring planting April 15 to June 15; fall planting August 20 to November 25. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

Before planting, verify that root flare is visible at top of root ball according to ANSI Z60 1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break. Set stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades. Use planting soil mix as specified in SPV.0035.02.

Remove only dead, dying, or broken branches. Do not prune for shape. Prune, thin, and shape trees and shrubs according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by the engineer, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D Measurement

The department will measure Trees by the number of each individual acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item (all Trees to be 4-inch DBH stock balled and burlapped):

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.09	Tree Taxodium distichum 'Mickelson'	Each

Payment is full compensation for providing, transporting, handling, storing, placing and replacing plant materials; for excavating all plant holes, salvaging topsoil, mixing and backfilling, soil amendment additions and warranty maintenance; and for disposing of all excess and waste materials.

- 15. Ornamental Grass Calamagrostis acutiflora 'Karl Foerster', Item SPV.0060.10; Ornamental Grass Carex flacca 'Blue Sedge', SPV.0060.11; Ornamental Grass Sporobolus heterolepis 'Tara'; SPV.0060.12**

A Description

This section describes furnishing and planting plants of the species, varieties and sizes specified and includes furnishing all necessary materials, excavating plant holes, backfilling, fertilizing, watering, heeling in, disposing of surplus and waste materials, and as necessary, care and required replacements pending acceptance at the locations shown on the plans, in accordance to section 632 of the standard specification, and as hereafter provided.

B Materials

Provide healthy, disease-free plants of species and variety shown or listed, with 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.

All plant material shall conform to subsection 632.2 of the standard specifications. All plants shall be from within the states of Wisconsin, Minnesota, Michigan or parts of northern Illinois located within Zone 4 of the “plant hardiness zone map” produced by the US Department of Agriculture, unless otherwise approved by engineer.

Conform to subsection 632.2.2.4 of the standard specifications regarding plant substitutions.

B.1 Submittals

Submit product data for each type of ornamental grass indicated. Submit ornamental grass materials including quantities, sizes, quality, and sources for plant materials. Submit ornamental grass photographs in color digital 3-inch by 5-inch print format for each required species and size of plant material as it will be furnished to the project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

Maintain approved samples on-site as a standard for comparison.

Submit product certificates for each type of manufactured product, from manufacturer, and with manufacturer's certified analysis of standard products.

Submit maintenance instructions with recommended procedures to be established by owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

B.2 Quality Assurance

Installer shall be a qualified landscape installer whose work has resulted in successful establishment of plants. Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association and have five (5) years of experience in landscape installation. Installer shall be supervised by

an experienced full-time supervisor on project site when work is in progress. Field supervisor shall have certification from the Professional Landcare Network as a Certified Landscape Technician with installation and maintenance specialty area(s), designated CLT-Exterior.

Pesticide applicator shall be state licensed commercial personnel.

B.3 Delivery, Storage, and Handling

Deliver ornamental grasses in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants. 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. Accompany each delivery of bulk soil amendments with appropriate certificates. Provide protective covering of ornamental grasses during shipping and delivery. Do not drop plants during delivery and handling. Handle planting stock by root ball. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

B.4 Warranty

Installer shall provide a 12-month warranty for ornamental grasses from the date of planting completion. Installer shall provide a special warranty to agree to repair or replace plantings that fail in material, workmanship, or growth within the specified warranty period. Failures include, but not limited to, death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by owner or incidents that are beyond installer's control; or structural failures including plantings falling or blowing over.

Installer's remedial plan shall include immediately removing dead plants and replace unless required to plant in the succeeding planting season; replace plants that are more than 25 percent dead at the discretion of the engineer or in an unhealthy condition at end of warranty period. Provide extended warranty for period equal to original warranty period, for replaced plant material.

B.5 Maintenance Service

Installer shall provide maintenance by skilled employees of landscape installer. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than 12-months from date of planting completion. Installer to provide a continuing maintenance proposal to the owner in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

C Construction

C.1 Examination

Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work. Do not interrupt services or utilities to facilities unless permitted by the engineer under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated. Notify engineer no fewer than three (3) days in advance of proposed interruption of each service or utility. Do not proceed with interruption of services or utilities without engineer's written permission.

C.2 Placement

Plant ornamental grasses during one of the following periods: spring planting April 15 to June 15; fall planting August 20 to November 25. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

For plant bed areas indicated on the planting details, prepare planting beds as directed by the contract and plan details. For all other plant bed areas, prepare planting bed in accordance with Section 632 of the Standard Specifications. Construction shall conform to the requirements of subsection 632.3 of the standard specifications.

D Measurement

The department will measure Ornamental Grasses by the number of each individual acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item (all Ornamental Grasses to be container-grown stock unless otherwise noted on plant list shown on plans):

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
SPV.0060.10	Ornamental Grasses, Calamagrostis acutiflora 'Karl Foerster'	Each
SPV.0060.11	Ornamental Grasses, Carex flacca 'Blue Sedge'	Each
SPV.0060.12	Ornamental Grasses, Sporobolus heterolepis 'Tara'	Each

Payment is full compensation for providing, transporting, handling, storing, placing and replacing plant materials; for excavating all plant holes, salvaging topsoil, mixing and backfilling, soil amendment additions and warranty maintenance; and for disposing of all excess and waste materials.

16. Perennials, Hemerocallis ‘Happy Returns’, Item SPV.0060.13; Perennials, Hosta ‘Golden Tiara’, SPV.0060.14; Perennials, Salvia nemorosa ‘Wesuwe’; SPV.0060.15

A Description

This section describes furnishing and planting perennial plants of the species, varieties and sizes specified and includes furnishing all necessary materials, excavating plant holes, backfilling, fertilizing, watering, heeling in, disposing of surplus and waste materials, and as necessary, care and required replacements pending acceptance at the locations shown on the plans, in accordance to section 632 of the standard specification, and as hereafter provided.

B Materials

Provide healthy, disease-free plants of species and variety shown or listed, with 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.

All plant material shall conform to subsection 632.2 of the standard specifications. All plants shall be from within the states of Wisconsin, Minnesota, Michigan or parts of northern Illinois located within Zone 4 of the “plant hardiness zone map” produced by the US Department of Agriculture, unless otherwise approved by engineer.

Conform to subsection 632.2.2.4 of the standard specifications regarding plant substitutions.

B.1 Submittals

Submit product data for each type of perennial indicated. Submit perennial plant materials including quantities, sizes, quality, and sources for plant materials. Submit perennial photographs in color digital 3-inch by 5-inch print format for each required species and size of plant material as it will be furnished to the project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

Maintain approved samples on-site as a standard for comparison.

Submit product certificates for each type of manufactured product, from manufacturer, and with manufacturer's certified analysis of standard products.

Submit maintenance instructions with recommended procedures to be established by owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

B.2 Quality Assurance

Installer shall be a qualified landscape installer whose work has resulted in successful establishment of plants. Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association and have five (5) years experience in landscape installation. Installer shall be supervised by an experienced full-time supervisor on project site when work is in progress. Field supervisor shall have certification from the Professional Landcare Network as a Certified Landscape Technician with installation and maintenance specialty area(s), designated CLT-Exterior.

Pesticide applicator shall be state licensed commercial personnel.

B.3 Delivery, Storage, and Handling

Deliver perennials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants. 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. Accompany each delivery of bulk soil amendments with appropriate certificates. Provide protective covering of perennials during shipping and delivery. Do not drop plants during delivery and handling. Handle planting stock by root ball. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

B.4 Warranty

Installer shall provide a 12-month warranty for perennials from the date of planting completion. Installer shall provide a special warranty to agree to repair or replace plantings that fail in material, workmanship, or growth within the specified warranty period. Failures include, but not limited to, death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by owner or incidents that are beyond installer's control; or structural failures including plantings falling or blowing over.

Installers remedial plan shall include immediately removing dead plants and replace unless required to plant in the succeeding planting season; replace plants that are more than 25 percent dead at the discretion of the engineer or in an unhealthy condition at end of warranty period. Provide extended warranty for period equal to original warranty period, for replaced plant material.

B.5 Maintenance Service

Installer shall provide maintenance by skilled employees of landscape installer. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than 12-months from date of planting completion. Installer to provide a continuing maintenance proposal to the owner in the form of a standard yearly (or other period) maintenance agreement, starting on date

initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

C Construction

C.1 Examination

Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work. Do not interrupt services or utilities to facilities unless permitted by the engineer under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated. Notify engineer no fewer than three (3) days in advance of proposed interruption of each service or utility. Do not proceed with interruption of services or utilities without engineer’s written permission.

C.2 Placement

Plant perennials during one of the following periods: spring planting April 15 to June 15; fall planting August 20 to November 25. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

For plant bed areas indicated on the planting details, prepare planting beds as directed by the contract and plan details. For all other plant bed areas, prepare planting bed in accordance with Section 632 of the Standard Specifications. Construction shall conform to the requirements of subsection 632.3 of the standard specifications.

D Measurement

The department will measure Perennials by the number of each individual Perennial acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item (all Perennials to be container-grown stock unless otherwise noted on plant list shown on plans):

<u>ITEM UMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
SPV.0060.13	Perennials, Hemerocallis ‘Happy Returns’	Each
SPV.0060.14	Perennials, Hosta ‘Golden Tiara’	Each
SPV.0060.15	Perennials, Salvia nemorosa ‘Wesuwe’	Each

Payment is full compensation for providing, transporting, handling, storing, placing and replacing plant materials; for excavating all plant holes, salvaging topsoil, mixing and backfilling, soil amendment additions and warranty maintenance; and for disposing of all excess and waste materials.

17. Bulb, Allium ‘Purple Sensation’, Item SPV.0060.16; Bulb, Allium ‘Summer Beauty’, SPV.0060.17; Bulb, Narcissus ‘All Spring Mix’; SPV.0060.18

A Description

This section describes furnishing and planting bulbs of the species, varieties and sizes specified and includes furnishing all necessary materials, excavating plant holes, backfilling, fertilizing, watering, heeling in, disposing of surplus and waste materials, and as necessary, care and required replacements pending acceptance at the locations shown on the plans, in accordance to section 632 of the standard specification, and as hereafter provided.

B Materials

Provide healthy, disease-free plants of species and variety shown or listed, with 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.

All plant material shall conform to subsection 632.2 of the standard specifications. All plants shall be from within the states of Wisconsin, Minnesota, Michigan or parts of northern Illinois located within Zone 4 of the “plant hardiness zone map” produced by the US Department of Agriculture, unless otherwise approved by engineer.

Conform to subsection 632.2.2.4 of the standard specifications regarding plant substitutions.

B.1 Submittals

Submit product data for each type of bulb indicated. Submit bulb materials including quantities, sizes, quality, and sources for plant materials. Submit bulb photographs in color digital 3-inch by 5-inch print format for each required species and size of plant material as it will be furnished to the project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

Maintain approved samples on-site as a standard for comparison.

Submit product certificates for each type of manufactured product, from manufacturer, and with manufacturer's certified analysis of standard products.

Submit maintenance instructions with recommended procedures to be established by owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

B.2 Quality Assurance

Installer shall be a qualified landscape installer whose work has resulted in successful establishment of plants. Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association and have five (5) years experience in landscape installation. Installer shall be supervised by an experienced full-time supervisor on project site when work is in progress. Field supervisor shall have certification from the Professional Landcare Network as a Certified Landscape Technician with installation and maintenance specialty area(s), designated CLT-Exterior.

