

URBAN REDEVELOPMENT AUTHORITY
OF PITTSBURGH
200 Ross Street
Pittsburgh, PA 15219

EAST LIBERTY
SITE PREPARATION CONTRACT NO. 4
(Liberty Green/River Roots Park)

July, 2018

**EAST LIBERTY
SITE PREPARATION CONTRACT NO. 4
(Liberty Green/River Roots Park)
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INVITATION FOR BIDS

The URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH will receive bids from qualified contractors for construction of a 4 acre Liberty Green/River Roots Park, a playground and public area in the City of Pittsburgh's East Liberty neighborhood, including 20,000 CY of grading, excavation, and fill, 40,000 SF of concrete sidewalks, stormwater basins and underground storage tanks, 1,200 LF of 12" - 24" HDPE stormwater sewers, 14,000 SF of resilient play surfaces, playground equipment, picnic equipment, approximately 200 trees and shrubs, 45,000 SF of lawn, and 31 pedestrian and street light poles and luminaires, and all work incidental thereto required to complete East Liberty Site Preparation Contract No. 4, until 11:00a.m. prevailing time on Tuesday, the 7th day of August, 2018, at its office on the 11th Floor, 200 Ross Street, Pittsburgh, Pennsylvania 15219, at which time all bids will be publicly opened and read aloud in the 11th Floor Conference Room.

Contract documents will be available on publicpurchase.com on Wednesday, July 11, 2018.

A **pre-bid meeting** will be held at the Environmental and Energy Community Outreach Center (EECO) at 200 Larimer Avenue, Pittsburgh, PA 15206 at 1:00p.m. on Tuesday, July 24, 2018, to discuss the specifications for this project and review the bid drawings. **Attendance by prospective bidders is mandatory.**

A certified check or bank draft payable to the order of the Urban Redevelopment Authority of Pittsburgh, negotiable U.S. Government Bonds (at par value), or a satisfactory Bid Bond executed by the Bidder and an acceptable surety, in a dollar amount equal to 5% of the total bid for **East Liberty Site Preparation Contract No. 4 (Liberty Green/River Roots Park)** shall be submitted for each bid. The bid submittal must include the Bid, Non-collusion Affidavit of Prime Bidder, Bid Bond, Statement of Bidder's Qualifications, Certificate of Compliance - Section 3, and the Certificate of Minority and Women's Participation.

Wages paid on this project shall not be less than the minimum wages determined by the U.S. Department of Labor as set forth in the Contract Documents.

The Contractor will be required to comply with all applicable Equal Employment Opportunity requirements for Federally-Assisted construction contracts. The Contractor must assure that employees and applicants for employment are not discriminated against because of their age, race, color, religion, disability, ancestry, national origin, age or sexual preference, gender identity, gender expression, political and/or union affiliation. Attention is called to Executive Order 11246, to Section 3 of the Housing and Urban Development Act of 1968, 12 U.S.C. 1701U, and to the Section 3 Clause and Regulations set forth in 24 CFR, Part 135.

The Contractor will be required to comply with the following laws, rules and regulations:

Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act as amended (42 U.S.C. 7401 et seq.) See 40 CFR, Parts 50-99, for relevant regulations of the EPA.

Contractor shall comply with the Copeland "Anti-Kickback Act" (18 U.S.C. 874) as supplemented in Department of Labor Regulations (29 CFR, Part 3).

Contractor shall comply with the Davis-Bacon Act (40 U.S.C. 276-a to a-7) as supplemented by Department of Labor Regulations (29 CFR, Part 5), and with the Contract Work Hours and Safety Act (40 U.S.C. 327 et seq.) as supplemented by Department of Labor Regulations (29 CFR, Parts 5 and 1926).

Contractor shall comply with Title VI of the Civil Rights Act of 1964, Section 109 of the Community Development Act of 1974, with Executive Order 11625 (Minority Business Enterprise) and Executive Order 12138 (Women Business Enterprise).