Pesticide applicator shall be state licensed commercial personnel.

B.3 Delivery, Storage, and Handling

Deliver bulbs in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants. 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. Accompany each delivery of bulk soil amendments with appropriate certificates. Provide protective covering of bulbs during shipping and delivery. Do not drop plants during delivery and handling. Handle planting stock by root ball. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

B.4 Warranty

Installer shall provide a 12-month warranty for bulbs from the date of planting completion. Installer shall provide a special warranty to agree to repair or replace plantings that fail in material, workmanship, or growth within the specified warranty period. Failures include, but not limited to, death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by owner or incidents that are beyond installer's control; or structural failures including plantings falling or blowing over.

Installers remedial plan shall include immediately removing dead plants and replace unless required to plant in the succeeding planting season; replace plants that are more than 25 percent dead at the discretion of the engineer or in an unhealthy condition at end of warranty period. Provide extended warranty for period equal to original warranty period, for replaced plant material.

B.5 Maintenance Service

Installer shall provide maintenance by skilled employees of landscape installer. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than 12-months from date of planting completion. Installer to provide a continuing maintenance proposal to the owner in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

C Construction

C.1 Examination

Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work. Do not interrupt services or utilities to facilities unless permitted by the engineer under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated. Notify engineer no fewer than three (3) days in advance of proposed interruption of each service or utility. Do not proceed with interruption of services or utilities without engineer’s written permission.

C.2 Placement

Plant Allium bulb species during one of the following periods: spring planting April 15 to June 15; fall planting August 20 to November 25. Plant Narcissus bulbs only during fall planting period of August 20 to November 25 unless otherwise directed by the engineer. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

For plant bed areas indicated on the planting details, prepare planting beds as directed by the contract and plan details. For all other plant bed areas, prepare planting bed in accordance with Section 632 of the Standard Specifications. Construction shall conform to the requirements of subsection 632.3 of the standard specifications.

D Measurement

The department will measure Bulb by the number of each acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item (all bulbs to be top available size for each species unless otherwise noted on plant list shown on plans):

<u>ITEM UMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
SPV.0060.16	Bulb, Allium ‘Purple Sensation’	Each
SPV.0060.17	Bulb, Allium ‘Summer Beauty’	Each
SPV.0060.18	Bulb, Narcissus ‘ All Spring Mix’	Each

Payment is full compensation for providing, transporting, handling, storing, placing and replacing plant materials; for excavating all plant holes, salvaging topsoil, mixing and backfilling, soil amendment additions and warranty maintenance; and for disposing of all excess and waste materials.

- 18. Street Lighting Polymer Concrete Vault 13-Inch X 24-Inch x 18-Inch, Item SPV.0060.19; Street Lighting Polymer Concrete Vault 17-Inch X 30-Inch x 18-Inch, Item SPV.0060.20.**

A Description

This special provision describes furnishing and installing Polymer Concrete Vaults in accordance with current City of Milwaukee methods.

B Materials

Polymer Concrete shall be manufactured from one of the general types and grades defined in polymers in concrete structural applications state of the art report, ACI 548.6R-96 for structural uses. Thermoplastics will not be acceptable.

Enclosure walls shall be made from pattern cut structural fiberglass cloths to assure uniform, pre-measurable fiberglass content on all areas. Chopper gun fiberglass construction is not acceptable.

Binding polymers used in the manufacture of the polymer concrete and the fiber reinforced polyester shall be of the same formulation or from formulations with demonstrated chemical compatibility to assure complete chemical bonding of all components. Fiber reinforced polyester wall sections must be cast integrally into and chemically bonded within the upper polymer concrete casting.

Testing

Meet ANSI/SCTE 77 2010 (**Tier 15 or greater**), ASTM C 857, & WUC 3.6 structural requirements.

Compressive Modulus of Elasticity (fiberglass reinforced polymer): 5.6×10^6 PSI tested in accordance with procedures outlined in ASTM D-695

Comprehensive Strength (fiberglass reinforced polymer): 24,300 PSI tested in accordance with ASTM D-695

Flexural Strength (fiberglass reinforced polymer): 18,700 PSI tested in accordance with ASTM D-790

Tensile Strength (fiberglass reinforced polymer): 12,100 PSI tested in accordance with procedures outlined in ASTM D-638

Tensile Modulus of Elasticity (fiberglass reinforced polymer): 8.6×10^5 PSI tested in accordance with procedures outlined in ASTM D-638

Splitting Tensile Strength (polymer concrete): Tested in accordance with procedures outlined in ASTM C-496

Accelerated Service: Tested in accordance with procedure E outlined in ASTM D-756

Water Absorption: Tested in accordance with ASTM D-570 outlined in sections 6.1 and 6.5

Impact Resistance (fiberglass reinforced polymer concrete): 72 foot pounds in accordance with ASTM D-2444 administered with a "C" tup

Skid Resistance: 0.60 coefficient of friction in accordance with ASTM C-1028

Flammability Test: Tested in accordance with ASTM D-635

Ultraviolet Exposure: Tested in accordance with ASTM test method G-53

Chemical Resistance

1. Sodium Chloride 5%
2. Sodium Carbonate 0.1 N
3. Hydrochloric Acid 0.2 N
4. Acetic Acid 5%
5. Sulfuric Acid 0.1N
6. Sodium Sulfate 0.1 N
7. Sodium Hydroxide 0.1N
8. Kerosene Oil per ASTM D-543
9. Transformer Oil per ASTM D-543

The street lighting vaults and covers shall be gray in color and shall be flared wall as indicated on the Drawings. Covers shall be provided with 2 stainless steel bolts. Each cover shall have the words "**STREET LIGHTING**" cast into its surface along the longest dimension. The words shall be permanently recessed into the surface.

C Construction

Install rectangular flared wall vaults according to current City of Milwaukee standards. **Vault shall be at minimum four (4) feet away from any proposed or existing street light pole.** Provisions for inserting conduit into any side or the bottom of the vault shall be included.

D Measurement

The Department will measure Street Lighting Polymer Concrete Vault as a unit for each specific vault installed that is acceptably completed.

E Payment

The Department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.19	Street Lighting Polymer Conc. Vault 13-Inch x 24-Inch x 18-Inch	EACH
SPV.0060.20	Street Lighting Polymer Conc. Vault 17-Inch x 30-Inch x 18-Inch	EACH

Payment is full compensation for furnishing and installing street lighting vaults.

19. 4' Diameter Manhole Type TES, Item SPV.0060.21.

A Description

The work under this item consists of a 4'-0" round manhole for the City of Milwaukee Underground Conduit Section at locations shown in the plans, in accordance with sections 301, 611 and 501 of the standard specifications, and as hereinafter provided.

B Materials

Concrete and steel reinforcement shall conform to ASTM specification: C478 (latest edition), except that the single cage circumferential reinforcement in all vertical walls shall consist of lines of #6 steel wire spaced 3" horizontally and lines of #10 steel wire spaced 8" vertically located in the center of the wall.

Two lifting inserts for 1-1/2" diameter lifting eyes shall be cast in the wall of the base and all other riser sections except the top cap section.

Up to four 7/8" diameter galvanized steel 1-11/16" pulling-in eyes shall be cast in the wall of the base section directly across from each duct entrance.

Four 5/8" diameter plastic threaded cable rack bolt inserts shall be cast in the wall of the riser section.

Supply a continuous circumferential Butyl Rubber gasket, to be laid on the wall joint of the base and riser section when manhole is being assembled at job site.

The number of pulling-in eyes and/or cable rack bolt inserts may vary.

Additionally, the size, location, shape and number of duct entrances and/or knock-out area may vary. Unit price of manhole shall not vary for number of openings, pulling-in eyes and/or rack bolt inserts.

The City will supply a frame and lid for the manhole. Contractor shall contact Mr. Ricardo Lopez, Inventory Clerk at (414) 286-6123 prior to obtaining the frame and lid from the DPW Headquarters at 3850 N. 35th St. Contractor must have the "Casting Requisition Form" which shall be supplied by the City at the Preconstruction Meeting.

For any questions on materials, contact Ms. Karen Rogney at (414) 286-3243.

C Construction

4' Diameter Manholes Type TES shall be installed in accordance with subsection 611.3. Install the top of the roof deck at a standard depth of 18" below finished grade where possible. A minimum depth of 12" from finished grade to the top of the roof deck must be maintained.

D Measurement

The department will measure 4' Diameter Manhole Type TES by each individual manhole acceptably completed.

E Payment

The department will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.21	4-FT Diameter Manhole Type TES	EACH

Payment is full compensation for locating, marking, and saw cutting existing pavement; for removing asphalt and concrete pavement; for all excavation work and disposal of material; for furnishing and installing all materials, including bricks, and coarse aggregate, bedding and backfilling, concrete forms, concrete placement, appurtenances, and backfilling; for replacing the restored finished surface in-kind including all concrete pavement, curb and gutter, sidewalk, or other restoration materials; for disposing of surplus materials; and for making inspections, for installing the conduit, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

20. 5' Diameter Manhole Type TES, Item SPV.0060.22.

A Description

The work under this item consists of a 5'-0" round manhole for the City of Milwaukee Underground Conduit Section at locations shown in the plans, in accordance with sections 301, 611 and 501 of the standard specifications, and as hereinafter provided.

B Materials

Concrete and steel reinforcement shall conform to ASTM specification: C478 (latest edition), except that the two cage circumferential reinforcements in all vertical walls shall consist of lines of #6 steel wire spaced 3" horizontally and lines of #10 steel wire spaced 8" vertically located in the center of the wall.

Two lifting inserts for 1-1/2" diameter lifting eyes shall be cast in the wall of the base and all other riser sections except the top cap section.

Up to four 7/8" diameter galvanized steel 1-11/16" pulling-in eyes shall be cast in the wall of the base section directly across from each duct entrance.

Four 5/8" diameter plastic threaded cable rack bolt inserts shall be cast in the wall of the riser section.

A continuous circumferential Butyl Rubber gasket shall be supplied, to be laid on the wall joint of the base and riser section when manhole is being assembled at job site.

The number of pulling-in eyes and/or cable rack bolt inserts may vary. Additionally, the size, location, shape and number of duct entrances and/or knock-out area may vary. Unit price of manhole shall not vary for number of openings, pulling-in eyes and/or rack bolt inserts.

The City will supply a frame and lid for the manhole. Contractor shall contact Mr. Ricardo Lopez, Inventory Clerk at (414) 286-6123 prior to obtaining the frame and lid from the DPW Headquarters at 3850 N. 35th St. Contractor must have the "Casting Requisition Form" which shall be supplied by the City at the Preconstruction Meeting.

For any questions on materials, contact Ms. Karen Rogney at (414) 286-3243.

C Construction

5' Diameter Manholes Type TES shall be installed in accordance with subsection 611.3. Install the top of the roof deck at a standard depth of 18" below finished grade where possible. A minimum depth of 12" from finished grade to the top of the roof deck must be maintained.

D Measurement

The department will measure 5' Diameter Manhole Type TES by each individual manhole acceptably completed.