Bidders will be required to submit the package of certifications included with the contract documents relating to the Equal Employment Opportunity and the participation of Minority and Women's Business Enterprises. The Urban Redevelopment Authority of Pittsburgh requires that all bidders complete and submit an MBE/WBE Solicitation and Commitment Statement along with the bid.

The Urban Redevelopment Authority of Pittsburgh reserves the right to reject any or all bids or to waive any informality in the bidding.

Bids may be held by the Urban Redevelopment Authority of Pittsburgh for a period not to exceed ninety (90) days from the date of the opening of Bids for the purpose of reviewing the Bids and investigation of Bidders prior to awarding the Contract.

URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH

BY Robert Rubinstein.

TITLE Executive Director

DATE July 9, 2018

INSTRUCTIONS TO BIDDERS

1. USE OF SEPARATE BID FORMS

These Contract Documents include a complete set of bidding and Contract forms, which are for the convenience of bidders and are not to be detached from the Contract Documents, filled out, or executed. Separate copies of Bid Forms are furnished for that purpose.

2. INTERPRETATIONS OR ADDENDA

No oral interpretation will be made to any Bidder as to the meaning of the Contract Documents or any part thereof. Every request for such an interpretation shall be made in writing to the URA. Any inquiry received seven or more days prior to the date fixed for opening of Bids will be given consideration. Every interpretation made to a Bidder will be in the form of an Addendum to the Contract Documents, and when issued, will be on file in the office of the URA and the office of the Engineer at least five days before Bids are opened. In addition, all Addenda will be mailed or faxed to each person holding Contract Documents, but it shall be the bidder's responsibility to make inquiry as to the Addenda issued. All such addenda shall become part of the Contract, and all Bidders shall be bound by such Addenda, whether or not received by the Bidders.

3. INSPECTION OF SITE

- a. Each Bidder shall visit the site of the proposed work and fully acquaint himself with the existing conditions there relating to construction and labor, and shall fully inform himself as to the facilities involved, the difficulties and restrictions attending the performance of the Contract. The bidder shall thoroughly examine and familiarize himself with the Drawings, Technical Specifications, and all other Contract Documents. The Contractor by the execution of the Contract shall in no wise be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or to visit the site and acquaint himself with the conditions there existing and the URA will be justified in rejecting any claim based on facts regarding which he should have been on notice as a result thereof.
- b. It is not unlikely that subsurface structures, unknown to the URA, abandoned, or filled in, still exist at some locations and will be encountered. The URA has collected data from record drawings regarding the supposed location of many subsurface structures; but the actual location and existence of these, except as indicated on the drawings, are unknown to the URA.
- c. It is understood and agreed that the URA does not warrant or guarantee that the materials and conditions encountered during construction will be even approximately the same as those indicated by boring samples or on the drawings. The Bidder must satisfy himself regarding the character, quantities and conditions of the various materials and the work to be done, and assume the risk of all discrepancies between the information given and the actual conditions encountered.

- d. It is further understood and agreed that the Bidder or the Contractor will not use any of the information made available to him, or obtained in any examination made by him, in any manner as a basis or ground of claim or demand of any nature against the URA or the Engineer, arising from or by any reason of the variance which may exist between the information offered and the actual materials or structures encountered during the construction work.

4. ALTERNATIVE BIDS

No alternative bids will be considered unless alternative bids are specifically requested by the technical specifications.

5. BIDS

- a. All Bids must be submitted on forms supplied by the URA and shall be subject to all requirements of the Contract Documents, including the Drawings, and these INSTRUCTIONS TO BIDDERS. All Bids must be regular in every respect and no interlineations, excisions or special conditions shall be made or included in the Bid Form by the Bidder.
- b. Bid Documents including the Bid, the Bid Guaranty, the Non-Collusion Affidavit, the Statement of Bidder's Qualifications, Certification of Compliance--Section 3, and Certificate of Minority Participation shall be enclosed in envelopes (outer and inner), both of which shall be sealed and clearly labeled with the words ("Site Preparation Bid Documents"), project number, name of Bidder, and date and time of bid opening in order to guard against premature opening of the bid.
- c. The URA may consider as irregular any Bid on which there is an alteration of or departure from the Bid Form hereto attached and at its option may reject the same.
- d. If the contract is awarded, it will be awarded by the URA to a responsible Bidder on the basis of the lowest total bid which shall be the sum of the base bid plus the selected alternative bid items, if any. The Contract will require the completion of the work according to the Contract Documents.
- e. Each Bidder shall include in his Bid the following information:

Principals

Names
Employment Identification Numbers
Home addresses, including City, State and Zip Code

Firm

Name
Treasury Number
Address
City, State and Zip Code

6. BID GUARANTY

- a. The Bid must be accompanied by a Bid Guaranty which shall not be less than five percent (5%) of the amount of the Bid. At the option of the Bidder the guaranty may be a certified check, bank draft, negotiable U.S. Government Bond (at par value), or a Bid Bond on the form attached. Bid Bonds submitted on any form other than that attached will not be accepted and the Bid will be rejected. The Bid Bond shall be secured by a guaranty or a surety company listed in the latest issue of U.S. Treasury Circular 570. No Bid will be considered unless it is accompanied by the required guaranty. Certified check or bank draft must be made payable to the order of Urban Redevelopment Authority of Pittsburgh. Cash deposits will not be accepted. The Bid Guaranty shall insure the execution of the Agreement and the furnishing of the surety bond or bonds by the successful Bidder, all as required by the Contract Documents.
- b. Revised Bids submitted before the opening of Bids, whether forwarded by mail or telegram, if representing an increase in excess of two percent (2%) of the original Bid, must have the Bid Guaranty adjusted accordingly; otherwise the Bid will not be considered.
- c. Certified checks or bank drafts, or the amount thereof, Bid Bonds, and negotiable U.S. Government Bonds of unsuccessful bidders will be returned as soon as practical after the opening of the Bids.

7. COLLUSIVE AGREEMENTS

- a. Each Bidder submitting a Bid to the URA for any portion of the work contemplated by the documents on which bidding is based shall execute and attach thereto an affidavit substantially in the form herein provided, to the effect that he has not entered into a collusive agreement with any other person, firm, or corporation in regard to any Bid submitted.
- b. Before executing any subcontract the successful Bidder shall submit the name of any proposed subcontractor for prior approval and an affidavit substantially in the form provided in Section 103 hereof.

8. STATEMENT OF BIDDER'S QUALIFICATIONS

Each Bidder shall submit on the form furnished for that purpose (a copy of which is included in the Contract Documents), a statement of the Bidder's qualifications, his experience record in constructing the type of improvements embraced in the Site Preparation, his organization and equipment available for and to be placed upon the work contemplated; and a detailed financial statement. The URA shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform his obligations under the contract including the obligation for an Affirmative Action Program (see IB-6, Section 17) under the Contract and the Bidder shall furnish the URA all such information and data for this purpose as it may request. The right is reserved to reject any Bid where an investigation of the available evidence or information does not satisfy the URA that the Bidder is qualified to carry out properly the terms of the Contract.

9. UNIT PRICES

- a. The unit price for each of the several items in the proposal of each Bidder shall include its prorated share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price Bid represents the total Bid. Any bid not conforming to this requirement may be rejected as informal. The special attention of all Bidders is called to this provision, for should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities nor extra compensation allowed.
- b. Bids in which unit prices are unbalanced may be rejected for that reason alone.

10. CORRECTIONS

Erasures or other changes in the Bids must be explained or noted over the signatures of the Bidder.

11. TIME FOR RECEIVING BIDS

- a. Bids received prior to the advertised hour of opening will be securely kept, sealed. The officer whose duty it is to open them will decide when the specified time has arrived, and no Bid received thereafter will be considered; except that when a Bid arrives by mail after the time fixed for opening, but before the reading of all other Bids is completed, and it is shown to the satisfaction of the URA that the non-arrival on time was due solely to delay in the mails for which the Bidder was not responsible, such Bid will be received and considered.
- b. Any Bidder may modify his bid by electronic communication at any time prior to the scheduled closing time for receipt of bids, provided such electronic communication is received by the URA prior to the closing time, and provided further the URA is satisfied that a written confirmation of the electronic modification over the signature of the Bidder was mailed prior to the closing time. The electronic communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the URA until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to electronic modification.

12. OPENING OF BIDS

At the time and place fixed for the opening of Bids, the URA will cause to be opened and publicly read aloud every Bid received within the time set for receiving Bids, irrespective of any irregularities therein. Bidders and other persons properly interested may be present, in person or by representative.

13. WITHDRAWAL OF BIDS

Bids may be withdrawn on written or electronic request dispatched by the Bidder in time for delivery in the normal course of business prior to the time fixed for opening; provided, that written confirmation of any electronic withdrawal over the signature of the Bidder is placed in the mail and postmarked prior to the time set for Bid opening. The Bid Guaranty of any Bidder withdrawing his Bid in accordance with the foregoing conditions will be returned promptly.

14. AWARD OF CONTRACT: REJECTION OF BIDS

- a. The Contract will be awarded to the responsible Bidder submitting the lowest Bid complying with the conditions of the Invitation for Bids. The Bidder to whom the award is made will be notified at the earliest possible date. The URA, however, reserves the right to reject any and all Bids and to waive any informality in Bids received whenever such rejection or waiver is in its interest.
- b. The URA reserves the right to consider as unqualified to do the work of general construction any Bidder who does not habitually perform with his own forces the major portions of the work involved in construction of the Improvements embraced in this Site Preparation Contract.
- c. Under the terms of its cooperation agreement with the City of Pittsburgh, the URA reserves the right to consider as unqualified to do the work of general construction any Bidder whose work in the past has not been satisfactory to the City of Pittsburgh.

15. EXECUTION OF AGREEMENT: PERFORMANCE AND PAYMENT BOND

- a. Subsequent to the award and within ten (10) days after the prescribed forms are presented for signature, the successful Bidder shall execute and deliver to the URA an Agreement in the form included in the Contract Documents in such number of copies as the URA may require.
- b. Having satisfied all conditions of award as set forth elsewhere in these documents, the successful Bidder shall, within the period specified in Paragraph "a" above, furnish a surety bond in a penal sum not less than the amount of the Contract as awarded, as security for the faithful performance of the Contract, and also an additional bond in the equivalent penal sum for the payment of all persons, firms, or corporations to whom the Contractor may become legally indebted for labor, materials, tools equipment, or services of any nature including utility and transportation services, employed or used by him in performing the work. Such bonds shall be in the same form as that included in the Contract Documents and shall bear the same date as, or a date subsequent to, that of the Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bond. This bond shall be signed by a guaranty or surety company listed in the latest issue of the U.S. Treasury Circular 570 and the total penal sum shall be within the maximum specified for such company in said Circular 570. This bond shall be endorsed to the City of Pittsburgh by the Urban Redevelopment Authority of Pittsburgh for the use of the City of Pittsburgh in the enforcement of guarantees after this project is accepted by the City of Pittsburgh.

- c. The failure of the successful Bidder to execute such Agreement and to supply the required bonds within ten days after the prescribed forms are presented for signature, or within such extended period as the URA may grant, based upon reasons determined sufficient by the URA, shall constitute a default, and the URA may either award the Contract to the next lowest responsible Bidder or readvertise for Bids, and may charge against the Bidder the difference between the amount of the Bid and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the Bid bond. If a more favorable Bid is received by readvertising, the defaulting Bidder shall have no claim against the URA for a refund.

16. WAGES AND SALARIES

- a. Attention of Bidders is particularly called to the requirements concerning the payment of not less than the prevailing wage and salary rates specified in the contract Documents and the conditions of employment with respect to certain categories and classifications of employees. See GENERAL CONDITIONS, PART II.
- b. The rates of pay set forth under GENERAL CONDITIONS, PART II, are the minimums to be paid during the life of the Contract. It is therefore the responsibility of Bidders to inform themselves as to local labor conditions, such as the length of work day and work week, overtime compensation, health and welfare contributions, labor supply and prospective changes or adjustments of rates.