E Payment

The department will pay for the measured quantity at the contract unit price under the following bid item:

<u>Item Number</u>	<u>Description</u>	<u>Unit</u>
SPV.0060.22	5' Diameter Manhole Type TES	EACH

Payment is full compensation for locating, marking, and saw cutting existing pavement; for removing asphalt and concrete pavement; for all excavation work and disposal of material; for furnishing and installing all materials, including bricks, and coarse aggregate, bedding and backfilling, concrete forms, concrete placement, appurtenances, and backfilling; for replacing the restored finished surface in-kind including all concrete pavement, curb and gutter, sidewalk, or other restoration materials; for disposing of surplus materials; and for making inspections, for installing the conduit, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

21. Cored Hole 5-Inch Diameter, Item SPV.0060.23

A Description

Core 5-inch diameter opening through a 30" concrete slurry wall structure and an 8" concrete masonry unit (CMU) facing wall as shown in the detail and on the plans, as directed by the engineer, and as hereinafter provided.

B Materials (Vacant)

C. Construction

C.1 Surface Area Preparation

Clean the surface areas, adjacent to the core location on the street side of slurry wall, of all dirt or other foreign matter. Place protection on inner CMU wall to contain and collect all

coring debris from damaging building facilities hanging on CMU wall below coring entry location.

C.2 Surface Location of Slurry Wall Steel Reinforcement

Contractor shall surface scan for steel reinforcement and mark vertical and horizontal rebar locations around core site. Rebar schedule is #9 horizontal and #6 vertical @ 12” O/C. Core location shall be centered in nearest window between rebar as directed by the engineer.

C.3 Coring

Install anchor points in outer slurry wall, mount coring rig and core through 30” slurry wall and CMU facing wall into building basement.

C.4 Finishing and Clean-Up

When coring is complete, remove all coring debris and vacuum off any debris on building facilities hung on wall below core location.

D Measurement

The department will measure Cored Hole 5-Inch Diameter as each individual cored hole as approved by the engineer and acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.23	Cored Hole 5-Inch Diameter	Each

Payment is full compensation for coring, all materials, inspection and any cleaning.

22. Installing Conduit Into Existing Manhole, Item SPV.0060.24

A Description

This special provision describes locating existing conduit system manholes and installing new conduit into those manholes at the locations shown on the plans. The contractor shall verify existing conduit manhole locations with the City of Milwaukee, and shall maintain any existing conductors, fibers, and conduit paths without interruption or damage. Repair and restoration of all disturbed areas resulting from the work shall be in accordance with the pertinent provisions of the standard specifications, and as hereinafter provided.

B Materials

Conduit including restoration materials, as provided and paid for under other items in this contract. All materials shall conform to the pertinent provisions of the standard specifications unless otherwise noted.

C Construction

Carefully expose the outside of the existing structure without disturbing any existing conduits or cabling.

Drill the appropriate sized hole in a concrete structure or saw and remove full sections of block or bricks from the existing structure for the entering of conduit at a location within the structure that will not disturb the existing cabling and will not hinder the installation of new cabling within the installed conduit. This work may include the removal of the existing abandoned conduit from the structure to allow for the installation of the new conduits as indicated on the plans.

Fill any void area between the drilled hole and conduit with an engineer-approved filling material to protect against conduit movement and entry of fill material into the structure.

Carefully tamp backfill into place.

All disturbed areas shall be repaired and restored in kind.

D Measurement

The department will measure Installing Conduit Into Existing Manhole by the unit, acceptably installed. Up to six conduits entering a structure per entry point into the existing structure will be considered a single unit. Conduits in excess of six, or conduits entering at significantly different entry points into the existing manhole will constitute multiple units.

E Payment

The department will pay for the measured quantity at the contract unit price under the following bid item:

<u>Item Number</u>	<u>Description</u>	<u>Unit</u>
SPV.0060.24	Installing Conduit Into Existing Manhole	Each

Payment is full compensation for drilling holes; removing blocks: removing bricks: removing abandoned conduit; furnishing and installing all materials, including bricks, and coarse aggregate; for excavation, bedding and backfilling, including any sand or other required materials; furnishing and placing topsoil, fertilizer, seed, and mulch in disturbed areas; for disposal of surplus materials; for making inspections; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

23. Install Traffic Signal Base; Item SPV.0060.25.

A Description

Install concrete traffic signal bases furnished by the City of Milwaukee, for traffic signals as shown on the plans.

B Materials

Pre-cast concrete traffic signal bases will be furnished by the City of Milwaukee.

C Construction

Pick up pre-cast concrete traffic signal bases from the City of Milwaukee yard located at 1540 W. Canal Street. Contact traffic signal shop dispatch at (414) 286-3687 to coordinate pick up. Install concrete traffic signal bases in accordance with the plans. Plan changes must be approved by the City of Milwaukee Electric Services Supervisor or Traffic Engineer. The primary contacts are Mr. Al Nichols, Traffic Operations Supervisor (414) 286-3687-office, (414) 708-5148-mobile; or Mr. Joseph Blakeman, Traffic Control Engineer (414) 286-8070.

D Measurement

The department will measure Install Traffic Signal Base as each individual item of material acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

<u>Item Number</u>	<u>Description</u>	<u>Unit</u>
SPV.0060.25	Install Traffic Signal Base	Each

Payment is full compensation for installing all materials; for excavation, backfilling and disposal of surplus material; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

24. Sidewalk Bollard Type B 36-Inch, Item SPV.0060.26.

A Description

This special provision describes furnishing and installing the sidewalk bollards Type B in accordance to the locations as shown on the plans and provided in the contract.

B Materials

B.1 General

The bollard Type B is a basis-of-design product and shall be a Forms+Surfaces Rincon Bollard manufactured by Forms+Surfaces; 30 Pine Street; Pittsburgh, PA 15223; phone 847-636-6651; fax 412-781-7840; website www.forms-surfaces.com. Items specified are to establish a standard of quality for design, function, material, and appearance. Equivalent products must be evaluated and approved by the engineer.

B.2 Submittals

Submit complete engineered shop drawings conforming to the contract plans for each type of product indicated. Shop drawings shall include construction details, material descriptions, dimensions of individual components and profiles, finishes, filed-assembly requirements, installation details and maintenance instructions. Coordinate fabrication schedule with construction progress to avoid delaying the work.

Submit materials related to metal and wood of size, color, and finish for approval. Samples shall be sized accordingly for architect to provide accurate review and approval.

Submit maintenance data for each product indicated to include in maintenance manuals.

B.3 Quality Assurance

Obtain the bollards through one source from a single manufacturer.

Manufacturer shall be engaged in the manufacturing of bollards of various types and sizes and whose products have been in satisfactory use in a similar service for a minimum of fifteen (15) years. Manufacturer shall provide a list of at least ten (10) major transportation authorities, municipalities, universities, or other high-use public environments currently using a similar product.

Installer shall be an experienced firm who has completed similar work utilizing similar products. Previous install work shall be similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

B.4 Delivery, Storage, Handling

Deliver, handle, and store products in accordance with manufacturer's instructions. Products shall be stored in original packaging until ready for installation and protected from impacts or abrasions during storage.

B.5 Components, Materials, and Procedures

The bollard will be stainless steel and have a body thickness of 0.06-inch. The base and head cap of the bollard will be stainless steel casting. The bollard will have a 0.25-inch thick white-frosted acrylic lens. The bollard will have a stainless steel optional directional shield that is 10.76-inches high by 4.18-inches wide with a horizontal shield pattern. The optional directional shield will be on sides leaving the curbside open. The bollard will have an LED driver with input power of 90-VAC to 305-VAC and include high efficiency constant output current with over-voltage short circuit and overload protection. The LED driver will have certifications for an IP66 (waterproof) enclosure, and Class 2 rated output (UL1310/UL8750). The LED light engine will be an LED3K with 14-watts, 1020-lumens, and a color temperature of 3000K.

The bollard body, head cap, base, and shield will have a stainless steel finish.

The bollard will be 36.2-inches high by 4.5-inches wide by 4.5-inches deep. The bollard will be surface mounted using a 4.5-inch by 4.5-inch base incorporating four (4) tamper-resistant bolts. The bollard shall include all necessary hardware and templates.

B.6 Warranty

The contractor will provide a warranty one year from the date of invoice against defects in materials and workmanship.

C Construction

C.1 Examination

Examine areas and conditions in which the product is to be installed, and notify the engineer of any conditions that would impact the installation, integrity, or timely completion of the work.

Verify that substrates are stable and capable of supporting the weight of the product and that the substrate has been adequately prepared to securely anchor the product.

Verify that conduit is clear from obstructions and blockages and all electrical wires are in place or will be in place in order to provide electricity to bollard lights.

Examine areas and conditions, with the Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

Proceed with installation only after installer accepts the construction area and conditions as satisfactory or after all unsatisfactory conditions have been corrected.

C.2 Installation

Comply and install products with manufacturer’s written installation instructions unless more specific requirements are indicated. Complete field assembly of site and street furnishings where required.

Unless otherwise indicated, install the bollards after landscaping and paving have been completed. Install the bollards level, plumb, true, and securely anchored at locations indicated on the drawings.

Install in accordance with ADA guidelines and End User’s established Accessibility policies.

D Measurement

The department will measure Sidewalk Bollard Type B 36-inch by each unit acceptably completed in place.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.26	Sidewalk Bollard Type B 36-Inch	Each

Payment is full compensation for furnishing, delivering, storing, and installing the bollard; for completing all electrical connections; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

- 25. 14-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.01; 10-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.02; 8-Duct Conduit,**

Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.03; 6-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.04; 4-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.05; 3-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.06; 2-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.07; 1-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.08

A. Description

This work consists of furnishing and installing cement encased multiple duct conduit packages below grade as shown on the plans and as hereinafter described including all restoration work and materials necessary to replace the finished surface in-kind. Work shall progress continuously once excavation has commenced to reduce roadway closure time.

B. Materials

1. Conduit. Furnish and install DB-60 polyvinyl chloride (PVC) conduit. Conduit will be accepted on the basis of a Manufacturer’s Certificate of Compliance and WISDOT field inspection upon delivery to a project.

PVC conduit and fittings shall conform to the requirements of Standard Specifications for Smooth-Wall Poly (Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation, ASTM Designation: F512 (latest edition).

2. Conduit Spacers. Furnish and install nonmetallic Snap-Loc 4 x 1 base spacer (part number S288NFN) and intermediate spacer (part number S289NFN) manufactured by Carlon or engineer (City of Milwaukee) approved equal.

3. Conduit Bed. Furnish and install a minimum 2” conduit bed of stone chips or crushed stone screenings conforming to the following:

3/8 Inch Crushed Stone Chips	
Sieve Sizes	% Passing by Weight
1/2”	100
3/8”	90-100
No. 8	0-15
No. 30	0-3

Crushed Stone Screenings	
Sieve Sizes	% Passing by Weight
1/2”	100
No. 4	75-100
No. 100	10-25

4. Concrete. The type of concrete mix to be used to encase the ducts will be:

Type I Cement	280 lbs
Fly Ash	100 lbs
Sharp Torpedo Sand	3100 lbs
Water	35 gals
Chryso Air 260 or approved equal	2.0 ozs
Chryso Plast 209 or approved equal	7.0 ozs
Air	5%

Mix the materials to provide an approximate 3 inch slump

5. Slurry Backfill. Aggregate slurry backfill consists of No. 1 concrete aggregate Class 'C' concrete mix with the cement deleted.

Fly Ash (Class C)	75 lbs.
Concrete Sand (Damp)	1830 lbs.
No. 1 Concrete Aggregate	1830 lbs.

Mix the materials with water to inundate the aggregate sufficiently to provide an approximate 3 inch slump. Deposit the mix in the trench directly from a concrete transit mix truck.

6. Pull Rope. Pull rope specifications will be:

- Flat construction (7/16" to 5/8" wide)
- 100% woven aramid fiber (may include tracer wire)
- 1500 lbs. Minimum pull strength prelubricated
- sequential footage markings for location

7. Surface Restoration. Materials shall consist of 8-Inch concrete pavement in areas where the existing roadbed was removed, 31-inch concrete curb & gutter in areas where existing curb & gutter was removed, 5-inch sidewalk in areas where concrete sidewalk was removed, and 7-inch concrete driveway where existing driveway was removed. Four (4) inches of topsoil, seed, and mulch shall be used to restore areas where no hard surfaces as defined above were removed. All surface restoration shall conform to the requirements for the above bid items as defined in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2015 Edition.

For any questions on materials, contact Ms. Karen Rogney at (414) 286-3243.

C. Construction Method

1. Excavation. The excavation shall have the minimum or maximum dimensions shown on the plans and as follows:

No. of Ducts Wide	Minimum	Maximum
1	8 1/2"	11"
2	14 1/8"	16 5/8"
3	19 3/4"	22 1/4"
4	25 3/8"	27 7/8"
5	31"	33 1/2"
6	36 5/8"	39 1/8"
7	42 1/4"	44 3/4"
8	47 7/8"	50 3/8"

These minimum and maximum trench widths apply to standard 4 inch PVC electrical duct only. When required, the excavation may be widened for the handling and placing of materials. The cost of additional surface restoration shall be included in the unit bid for the work and will not be paid separately.

Sheath and brace open-cut trenches as required by code and as necessary to maintain safety. The cost of furnishing, placing and removing of sheathing and bracing shall be included in the unit bid for the work.

The dimensions of the excavation will be governed by the number, configuration and the grade (cover) to which the conduit is to be installed as shown on the plan. The walls of the excavation shall be clean and true.

Prior to excavating trenches, locate and mark the trench and place full depth sawcuts along each side. The cost of locating and sawcuts needed for excavation shall be included in the unit bid for the work.

Prior to excavating trenches, expose the existing manhole and conduit lines. The object of this is to permit adjustments in line and grade to avoid special construction methods. Protect the exposed manhole and conduit from damage.

Lay the conduit at a depth so that sufficient protection from damage is provided. Allowable covers shall be as follows:

The standard cover for mainline conduit is 39 inches and the minimum cover acceptable is 28 inches.

Maintain the standard cover wherever possible and any deviation less than the minimum cover requires the approval of the engineer.

Grade the trench to have a minimum pitch of three inches per 100 feet. When an obstruction is encountered in the trench and it is necessary to excavate a deeper trench than would otherwise be required, in order to obtain drainage, refer the matter to the engineer to determine whether the extra excavation should be made.

In grading a trench for mainline conduit, there are three general practices for direction of pitch.

(a) When grading a trench in a street with a level grade, the high point of the trench bottom should ordinarily be centered between manholes and pitched downward equally toward each manhole.

(b) Where the street slopes in one direction, locate the high point of the trench bottom approximately 30 feet from the end wall of the higher manhole and grade toward both manholes.

(c) Where a steep grade is encountered, grade the trench at the minimum pitch from the end wall of the higher manhole to a point 20 feet plus or minus toward the lower manhole. From this point, follow the street grade at the standard cover to a point 20 feet plus or minimum away from the end wall of the lower manhole. From this point, the remainder of the section shall be laid at the normal pitch.

After the rough excavation is completed, prepare the bottom of the trench to receive the conduit. Bring the duct bed to the final grade by grading uniformly from the high point to the low or drainage points. Use stone chips or crushed stone screenings to grade the trench. The duct bed shall be a minimum of 2" in depth.

2. Placing of Duct

Proceed with placing the ducts as soon as the duct bed has been completed. Inspect all ducts before placing to see that the bores are clean and free from mud, sand, etc. Use only ducts with a smooth bore, free from burrs, rough projections etc. Smooth off burrs or other rough areas likely to damage cable are found in the duct by rasping or scraping.

Place the duct on base spacers with the ends staggered so no two couplings are adjacent. This may be accomplished by the use of the short lengths in stock or cutting back full length sections to the desired lengths. If cut pieces are used, place the cut end at the manhole. Locate the base spacers within 2 feet of the end of each duct and one base spacer located in the middle of the duct.

Use full length pieces for the balance of the conduit line.

Formations of two ducts or more in height are to be carried forward in full formation, that is, as each tier of twenty foot lengths is laid, the next higher tier of ducts shall then be placed on the intermediate spacers. Place these intermediate spacers on top of the base spacers located within two feet from each duct end and one in the middle of each duct. Place the intermediate spacers and ducts for the remaining tiers. Glue each length into the adjoining coupling. A twist and push on the duct being placed will suffice for a water tight joint. Exercise caution in the driving operation, so that neither the coupling nor the duct will be split or damaged in any way. After the full formation has been completed, place wood trench and duct bracing on the ducts to prevent shifting or floating while the concrete envelope is being placed and during driving operation.

This procedure shall be followed with succeeding lengths, providing spacers at the proper intervals, until sufficient trench footage of completed formation has been placed and is ready to receive concrete encasement.

The terminating point for mainline conduit will be the inside manhole wall. Install a standard end bell fitting flush with the wall on all duct access points.

Install a #10 copper tracer wire along and above the centerline of the duct for encasement in the concrete. The wire shall be 4 feet longer than the run of conduit and be at least 2 feet long at each access point.

Install a pull rope in each run of conduit, as laid. The rope shall be 4 feet longer than the run of conduit and shall be doubled back at least 2 feet at each raceway access point. Anchor the pull rope at each access point in a manner acceptable to the engineer.

3. Concreting. Begin concreting after sufficient conduit has been laid and the trench and duct have been inspected. The minimum concrete encasement of the ducts is three (3) inches on the top, two (2) inches on the sides, and three (3) inches on the bottom. After placing, puddle the concrete with a splicing bar or similar tool so that complete duct encasement is accomplished. Remove wood braces used to keep the conduit from floating before the concrete sets completely and the resultant encasement voids filled with concrete.

Allow the concrete encasement to set for a minimum of 6 hours before backfilling is commenced.

4. Slurry Backfill. Commence backfilling of the conduit immediately after the duct has been inspected, approved and has set to withstand the load.

Use an aggregate slurry as specified to backfill all concrete encased conduit. Slurry backfill the trench to the proposed or existing subgrade. Deposit the in the trench directly from a concrete transit mix truck.

5. Surface Restoration. Commence restoration immediately after the aggregate slurry backfill has been placed to minimize work zone closures and disruptions to traffic. Protect all finished surfaces until all concrete has set and cured. Do not allow traffic on restoration areas until concrete surfaces have reached 3000 psi compressive strength. Three (3) concrete cylinders shall be cast for each concrete pour over traffic loaded areas and results shall be submitted to the engineer showing 3000 psi compressive strength has been achieved prior to opening to traffic. The cost of all restoration and concrete testing, including compressive strength tests needed for restoration shall be included in the unit bid item for this work.

Concrete Pavement 8-Inch Colored Red located in the East Wisconsin Street intersection is excluded from surface restoration and will be paid for under a separate bid item.

D. Measurement

The item 10-Duct, 8-Duct, 6-Duct, 5-Duct, 4-Duct, 3-Duct, 2-Duct and 1-Duct Cement Encased, 4-Inch Rigid Non-Metallic Conduit DB-60, furnished and installed at the locations on the plans, will be measured by the linear foot acceptably installed. The measured quantity will equal the linear feet of encased duct, based on the distance along the centerline of duct between ends of conduit. City of Milwaukee shall have final acceptance.

E. Payment

The department will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.01	14-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.02	10-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.03	8-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.04	6-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.05	4-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.06	3-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.07	2-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF
SPV.0090.08	1-Duct Conduit Cement Encased 4-Inch Conduit DB-60	LF

Payment is full compensation for furnishing the conduit, conduit bodies, conduit fittings, conduit spacers, end caps and trace wire; for locating, marking, and saw cutting existing pavement; for removing asphalt and concrete pavement, excavating, bedding material, encasement and backfilling including concrete, stone, aggregate slurry, bracing, or other related materials; for replacing the restored finished surface in-kind including all concrete pavement, curb and gutter, sidewalk, or other restoration materials; for disposing of surplus materials; and for making inspections, for installing the conduit, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

26. Sidewalk Bollard Type A 36-Inch (DS-22 Design), Item SPV.0105.01.

A Description

This special provision describes furnishing and installing a reinforced crash rated concrete sidewalk bollard system.

B Materials

B.1 General

Sidewalk bollard system shall include ten (10) DS-22 rated 36-Inch Sidewalk Bollards with a K-12 Crash Rating connected in a series. The bollard design shall use a high strength concrete filled steel pipe that is cast-in-place using a 4-ft deep reinforced foundation. This bollard system shall conform to all manufactures specifications.

Product specified is “DS-22 Bollard” as manufactured by SecureUSA, Inc.; 4250 Keith Bridge Road; Cumming, Georgia 30041; phone 888-222-4559; fax 770-889-7939; website www.SecureUSA.net or approved equal. Items specified are to establish a standard of quality for design, function, materials, and appearance. The engineer will be the sole judge of the evaluation of any equivalent products. Products shall be field-tested and certified by the Department of State (DOS).

B.2 Submittals

B.2.1 Field Measurements

Take field measurements prior to fabrication of the work and preparation of shop drawings, to ensure proper fitting of the work. Show recorded measurements on final shop drawings. Notify the City, in writing, of any dimensions found which are not within specified dimensions and tolerances in the Contract Documents, prior to proceeding with the fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the work.

B.2.2 Shop Drawings

Shop drawings shall conform to the contract plans and consist of shop detail, erection and other working plans and include computations demonstrating crash ratings, dimensions, sizes of material, including the dimensional properties of all rolled shapes, details and other information necessary for completely fabricating and erecting metal work. Each sheet of the shop drawings shall carry the project and the structure numbers and shall be sealed by a professional engineer licensed in the State of Wisconsin practicing in the structural engineering field.

The contractor shall submit to the engineer, for placing on file before commencing fabrication, one set of shop drawings that the contractor has had sealed by a professional engineer licensed in the State of Wisconsin and practicing in the structural engineering field. In addition, provide two (2) sets to the City or its designee and one (1) set to the City’s representative for inspection purposes. Only then may fabrication begin without awaiting the results of any review the engineer may make. The engineer may refuse prints of shop drawings not clear and legible. If the engineer requests, submit one additional copy

of drawings for review. After review, the contractor shall furnish as many copies of shop drawings as required.

The shop drawings become a part of the contract, provided any differences between sections on shop drawings and sections the plans show are made only if the engineer approves and if the substitution is made at no additional expense to the City or its designee.

After initial submittal and review, make no deviation from the shop drawings or changes to them without a licensed professional engineer in the State of Wisconsin and practicing in the structural engineering field's further review.

The engineer's review of shop drawings means only a review of the character and sufficiency of the details and does not relieve the contractor from responsibility in regard to errors or omissions on those drawings.

Submit materials related to metal and wood of size, color, and finish for engineer's approval. Samples shall be sized accordingly for architect to provide accurate review and approval.

B.2.3 Product Data Sheet

Submit product data sheet showing material proposed. Submit sufficient information to determine compliance with manufacturer's drawings and specifications.

B.2.4 Quality Control Submittals

Include structural analysis data signed and sealed by a professional engineer licensed in the State of Wisconsin and practicing in the structural engineering field for installed products designated to comply with specific design loadings.