17. EQUAL EMPLOYMENT OPPORTUNITY

- a. Attention of Bidders is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against on the basis of race, color, religious creed, ancestry, national origin, age, handicap or sex.
- b. The Contractor is required to have in operation an Affirmative Action Program to insure meaningful employment of persons from minority groups among the Contractor's and its subcontractor's employees and among all trade classifications which may be used in the execution of the contract. The Contractor will be required to prepare a written Affirmative Action Plan outlining his Affirmative Action Program for approval by the Urban Redevelopment Authority of Pittsburgh.
- c. Attention of Bidders is particularly called to the requirement for contractors to meet the requirements of Section 3 of the Housing and Urban Development Act of 1968 and the requirements of the Minority Participation Policy of the Urban Redevelopment Authority of Pittsburgh.

18. PERMITS

It shall be the responsibility of the Contractor to secure all permits required by all local government agencies for all work performed under this contract.

19. FICTITIOUS NAME REGISTRATION

Where the contract is made by an individual or individuals doing business under a fictitious name, there shall be attached to the contract a certificate showing that such individual or individuals are duly registered under the Fictitious Names Act of the Commonwealth of Pennsylvania. Such certificate in as many copies as may be required shall be furnished to the URA by the successful Bidder prior to the signing of the Contract.

20. ENVIRONMENTAL PROTECTION

The bidder's attention is called to the Act of 1972 of the Pennsylvania Legislature entitled "Environmental Impact Statement" relating to provisions of environmental pollution and preservation of public natural resources in construction projects. The bidder's attention is also called to the Congressional Acts entitled "National and Environmental Policies," Act of 1970 and "Noise Control Act of 1972." Pollution includes but is not limited to noise, dust and water contamination. It is suggested that bidders contact the local office of the U.S. Environmental Protection Agency for instructions. Compliance with the provisions of the above laws are required by the successful bidder under its contract with this Authority.

EAST LIBERTY

**SITE PREPARATION CONTRACT NO. 4
(Liberty Green/River Roots Park)**

TO: Urban Redevelopment Authority of Pittsburgh
200 Ross Street
Pittsburgh, PA 15219

Gentlemen:

1. The undersigned, having familiarized (himself) (themselves) (itself) with the existing conditions of the Project Area affecting the cost of the work, and with the Contract Documents, which include Invitation for Bids, Instruction to Bidders, the form of Bid, the form of Bid Bond, form of Non-Collusion Affidavit, Addenda (if any), form of Contract, form of Surety Bonds, General Conditions, Parts I and II, Special Conditions, Parts I and II, Technical Specifications (including the Standard Specifications for Materials and Construction issued by the City of Pittsburgh, Department of Public Works, dated November 1938, with the supplements thereto and revisions thereof including the March, 1962 edition, and the Specifications for Concrete Pavement and Base Course dated March, 1978; the current City of Pittsburgh, Department of Public Works Standards for Construction); the Pennsylvania Department of Transportation Publication 408 and Supplements thereto; and drawings (as listed in the Schedule for Drawings and attached to the Contract Documents), hereby proposes to furnish all supervision, including utility and transportation services, required to construct and complete the work as indicated in the Drawings and Specifications entitled **Site Preparation Contract No.4** all in accordance with the above-listed documents at and for the unit prices for work in place for the following items and quantities:

2. In submitting this bid, the Bidder understands that the right is reserved by the Urban Redevelopment Authority of Pittsburgh to reject any and all bids. Bids will be compared and their amounts computed on the basis of the approximate estimate of quantities given on the proposal forms. The quantities given thereon are approximate only and the URA does not expressly or by implication agree that the actual amount of work will correspond therewith. The URA reserves the right to increase or decrease each and all quantities. The final quantities shall be based on actual measurements made in the field by the Engineer. When prices bid on the various items are unreasonably high or low so as, in the opinion of the URA, to unbalance the bid, the URA may reject the bid. If written notice of the acceptance of this bid is mailed, electronically mailed or delivered to the undersigned within ninety (90) days after the opening thereof, or at any time thereafter before the bid is withdrawn, the undersigned agrees to execute and deliver an agreement in the prescribed form and furnish the required bonds within ten (10) days after the agreement is presented to him for signature.