B.2.5 Warranty Data

Submit manufacturer's warranty documents. Submit letter of certification from the manufacturer, signed by the Contractor and the Installer, stating that the work was provided in compliance with the Contract Documents and that the installation was proper for the conditions of application and use, and resulted in the work being installed to comply with the performance characteristics specified.

The Contractor shall warrant the work to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period of one year. The warranty shall be countersigned by the installer.

B.3 Quality Assurance

Installer shall be a firm that shall have a minimum of five (5) years of successful installation experience with projects utilizing sidewalk bollards similar in type and scope to that required for this project, and shall be approved by the manufacturer.

Qualify welding processes and welding operators in accordance with AWS stand qualification procedures.

Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

At the start of the installation, periodically as work progresses, and after completion, furnish the services of the manufacturer's certified representative at the job site as necessary to advise on every phase of work.

Prior to commencing the installation, meet at the project site to review the material selections, installation procedures, and coordination with other trades. At a minimum, the Contractor, the installer, the manufacturer's certified representative, and any trade that requires coordination with the work shall be present. The Contractor shall notify the engineer of the date and time of this meeting a minimum of three (3) business days in advance.

Obtain sidewalk bollards and required accessories from a single source with resources to produce products of consistent quality and appearance and physical properties without delaying the work and without affecting the performance characteristics of the work. Any materials which are not produced by the manufacturer shall be acceptable and approved by the manufacturer.

B.4 Delivery, Storage, Handling

Deliver materials to the project site in original wrappings and containers, labeled with suppliers or manufacturer's name, material or product brand name, and lot number, if any.

Manufacturer's recommended measures shall be taken to prevent damage to the materials during shipment. Measures shall be of sufficient structural integrity to enable the assembly to be lifted and transported by overhead crane or forklift.

Upon receipt to the site, materials shall be checked to ensure that no damage occurred during shipping or handling.

Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

B.5 Components, Materials and Procedures

Materials shall conform to the manufacturer's specifications or as listed below.

1. Steel Pipes: ASTM A 53/A 53M, A 500B/C, A 106B
2. Welding Electrodes: AWS A5.1 or AWS A5.5 E-7-XX.
3. Shear Studs: ASTM A 108 and AWS D1.1

4. Welding: Quality assurance and personnel according to AWS D1.1. Certify each welder has satisfactory passed the AWS qualifications.
5. Concrete:
 - a. Concrete shall conform to AACI 318/318M unless noted otherwise. Concrete shall be normal weight, 4000 psi (27.58 MPa) at 28 days with maximum water/cement material ratio of 0.50. Maximum slump for concrete shall be 5 inches (127 mm) at point of placement.
 - b. Unless noted, cement shall conform to ASTM C 150, Type I or Type II. Aggregates shall be normal weight conforming to ASTM C 33. Maximum size of aggregate shall be 1.5 inches (38 mm).
 - c. Concrete shall be air-entrained in accordance with ACI 318/318M, Table 4.2.1.
 - d. Concrete shall include, but shall not be limited to, a corrosion inhibitor complying with ASTM C 494, Type C at a dosage of 1.5 times the minimum recommended by the manufacturer.
 - e. Concrete shall include, but shall not be limited to, Forta Ferro Synthetic Fiber manufactured by Forta Corp., complying with ASTM C 1116/C 1116M at a dosage of 5 pounds per cubic yard (80.1 kg/m³), placed per manufacturer's recommendations.
6. Reinforcing Steel:
 - a. Reinforcing steel shall conform to ASTM A 615/A 615M, Grade 60 (Grade 420) (60,000psi [413.7 MPa])
 - b. Epoxy-coated reinforcing steel shall comply with ASTM A 775/A 775M.
 - c. Welded deformed wire fabric (WDWF) shall conform to ASTM A 496 and ASTM A 497, Grade 80.

B.6 Bollards

Bollards shall be a below-grade assembly containing a heavy steel cylindrical weldment that shall present an obstacle to approaching vehicles. Upon impact, forces shall be first absorbed by the weldment and then transmitted to the foundation of the unit.

1. Bollard Height: Height of the bollard shall be 36 inches (914 mm) as measured from the top of the sidewalk to the top of the bollard assembly with a decorative sleeve installed.
2. Bollard diameter dimension:
 - K12 = 10 in (254 mm)
3. Bollards Architectural Enhanced Decorative Outer Sleeves: Bollards shall have a decorative sleeve containing one (1) reveal. Sleeve size shall match bollard height and shall have recommended outside diameter to match bollards as manufactured by SecureUSA.

B.7 Fabrication

Manufactured parts shall be shop-welded and cleaned to specifications. Bollards or sleeves shall be coated with the specified color.

1. Steel Structure: The bollard shall be coated for corrosion protection in accordance with the manufacturer's written recommendations.

2. Architectural Enhancement: Standard aluminum decorative outer covers shall be powder coated. Highlight colors shall be of equivalent quality.
3. Custom Architectural Enhancement: Outer covers shall be finished in accordance with approved specified drawings.

B.8 Finishes

All architectural enhanced decorative sleeves shall have a brushed stainless steel surface. Verify the finish with the engineer prior to ordering.

C Construction

C.1 Examination

C.1.1 Verifications of Conditions

Examine areas and conditions under which the work is to be installed, and notify the contractor in writing, with a copy to the engineer and the Owners representative, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

Beginning the work shall indicate acceptance of the areas and conditions as satisfactory by the installer.

C.2 Preparation

Indicate the location of the bollards. Indicate all underground utility locations, benchmarks, property monuments, and other underground structures.

Traffic shall be controlled around the work zone for safety purposes.

Final grades and installation conditions shall be examined to verify compliance with manufacturer's written installation recommendations.

C.3 Installation

C.3.1 General

Install sidewalk bollards in accordance with reviewed product data sheets, final approved shop drawings, manufacturer's written instructions, and as indicated on the drawings.

The bollards shall be cast-in-place. The center of the bollard shall be located no less than 24 inches from the face of curb.

The excavation for the foundation shall be common for all bollards. A common foundation shall provide the strongest system. The foundations shall be as shown on the drawings or as recommended by the manufacturer.

If the sidewalk is not level, the bollard shall always stay vertical. The appearance factor shall be considered and all bollards shall be in line.

Before concrete placement, the bollard shall be checked for vertical and horizontal alignment.

C.3.2 Corrosion

Occasionally a site is both wet and unfriendly, i.e., either highly acidic or basic. The manufacturer will review specific job locations and make suitable recommendations where such protection is needed.

C.3.3 Concrete

C.3.3.1 General

Contractor shall use materials and employ construction methods in order to comply with the drawings. The contractor shall inform the engineer in writing of any specific deviations and obtain the engineers written acceptance for the specific deviation. The Contactor shall verify and shall be responsible for dimensions and conditions at the job site.

C.3.3.2 Foundations

Foundation concrete may be placed directly into neat excavations, provided the sides of the excavation are stable. Where caving occurs, provide shoring. Type and method of shoring shall be at the Contractor's option.

The excavation shall be kept dry at all times. Ground water, if encountered, shall be pumped from the excavation.

Subgrade shall be uniformly compacted to at least 90 percent of the standard proctor maximum dry density.

C.3.3.3 Concrete

Hot weather concrete placement shall comply with ACI 305R. Cold weather concrete placement shall comply with ACI 306R.

Concrete curing shall comply with ACI 308.

Concrete shall be consolidated and shall comply with ACI 309R.

Provide spacer bars, chairs, spreaders, blocks, etc., as required to positively hold the steel in place. Dowels shall be firmly wired in place before concrete is poured.

Concrete shall be conveyed from the mixer to final deposit by methods that shall prevent separation or loss of materials. Troughs, buckets or the like may be used to convey concrete. In no case shall concrete be allowed to free drop more than 5 feet (1524 mm).

Concrete shall be thoroughly consolidated by suitable means during placement and shall be thoroughly worked around reinforcement, embedded fixtures, and into corners of forms.

Where exterior wall face requires shoring and/or forming, the forms shall be substantial and sufficiently tight to prevent leakage. Backfilling shall be done by depositing and tamping into place clean sand or pouring lean concrete. Water jetting shall not be allowed.

Construction joints not indicated on the Drawings shall not be allowed. Where a construction joint is to be made, the surface of concrete shall be thoroughly cleaned and laitance and standing water removed.

The Contractor shall be responsible for the protection of adjacent areas against damage and shall repair or patch damaged areas to match existing improvements.

C.3.3.4 Reinforcing Steel

Conform to ASTM A-615.

C.4 Cleaning

Contractor shall keep the construction area clean and at completion of work remove surplus materials, equipment, and debris and leave the premises in a clean condition acceptable to the engineer.

C.5 Protection

Provide final protection and maintain conditions in a manner acceptable to the Installer that ensure the sidewalk bollards shall be without damage at time of Substantial Completion.

The bollards shall be placed no less than 24-Inches from the face of curb. Bollards shall be installed at a 54-Inch spacing from center to center.

D Measurement

The department will measure Sidewalk Bollard Type A 36-Inch, as a single lump sum unit for all work associated with designing and constructing the bollards, acceptably complete.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.01	Sidewalk Bollard Type A 36-Inch	LS

Payment is full compensation for providing all materials for sidewalk bollards Type A including concrete and steel reinforced foundation; for furnishing all bollard sleeves; for engineering services; for any required manufacturer supervision; for surveying; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

27. Survey Project, Item SPV.0105.02.

A Description

Perform this work according to standard spec 105.6 and standard spec 650 and as hereinafter provided.

Standard spec 105.6 and 650 are modified to define the requirements for construction staking for this contract.

Replace standard spec 105.6.2 with the following:

The City will not perform any construction staking for this contract. The contractor shall perform all survey required to layout and construct the work under this contract, subject to the engineer's approval.

The survey includes establishing horizontal and vertical position for all aspects of construction including but not limited to subgrade, base aggregate, concrete pavement, curb, gutter, curb and gutter, sidewalk, cross walks, decorative sidewalk, sidewalk and other concrete jointing, conduit, manholes, pull boxes and vaults, bollard layout, site furniture, irrigation system, electrical installations, supplemental control, traffic control, pavement marking, etc.

The City may choose to perform quality assurance survey during construction. The quality assurance survey does not relieve the contractor of the responsibility for furnishing all survey work required under this contract.

Delete standard spec 650.1 of the standard specifications.

B Materials (Vacant)

C Construction

C.1.1 Verifications of Conditions

Survey required under this item shall be in accordance to all pertinent requirements of section 650 of the standard specifications and shall include all other miscellaneous survey required to layout and construct all work under this contract.

D Measurement

The department will measure Survey Project, as a single lump sum unit for all work associated with survey, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.02	Survey Project	LS

Payment is full compensation for performing all survey work required to layout and construct all work under this contract and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

28. Irrigation System, Item SPV.0105.03.

A Description

This special provision describes furnishing and installing an irrigation water service and related appurtenances for irrigation as shown on the Drawings along the south side of East Michigan Street and as hereinafter provided.

Prior to any work taking place the contractor shall contact City of Milwaukee irrigation coordinator Mr. James Kringer at 414-708-2428 or James.kringer@milwaukee.gov

Design and install an irrigation system for the three planters located in front of the 833 East Michigan Street building. The irrigation system will be connected to the existing water main on the north side of East Michigan Street by others as part of a future contract.

B Materials

B.1 Copper Pipe & Fittings

Copper tubing shall be "soft annealed" and shall conform to the standards for "Type K," prescribed in ANSI/AWWA C800-89 Section A.2 for "Copper Water Tubing" and to ASTM, designation B42 and B88-99, and current revisions thereof.

It shall be free from grooving cracks, indentations, flaws or other defects. At intervals of not greater than one and one-half feet, the tubing shall bear clear, permanent markings indicating the type and manufacturer.

"Flared" type fittings shall be used.

Unions shall be extra heavy three-part unions. Each fitting shall bear a clear, permanent marking indicating the manufacturer. Fittings shall be of cast brass meeting the requirements of ASTM B62. They shall be well made to assure uniformity in wall thickness and strength and shall be free from any defect which may affect their serviceability.

B.2 Service Saddle

Service saddle shall be bronze with AWWA taper thread, double strap, and conforming to Milwaukee Water Works Specification No. 30-B-9c (Mueller Co. or equal).

B.3 Corporation Stop

Corporation stop shall be a ball valve stop with inlet AWWA taper thread, outlet copper flare connection, and conforming to Milwaukee Water Works Specification No. 30a-C-3 (Mueller Co. or equal).

B.4 Curb Stops

Curb stops shall be ball curb valves with copper flare nut connections, quarter turn check, and conforming to Milwaukee Water Works Specification No. 30a-C-6 (Mueller Co. or equal).

B.5 Service Box

Service Box shall be a cast iron box of “Buffalo Pattern” design, adjustable screw type, and conforming to Milwaukee Water Works Specification No. 30-C-1 (Tyler Union or equal).

B.6 Galvanized Steel Piping & Fittings

Galvanized Steel Piping shall be thoroughly zinc coated (galvanized), Schedule 40 or heavier.

All fittings shall be rated 125 psi or greater.

B.7 Gate Valves

Gate valves shall be solid wedge disc bronze valves rated for 125 psi standard working pressure. Valves shall have a non-rising stem and threaded bonnet (Milwaukee Valve or equal).

B.8 Atmospheric Vacuum Breaker

RPZ Atmospheric Vacuum breaker shall be pipe applied vacuum breaker conforming to ASSE 1001. Body shall be brass and rated for 125 psi standard working pressure (Watts or equal). Place RPZ in aluminum enclosure sized for the RPZ. Use a WS Series enclosure by Watersafe or approved equal.

B.9 Irrigation Valve Box and Cover

Valve box and cover shall be made of heavy duty plastic design. Size shall be “Jumbo”. Cover and box shall be green.

B.10 Precast Vault, Frame, and Lid

Precast vaults shall be 4’-0” inner diameter and conform to WISDOT Type 1 precast manholes. Frame and lid shall be WISDOT Type “L”.

B.11 Bedding and Backfill Materials

Bedding and backfill materials shall conform to Milwaukee Water Works Water Service Piping Specifications and City of Milwaukee Water Main Installation Specifications. Backfill for piping that is below vegetated areas and has less than 24” cover shall be bedding sand.

B.12 Winterization Blowout

Provide a 1” blowout after the curb stop, bring to surface, cap with a threaded plug. Place in 12” rectangular valve box.

B.13 Polyethylene Wrap

Copper services shall be covered with a polyethylene envelope for a distance of six feet from the connection to the public water main along the service pipe.

Polyethylene film shall be manufactured and tested in accordance with AWWA C105/A21.5 and:

1. Polyethylene wrap shall be Class “C” (black).

2. The polyethylene envelope shall be free of gels, streaks, pinholes, particles of foreign matter, and undispersed raw materials. There shall be no visible defects such as holes, tears, blisters, or thinning out at folds.
3. The tape shall be thermoplastic material with pressure sensitive adhesive face.

B.14 Pipe Location Materials

Mark all non-conductive lateral pipes with a locating wire system.

Locating wire system consists of the following:

1. Tracer Wire: 45-mil solid copper, No. 12 HMW-PE yellow jacket coating. Install to enable electronic locating of underground utility.
2. Tracer Wire Locating Box: 2-1/2-inch diameter, minimum, ABS pipe with 2 point terminal box and cast iron cover.
Manufacturer: Valco, Inc. Model C.P. Mini Box, or an approved equal.

C Construction

Coordinate all construction with the City of Milwaukee Water Works. The contractor shall supply and install all materials for the irrigation service and cap the end under the roadbed for connection under a future contract.

The City will supply and install the water meter under a future contract.

Construct new valve manhole, if necessary, in accordance with Part III of the Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Edition, except where amended by these special provisions and the plans.

The locations of the irrigation services shown on the drawings are general in nature. The contractor shall provide all fittings and piping as necessary to construct the water services.

Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil. Support all utilities that are exposed due to trenching and excavations. Provide excavation dewatering as needed to facilitate construction.

Coordinate irrigation service construction with landscape planting and other site work.

Protect the end cap prior to backfilling while using a method approved by the engineer.

Locate the finished end cap in the field prior to backfilling using surveyed coordinates and provide to the engineer for use on a future contract.

D Measurement

The department will measure Irrigation System, as a single lump sum unit for all work included as part of the irrigation system, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.03	Irrigation System	LS

Payment is full compensation for performing all work required to design, layout and construct an irrigation system and related appurtenances for three planters and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

29. Concrete Sidewalk 3-Inch Colored Gray, Item SPV.0165.01.

A Description

This special provision describes constructing decorative sidewalks in accordance to the lines, dimension, elevations and details as shown on the plans and provided in the contract.

B Materials

B.1 Concrete

Conform to section 501 of standard specification and as follows:

Integrally color the concrete using non-fading pigments conforming to ASTM C979.

Use “Landmarks Gray #2543” color as manufactured by LM Scofield Company; 1652 E Main St, St. Charles, IL 60174; phone 630-377-5959. Product will be a Chromix Admixture for Color-Conditioned Concrete and cured with Lithochrome Colorwax.

Add integral concrete coloring according to manufacturer’s instructions. Provide to the engineer a copy of the manufacturer instructions before producing material for incorporation into the work.

Maintain mix characteristics for all colored concrete requiring a matching finish. Use the same source, brand, type, and color of Portland cement, supplementary cementitious materials, aggregates, and admixtures for colored concrete throughout the project. Use constant cement content, supplementary cementitious material content and water/cement materials ratio in the concrete mix to maintain consistent color.

B.2 Concrete Curing

Supply a liquid membrane-forming clear curing compound conforming to ASTM C1315, type 1.

B.3 Admixtures

Furnish admixtures designed for use with and compatible with colored concrete pigments. Do not use calcium chloride or other admixtures containing chlorides.

B.4 Mix Approval

Obtain engineer approval for colored concrete mixes before placing colored concrete. The engineer will base approval either on a successful performance history or on trial batches. Upon engineer approval, the submitted sample panel or the test slab will be the visual quality standard for finished work under the contract.

B.4.1 Performance History

Provide documentation from a previously completed site development project that incorporated colored concrete sidewalk. Provide the following to the engineer for review and approval:

1. Project Info: Project ID, Client, Location, Contact Information
2. Mix proportions: quantities per cubic yard expressed as SSD weights and net water, water to cementitious material ratio, air content, and 28-day or earlier compressive strength.
3. Materials: type, brand, and source.
4. Sample panel: Provide a finished colored concrete sample from the previous project having minimum dimensions of 2-foot by 2-foot by 1.5-inch.

B.4.2 Trial Batch

Perform preliminary laboratory and/or field trial batching to establish the mix proportions necessary to meet the final concrete characteristics.

Produce test panels to demonstrate the typical texture, surface finish, color, and color intensity. Notify the engineer seven (7) days in advance by providing the dates and times for test panel construction.

Place and finish a 6-foot by 6-foot by 3-inch colored concrete test panel at an engineer-determined location on the project using processes and techniques intended for use on permanent work including curing procedures. Produce test panels using the same workers who will perform the contract work. Retain samples of cement, sands, aggregates, and color additives used in test panels for comparison with materials used in remaining contract work. Use at least a 2-cubic yard batch to produce the test panel to accurately represent the desired color and color intensity.

Acceptance of the test panel will be determined by the engineer. Submit final mix design information to the engineer including specific sources and, if applicable, trade names for materials.

C Construction

Construct colored concrete in accordance to section 602 of the standard specifications and conforming to the contract specifications under the associate bid items and provided herein.

C.1 Preparing the Foundation

Remove all materials, foreign debris, and sediment from areas that decorative concrete will be in contact with. Clean all corners and edges of adjacent full depth concrete sidewalk which colored concrete will be poured against.

Cover or otherwise protect adjacent concrete work from discoloration and spillage while placing and curing colored concrete. Remove and replace discolored concrete as directed by the engineer.

Remove test slabs not permanently incorporated into the work and restore the site after the engineer determines the test slab is no longer needed.

C.2 Forms

Furnish and use wood or metal forms of sufficient strength to resist springing, tipping, or other displacement during depositing and consolidating the concrete. If using wood forms, provide surfaced planks, at least 2-inch nominal thickness stock except for sharply curved sections. If using metal forms, insure they are the engineer-approved sections with a flat surface on top. Use forms as deep as the depth of the sidewalk. Securely stake, brace, and hold the forms firmly to the required line. Make forms tight to prevent mortar leakage. Clean and oil before placing concrete against them. Secure curved forms to previously placed concrete base using drilled anchors or an acceptable method as approved by the engineer.

C.3 Placement

Place colored concrete in accordance to section 602 of the standard specifications and conforming to the contract specifications under the associate bid items and provided herein.

The engineer will check and approve the foundation, forms, and reinforcement, if required, before placing the concrete.

Produce consistent colored concrete mixes. Once colored concrete placement has started, the engineer will not allow variations in the amounts, types, or source of materials with the exception of minor adjustments of water and air-entraining agent as necessary. Other changes require the contractor to repeat the mix approval process.

Colored concrete mixes for matching colored items shall be consistent. If the contractor chooses to provide the mixes with high early strength concrete, then all colored concrete for matching colored items shall be provided as high early strength concrete.

Schedule colored concrete placement to minimize exposure to rapid drying conditions, wind and full sun, before curing materials are applied. Do not place colored concrete if rain, snow, or freezing temperature is forecast within 24-hours. Do not place colored concrete on surfaces unless the ambient temperature of that surface is at least ten degrees above freezing temperatures. Utilize blankets, tents, heaters, and other approved methods to prevent all surfaces below the colored concrete from freezing.

Perform finishing operations consistently to avoid discoloration in the finished colored concrete. Do not begin finishing until bleed water has left the surface. Addition of surface water for aiding in finishing (often referred to as blessing the concrete) is not allowed. If

water is added to the surface of the colored concrete once concrete is in place, the engineer will reject the colored concrete. During final finishing and texturing, apply all strokes in the same direction.

All joints shall be hand tooled utilizing a skilled workmanship unless called out otherwise on the plans.

Cure colored concrete in accordance to section 415.3.12 of the standard specifications, using the impervious coating or impervious sheeting method. Protect colored concrete from premature drying and excessive cold or low temperatures by prompt application of curing material. Do not allow plastic sheeting to come in contact with colored concrete.

Protect the colored concrete from damage. Do not permit construction traffic or material storage on the colored concrete. Exclude other foot traffic from colored concrete for at least 24-hours after placement.