3. Security is a sum equivalent to five percent (5%) of the amount of the bid in the form of _____, is submitted herewith in accordance with the Instruction to Bidders.

4. Attached hereto is an affidavit in proof that the undersigned has not colluded with any person in respect to this bid or any other bid or the submitting of bids for the Contract for which this bid is submitted.

5. The Bidder is prepared to submit a financial and experience statement upon request.

6. Attached hereto is the following certification:

- a. Certificate of Minority and Women's Participation
- b. Certificate Regarding Lobbying
- c. Certification of Compliance – Section 3

7. The Bidder certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The Bidder agrees that a breach of this certification will be a violation of the Equal Opportunities clause in any contract resulting from acceptance of this bid. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise. The Bidder agrees that (except where he has obtained identical certification from proposed subcontractors for specific time periods) he will obtain identical certification from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such certifications in his files.

BID PAGES

Bid Tabulation
Liberty Green / River Roots
East Liberty Site Preparation Contract No. 4

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
GENERAL ITEMS - APPLY TO LIBERTY GREEN AND RIVER ROOTS (ITEMS 1 - 7)					
1	Mobilization/Demobilization/General Conditions	1	LS		
2	Erosion and Sedimentation Control	1	LS		
3	Demolition and disposal; item removal and storage	1	LS		
4	Soil Excavation, handling, storage, re-placement, to create final grades	21,350	CY		
5	Excess earthen material removal from site (disposal at designated URA property)	18,700	CY		
6	Rock Excavation - Open pit excavation	200	CY		
7	Rock Excavation - Trench excavation	20	CY		
LIBERTY GREEN-SPECIFIC ITEMS - (ITEMS 8 - 94)					
8	Underground Detention (UGD-1) System (COMPLETE)	1	LS		
9	12" HDPE Pipe	65	LF		
10	15" HDPE Pipe	688	LF		
11	18" HDPE Pipe	75	LF		
12	24" HDPE Pipe	80	LF		
13	Bioswale Underdrain Piping	120	LF		
14	Yard Drains	3	Ea.		
15	Standard Manholes - 4' ID	3	Ea.		
16	Water Quality Manhole-CDS-4 (4' ID, MH-112)	1	Ea.		
17	Water Quality Manhole-CDS-4 (6' ID, MH-108A)	1	Ea.		
18	Catch Basins	7	Ea.		
19	Endwalls and riprap aprons	4	Ea.		
20	LLDPE Liner System	18,600	SF		
21	Concrete Sidewalks / Vehicular Medium Broom Finish (6" Thick)	27,704	SF		
22	Concrete Sidewalks / Vehicular Exposed Aggregate Finish (6" Thick)	8,596	SF		
23	Concrete Sidewalks / Pedestrian Medium Broom Finish (4" Thick)	14,475	SF		
24	Concrete Sidewalks / Pedestrian Exposed Aggregate Finish (4" Thick)	325	SF		
25	Concrete Sidewalks / ADA Curbs & Ramp	8	Ea.		
26	Concrete Seat Walls	380	LF		
27	Educational Signage	5	Ea.		
28	Playground Signage	5	Ea.		
29	Park Signage	4	Ea.		
30	Picnic Table	5	Ea.		
31	Grill	4	Ea.		
32	6-Foot Bench	15	Ea.		

Bid Tabulation
Liberty Green / River Roots
East Liberty Site Preparation Contract No. 4