D Measurement

The department will measure Concrete Sidewalk 3-Inch Colored Gray in area by the square foot acceptably completed, measured as the vertical area within the pay limits the contract plans show.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.01	Concrete Sidewalk 3-Inch Colored Gray	SF

Payment is full compensation for providing all material, including concrete, pigment, reinforcement, and expansion joints; for preparation of foundation; for placing, finishing, and hand tooling joints, protecting, and curing; for maintaining appropriate temperatures throughout the project; and restoring the work site including the area of curb ramp.

30. Concrete Pavement 8-Inch Colored Red, Item SPV.0165.02.

A Description

This special provision describes replacing existing decorative colored concrete pavement located in the intersection of East Wisconsin Street in accordance to the lines, dimension, elevations and details as shown on the plans and provided in the contract.

B Materials

B.1 Concrete

Conform to section 501 of standard specification and as follows:

Integrally color the concrete using non-fading pigments conforming to ASTM C979.

Contact the City of Milwaukee for color and stamp information in order to match the existing pavement.

Add integral concrete coloring according to manufacturer's instructions. Provide to the engineer a copy of the manufacturer instructions before producing material for incorporation into the work.

Maintain mix characteristics for all colored concrete requiring a matching finish. Use the same source, brand, type, and color of Portland cement, supplementary cementitious materials, aggregates, and admixtures for colored concrete throughout the project. Use constant cement content, supplementary cementitious material content and water/cement materials ratio in the concrete mix to maintain consistent color.

B.2 Concrete Curing

Supply a liquid membrane-forming clear curing compound conforming to ASTM C1315, type 1.

B.3 Admixtures

Furnish admixtures designed for use with and compatible with colored concrete pigments. Do not use calcium chloride or other admixtures containing chlorides.

B.4 Mix Approval

Obtain engineer approval for colored concrete mixes before placing colored concrete. The engineer will base approval either on a successful performance history or on trial batches. Upon engineer approval, the submitted sample panel or the test slab will be the visual quality standard for finished work under the contract.

B.4.1 Performance History

Provide documentation from a previously completed site development project that incorporated colored concrete sidewalk. Provide the following to the engineer for review and approval:

5. Project Info: Project ID, Client, Location, Contact Information
6. Mix proportions: quantities per cubic yard expressed as SSD weights and net water, water to cementitious material ratio, air content, and 28-day or earlier compressive strength.
7. Materials: type, brand, and source.
8. Sample panel: Provide a finished colored concrete sample from the previous project having minimum dimensions of 2-foot by 2-foot by 1.5-inch.

B.4.2 Trial Batch

Perform preliminary laboratory and/or field trial batching to establish the mix proportions necessary to meet the final concrete characteristics.

Produce test panels to demonstrate the typical texture, surface finish, color, and color intensity. Notify the engineer seven (7) days in advance by providing the dates and times for test panel construction.

Place and finish a 6-foot by 6-foot by 3-inch colored concrete test panel at an engineer-determined location on the project using processes and techniques intended for use on permanent work including curing procedures. Produce test panels using the same workers who will perform the contract work. Retain samples of cement, sands, aggregates, and color additives used in test panels for comparison with materials used in remaining contract work. Use at least a 2-cubic yard batch to produce the test panel to accurately represent the desired color and color intensity.

Acceptance of the test panel will be determined by the engineer. Submit final mix design information to the engineer including specific sources and, if applicable, trade names for materials.

C Construction

Construct colored concrete in accordance to section 602 of the standard specifications and conforming to the contract specifications under the associate bid items and provided herein.

C.1 Preparing the Foundation

Remove all materials, foreign debris, and sediment from areas that decorative concrete will be in contact with. Clean all corners and edges of adjacent full depth concrete pavement which colored concrete will be poured against.

Cover or otherwise protect adjacent concrete work, if applicable, from discoloration and spillage while placing and curing colored concrete. Remove and replace discolored concrete as directed by the engineer.

Remove test slabs not permanently incorporated into the work and restore the site after the engineer determines the test slab is no longer needed.

C.2 Forms

Furnish and use wood or metal forms of sufficient strength to resist springing, tipping, or other displacement during depositing and consolidating the concrete. If using wood forms, provide surfaced planks, at least 2-inch nominal thickness stock except for sharply curved sections. If using metal forms, insure they are the engineer-approved sections with a flat surface on top. Use forms as deep as the depth of the sidewalk. Securely stake, brace, and hold the forms firmly to the required line. Make forms tight to prevent mortar leakage. Clean and oil before placing concrete against them. Secure curved forms to previously placed concrete base using drilled anchors or an acceptable method as approved by the engineer.

C.3 Placement

Place colored concrete in accordance to section 602 of the standard specifications and conforming to the contract specifications under the associate bid items and provided herein.

The engineer will check and approve the foundation, forms, and reinforcement, if required, before placing the concrete.

Produce consistent colored concrete mixes. Once colored concrete placement has started, the engineer will not allow variations in the amounts, types, or source of materials with the exception of minor adjustments of water and air-entraining agent as necessary. Other changes require the contractor to repeat the mix approval process.

Colored concrete mixes for matching colored items shall be consistent. If the contractor chooses to provide the mixes with high early strength concrete, then all colored concrete for matching colored items shall be provided as high early strength concrete.

Schedule colored concrete placement to minimize exposure to rapid drying conditions, wind and full sun, before curing materials are applied. Do not place colored concrete if rain, snow, or freezing temperature is forecast within 24-hours. Do not place colored concrete on surfaces unless the ambient temperature of that surface is at least ten degrees above freezing temperatures. Utilize blankets, tents, heaters, and other approved methods to prevent all surfaces below the colored concrete from freezing.

Perform finishing operations consistently to avoid discoloration in the finished colored concrete. Do not begin finishing until bleed water has left the surface. Addition of surface water for aiding in finishing (often referred to as blessing the concrete) is not allowed. If water is added to the surface of the colored concrete once concrete is in place, the engineer will reject the colored concrete. During final finishing and texturing, apply all strokes in the same direction.

Cure colored concrete in accordance to section 415.3.12 of the standard specifications, using the impervious coating or impervious sheeting method. Protect colored concrete from premature drying and excessive cold or hot temperatures by prompt application of curing material. Do not allow plastic sheeting to come in contact with colored concrete.

Protect the colored concrete from damage. Do not permit construction traffic or material storage on the colored concrete. Exclude other foot traffic from colored concrete for at least 24-hours after placement.

D Measurement

The department will measure Concrete Pavement 8-Inch Colored Red in area by the square foot acceptably completed, measured as the vertical area within the pay limits the contract plans show.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.02	Concrete Pavement 8-Inch Colored Red	SF

Payment is full compensation for providing all material, including concrete, pigment, reinforcement, and expansion joints; for preparation of foundation; for placing, stamping, finishing, and placing joints, protecting, and curing; for heating, covering the subgrade, tenting, or blankets required to maintain the required placement temperature; for maintaining appropriate temperatures throughout the project; and restoring the work site including the area of curb ramp.

31. Sand-Set Granite Paver, Item SPV.0165.03.

A Description

This special provision describes installing the granite pavers and paver setting bed; cutting of the pavers to fit; setting the granite pavers as shown on the plans; and providing geotextile fabric and joint compound as shown on the drawings, and as hereinafter provided.

B Materials

B.1 Reference

ASTM International (American Society for Testing and Materials)

- ASTM C33 - Specification for Concrete Aggregates.
- ASTM C136 - Method for Sieve Analysis for Fine and Coarse Aggregate
- ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
- ASTM C144 - Specification for Aggregate for Masonry Mortar.
- ASTM C936 - Specification for Solid Concrete Interlocking Paving Units.
- ASTM C979 - Specification for Pigments for Integrally Colored Concrete.
- ASTM C1645 - Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Interlocking Paving Units.

B.2 Delivery, Storage and Handling

The Sand-Set Granite Pavers will be procured by the City of Milwaukee and delivered to the project site. The Contractor shall unload the material from the delivery vehicle, store the material in a safe place as designated on site, and handle the material according to the manufacturer's instructions. After inspection, the materials should remain in the manufacturer's original, undamaged containers and packaging with identification labels intact. Coordinate unloading, storage, and paving schedule to minimize interference with normal use of buildings adjacent to paving. Granite pavers shall remain in steel banded, plastic banded or plastic wrapped packaging capable of transfer by forklift or clamp lift. Unload pavers at project site in such a manner that no damage occurs to the granite pavers.

Store materials protected such that they are kept free from mud, dirt, and other foreign materials. Store granite paver cleaners and sealers in accordance with manufacturer's instructions. Cover joint sand with waterproof covering if needed to prevent exposure to rainfall or removal by wind. Secure the covering in place.

B.3 Extra Materials:

Provide any remaining additional granite paver material on pallets and covered with stretch wrap for use by the City of Milwaukee for maintenance and repair as attic stock. Extra pavers to be from the same production run as installed materials. Store extra paver materials at location designated by Michael Loughran, City of Milwaukee Engineer, at (414) 286-3304.

B.4 Project Site Conditions

Begin placing sand bed and granite pavers after the concrete base has cured for a minimum of 48-hours. Do not run construction equipment on concrete base that has not cured for seven (7) days. Inform engineer a minimum of three (3) days in advance of commencing granite paver work.

Sand setting bed and granite pavers shall not be installed between November 1 and March 1 without prior written approval by the engineer. Any work completed during this timeframe without written approval is at contractor's risk and may be subject to rejection. Do not install during heavy rain or snowfall or over frozen base material or aggregate. If granite pavers are placed during cold weather, maintain an ambient temperature above 40 degrees Fahrenheit for the concrete base, sand bed and granite pavers during installation. Protect unpaved bed area from washing away if precipitation is forecasted.

Coordinate installation of granite pavers with Tim Gasperetti with Irgens at (414) 750-9822 or his designee. Granite pavers shall be cut and placed around the revolving entrance door for the 833 East Michigan Street building. Coordinate placement with Irgens contractor inside of revolving door so that the granite pavers are seamless throughout the glass entrance doors.

B.5 Granite Paver System

Granite pavers will be product name Silver Cloud manufactured by North Carolina Granite Corporation; PO Box 151; Mount Airy, NC 27030; phone 1-800-227-6242; website www.ncgranite.com. Granite pavers will be quarried from Georgia as specified by the manufacturer.

Granite paver will be manufacturer specified color Light Gray with a medium to fine grain and rated for outdoor use. Pavers will have a nominal size of 12-inches by 24-inches by 2-inches thick. Pavers shall be free of cracks, seams, or starts which may impair the structural integrity, function, or aesthetics prior to cutting or placement.

Pavers used will conform to the following requirements set forth in ASTM C936. Measured length or width of test specimens shall not differ by more than +/- 0.063-inches, while measured thickness shall not differ by more than +/- 0.125-inches. Average compressive strength shall be 8,000-psi with no individual unit under 7,200-psi when tested in accordance with ASTM C140. Average absorption shall be five (5) percent with no unit greater than seven (7) percent when tested in accordance with ASTM C140. For freeze-thaw testing, the average mass loss of all specimens tested shall not be greater than (a) 225-g/m² when subject to 28 freeze thaw cycles, or (b) 500-g/m² when subject to 49

freeze thaw cycles. Testing shall be conducted using a three (3) percent saline solution in according to ASTM C1645.

Bedding and joint sand shall be washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock. Do not use limestone screenings, stone dust, or sand for the bedding sand material that do not conform to the grading requirements of ASTM C 33. Do not use mason sand or sand conforming to ASTM C 144 for the bedding sand. Bedding sand shall conform the following grading requirements specified in ASTM C 33 and as listed herein:

Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10
No. 200 (0.075 mm)	0 to 1

Joint sand shall conform to the grading requirements specified in ASTM C 144 and as listed herein:

Sieve Size	Natural Sand Percent Passing	Manufactured Sand Percent Passing
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 100
No. 50 (0.300 mm)	10 to 35	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075 mm)	0 to 1	0 to 10

B.6 Joint Sealant

Joint sealant shall conform to ASTM C 1193-13 and shall be Spectrum 1 as manufactured by Tremco Commercial Sealants; 3735 Green Road, Beachwood, OH 44122; phone 800-321-7906; website www.tremcosealants.com.

Joint sealant shall be Spectrum 1 Ultra Low-Modulus Silicone Joint Sealant in Aluminum Stone and Anodized Aluminum color or engineer approved equal depending on location of application. Joint sealant shall be approved by both the engineer and the building owner prior to placement.

B.7 Submittals

Submit to the engineer shop drawings and details indicating perimeter conditions including radial cuts for the Irgens revolving entrance door located at the 833 East Michigan building, relationship to adjoining materials and assemblies, expansion or control joints, granite paver layout patterns, and installation and setting details.

Submit to the engineer a 25-square foot area of full sized granite paver samples from the procured granite pavers to be used illustrating layout, style, color, range, cut, and surface texture. Engineer to keep samples to use as product verification during construction.

Submit to the engineer a minimum of two (2), 5-lb samples of each of the bedding sand and joint sand including gradation certification from an approved independent testing facility.

Submit to the engineer two (2) 1/2-gallon cartridges of each of the listed colors including manufacturer certifications.

B.8 Mock-up

Submit a mock-up of no less than 10-foot by 10-foot for engineer's approval. Mock-up shall incorporate construction and installation techniques and equipment used in the field application of the paver system. Mock-up shall be a complete representation of the completed system including concrete underlayment, bedding sand, joint sand, and control and expansion joints. Mock-up will be used as the standard by which the contractors work will be judged and may be retained subject to the engineer's acceptance as part of the finished work. If mock-up is not accepted, contractor will, at contractor's expense, re-evaluate and re-create the mock-up.

B.9 Warranty Data

Submit to the engineer all available warranty documents for each component listed in the construction of the granite paver system including fabrics, sealants and expansion materials.

B.10 Quality Assurance

Paving contractor will have successfully completed paver installation similar in scope and design utilizing similar materials and construction techniques. Paving contractor will hold a current certificate from the Interlocking Concrete Pavement Institute (ICPI) Paver Installer Certification program.

C Construction

C.1 Examination

Contractor shall inspect, accept and certify in writing to the engineer that site conditions meet specifications for the following items prior to installation of granite paver system. Verify that concrete base materials, thickness, surface tolerances and elevations conform to specified requirements. Conduct moisture tests to verify that concrete surfaces are cured, free from hydrostatic pressure, and have a moisture content of less than five (5) percent. Do not proceed with installation of granite pavers until base conditions are corrected by the Contractor.

C.2 Preparation

Verify concrete base is dry, certified by contractor as meeting material, installation and grade specifications. Verify that concrete base is clean, dry, and ready to accept sand setting bed, pavers, and imposed loads.

Do not place granite pavers if rain, snow, or freezing temperature are forecast within 24-hours. If placement is approved by the engineer, utilize blankets, tents, heaters, and other approved methods to prevent all surfaces below the granite pavers and sand bed from freezing temperatures in accordance with the manufactures instruction and these specifications.

C.3 Granite Paver System

Verify that granite pavers are free from dust, dirt, and stains. Do not use soiled, cracked, or broken paver units. Spread setting bed sand evenly over prepared substrate surface to a maximum thickness as indicated on the drawings. Dampen and roller compact sand to level and even surface. Screed and scarify top 1/2-inch of sand. Place paver units in pattern as indicated on approved drawings from straight referenced edge and maintain a joint width of 5/16-inch at all vertical edges of each paver and at abutting vertical surfaces and protrusions. Place units hand tight without using hammers. Maintain straight pattern lines evenly spaced, joint lines and coursing as indicated on the approved drawings. Cut pavers to fit edges with a power saw. No cut paver shall be smaller than 1/3 of a whole unit. Install full-depth expansion joints at locations indicated on the approved drawings.

Install joint sealant as specified by the plans. Install per manufacturer recommendations.

After the pavers, joint filler, and sealant are installed, install joint sand in exact accordance with manufacturer's recommendations and only during proper exterior weather conditions. Remove all excess joint sand from site.

Tamp and level paver units with mechanical vibrator until units are firmly bedded, level, and to correct elevation and gradients. Do not tamp unrestrained edges. Recover with additional sand, sweep into joints and hollow areas of pavers. Remove excess sand.

The final surface tolerance from grade elevations shall not deviate more than plus or minus 3/8 inch under a 10 foot straightedge. Check final surface elevations for conformance to drawings. Height difference between adjacent pavers shall not exceed 1/8-inch. Joint width between pavers shall not deviate more than plus or minus 1/8-inch.

All work within 6-foot of the laying face must be left fully compacted with sand-filled joints at the end of each day or compacted upon acceptance of the work. Cover the laying face or any incomplete areas with plastic sheets overnight if not closed with cut and compacted pavers with joint sand to prevent exposed bedding sand from becoming saturated from rainfall.

C.4 Cleaning

Do not clean pavers for a minimum of three (3) days to ensure sand joints are fully set. Finished granite paver surfaces shall be free of dirt, debris, stains and “hazing” in order to be deemed as acceptable. Any surface stains or hazing left on the pavers must be removed with appropriate paver cleaner. Clean finished granite paver joints and paver surfaces in accordance with the cleaner manufacturer’s written requirements. Do not use abrasive cleaning tools that would damage finished joints and paver surfaces. Prior to installation, test paver cleaner in discreet area to verify paver surface or adjacent paving will not be damaged or discolored. Testing area shall be approved by the engineer prior to construction.

After work in this section is complete, the contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site. Do not permit traffic over unprotected paver surface for seven (7) days. Protect with plywood sheeting as required by the engineer.

D Measurement

The department will measure the Sand-Set Granite Paver Paving Over Concrete Base in area by the square foot acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.03	Install Sand-Set Granite Paver	SF

Payment is full compensation for unloading, storing, cutting, and installing all granite pavers, bedding and joint material; for heating, covering the subsurface, tenting, or blankets required to maintain the required placement temperature; and for all labor, tools, equipment, and incidentals necessary to complete the contract work. Incidentals to include: sand setting bed, joint sealant, joint sand, and expansion joint materials.

32. Concrete Sidewalk Base 5-Inch, Item SPV.0165.04.

A Description

This special provision describes furnishing all materials and constructing the cast-in-place concrete sidewalk that will support the granite pavers and decorative colored concrete in accordance to the lines, dimension, elevations and details as shown on the plans and provided in the contract.

B Materials

B.1 Concrete

Conform to section 501 and 602 of standard specifications and as follows:

Provide grade as specified in section 501.3.2.2. All concrete shall originate from the same batch plant.

C Construction

Supplement standard spec 602.3 with the following:

C.1 Preparing the Foundation

Excavate area to require depth as specified in the plans by removing existing aggregate, construction material, and debris. Tamp or compact subgrade before placing sub-base material.

Excavate area for the integral curb head as specified in the contract and plan details. Engineer to verify excavation behind integral curb head to create chamfer as specified in the plan details.

C.2 Forms

Furnish metal or wood forms of sufficient depth such that a vertical edge is created for the entire integral curb face. Form shall extend below the proposed concrete pavement or gutter as specified in the plan details.

C.2 Placing and Finishing Concrete

Do not install during heavy rain or snowfall or over frozen base material or aggregate. If concrete sidewalk base is placed during cold weather, maintain an ambient temperature above 40 degrees Fahrenheit for the base during installation. Protect unpaved area from washing away if precipitation is forecasted.

Where indicated on the plans, provide a vertical slip joint across the entire width of the curb head adjacent to the concrete pavement or gutter. Apply a suitable bond breaker at to the face of the curb as specified by the plan details. Bond breaker shall consist of a 3/4-inch felt or tear away material along with a plastic sheeting, geotextile fabric, or other means acceptable to the engineer.

Areas of base aggregate that will be covered by granite pavers or decorative colored concrete may be rough finished. All other locations shall conform to the requirements in standard spec 602.

D Measurement

The department will measure Concrete Sidewalk Base 5-Inch in area by the square foot acceptably completed. Measurement will include the integral curb head and extend to the vertical plane at the curb face.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.04	Concrete Sidewalk Base 5-Inch	SF

Payment is full compensation for providing all materials including concrete, curing agents, sealing agents, release and expansion joints; for heating, covering the subgrade, tenting, or blankets required to maintain the required placement temperature; for labor including subgrade preparation, placing, finishing, sealing, and curing; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

33. Concrete Sidewalk 8-Inch, Item SPV.0165.05.

A Description

This special provision describes furnishing all materials and constructing a cast-in-place concrete sidewalk in accordance to section 601 of the Standard Specifications and the lines, dimension, elevations and details as shown on the plans and provided in the contract.

B (Vacant)

C Construction

Supplement standard spec 602.3 with the following:

C.1 Preparing the Foundation

Excavate area to require depth as specified in the plans by removing existing aggregate, construction material, and debris. Tamp or compact subgrade before placing sub-base material.

C.2 Placing and Finishing Concrete

Do not install during heavy rain or snowfall or over frozen base material or aggregate. If concrete sidewalk is placed during cold weather, maintain an ambient temperature above 40 degrees Fahrenheit for the base during installation. Protect unpaved area from washing away if precipitation is forecasted.

D Measurement

The department will measure Concrete Sidewalk 8-Inch in area by the square foot acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.05	Concrete Sidewalk 8-Inch	SF

Payment is full compensation for providing all materials including concrete, curing agents, sealing agents, release and expansion joints; for heating, covering the subgrade, tenting, or blankets required to maintain the required placement temperature; for labor including subgrade preparation, placing, finishing, sealing, and curing; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

34. Shredded Hardwood Bark Mulch 2-Inch, Item SPV.0180.01

A Description

This special provision describes furnishing and placing shredded hardwood bark mulch in areas designated by the plans.

B Materials

The contractor shall furnish mulch comprised of shredded or chipped hardwood. The mulch shall be [COLOR] in color and have a nominal size of no greater than [INCH]-inches. The mulch shall be free of contamination including, but not limited to, weed seeds, chemical residues, [OTHER], and foreign debris including glass, metal, rocks, or any matter which impairs the visual appearance of the mulch. The moisture content of the mulch shall not exceed [XX]%.

C Construction

The contractor shall broadcast the mulch in areas designated in the plans. The mulch shall be broadcast by hand in a uniform thickness of 2-inches and shall be evenly distributed around the intended plantings. Mulch shall be removed and cleared off plants, shrubs, sidewalks, benches, and all other aesthetic components as to not impair their visual appearance.

D Measurement

The department will measure Shredded Hardwood Bark Mulch 2-Inch in volume by the cubic foot acceptably completed within the pay limits the contract plans show. No other measurement of quantities shall be made in the field unless the Engineer directs in writing a change to the limits indicated on the contract plans.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0180.01	Shredded Hardwood Bark Mulch 2-Inch	CY

Payment for Shredded Hardwood Mulch is full compensation for supplying, transporting, and installing the mulch.