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
33	8-Foot Bench	9	Ea.		
34	Fence - Wood Slat 1 / L-503	35	LF		
35	Fence - Omega 7 / L-500	360	LF		
36	Bike Rack	4	Ea.		
37	Trash Receptacles	12	Ea.		
38	Flush Concrete Curb	1,350	LF		
39	4.25" thick Play Surface / subsurface	14,500	SF		
40	Wood Deck & Elevated ADA ramp/ complete	1	LS		
41	Play Area Equipment	1	LS		
42	Play Area - Water Feature Equipment	1	LS		
43	Imported Soil - Structural Soil for Trees	415	CY		
44	Amended Soil/Planting Mix for Trees Pits and Planting Areas	1,940	CY		
45	Amended Soil Layer/Planting Mix for Bioswales	700	CY		
47	Stepping Stones	8	Ea.		
	CANOPY TREES				
48	- Sugar Maple	12	Ea.		
49	- Ginkgo	3	Ea.		
50	- Golden Larch	1	Ea.		
51	- London Plane	10	Ea.		
52	- American Sweetgum	8	Ea.		
53	- Tulip Poplar	12	Ea.		
54	- Kentucky Coffee tree	1	Ea.		
55	- Black Tupelo	11	Ea.		
56	- Swamp White Oak	10	Ea.		
57	- Willow Oak	8	Ea.		
58	- Shumard Oak	7	Ea.		
	EVERGREEN TREES				
59	- Atlantic White Cedar	2	Ea.		
60	- Deodar Cedar	1	Ea.		
61	- Dawn Redwood	3	Ea.		
62	- Sweet bay Magnolia	1	Ea.		
	ORNAMENTAL TREES				
63	- River Birch	5	Ea.		
64	- American Hornbeam	2	Ea.		
65	- Flowering Dogwood	3	Ea.		
66	- Common Witch-hazel	1	Ea.		
	SHRUBS				
67	- Blood twig Dogwood	40	Ea.		
68	- Oakleaf Hydrangea	10	Ea.		

Bid Tabulation
Liberty Green / River Roots
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ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
69	- Vernal Witch-hazel	10	Ea.		
	GRASSES				
70	- Switchgrass	1300	Ea.		
71	- Prairie Drop seed	5200	Ea.		
72	Lawn Area Grass	45,000	SF		
73	Liberty Green BioSwales Drip Irrigation piping and fittings	1	LS		
74	3/4" Water Supply Pipe/ Fittings	68	LF		
75	1" Water Supply Pipe/ Fittings	501	LF		
76	1-1/2" Water Supply Pipe/ Fittings	165	LF		
77	2" Water Supply Pipe/ Fittings	21	LF		
78	Hose Bibs & Shut off Valve Lawn Boxes	4	Ea.		
79	PWSA Water Service Tap / Meter Pit / Meters	1	LS		
80	Sewer Line to Water Feature	1	LS		
81	Sewer Line to Drinking Fountain	1	LS		
82	Drinking Fountain	1	Ea.		
83	Electrical Service Feeders	450	LF		
84	Electrical Service and Control Cabinet	1	LS		
85	Electrical Outlets at Wood Deck	2	Ea.		
86	Water Play Feature Electrical Power and Controls System	1	LS		
87	Cistern Mechanical Electrical Power and Controls System	1	LS		
88	Irrigation System Power	1	LS		
89	Direct Burial Lighting Conduit & Cable	2,400	LF		
90	14' Standard Park Pole & Luminaire	25	Ea.		
91	Remove & Reinstall Existing Street Light Pole	7	Ea.		
92	15' Decorative Street Light and Pole	6	Ea.		
93	Remove & Deliver Existing Street Light Pole and Bracket Arm	1	LS		
94	City Standard Junction Box, Type JB-1	1	Ea.		
RIVER ROOTS-SPECIFIC ITEMS - (ITEMS 95 - 141)					
95	Gabion Retaining Walls	102	CY		
96	PVC Piping & Connections	230	LF		
97	Pex, 1" to Hand Pump (inc. fittings)	150	LF		
98	Hand Pump	1	Ea.		
99	Galvanized Steel and HDPE Overflows	5	Ea.		
100	EPDM Liner System	14,000	SF		
101	Stormwater Storage Tank & Associated Equipment	1	Ea.		
102	Riprap Aprons (Reuse existing site materials)	4	Ea.		

Bid Tabulation
Liberty Green / River Roots
East Liberty Site Preparation Contract No. 4

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
103	AASHTO # 57 washed aggregate (basin underdrain material at River Roots)	200	TON		
104	Sandy Planting Medium (Imported Soil)	530	CY		
105	Kalida St. Inlet Retrofitting (2) Piping/Fittings & street restoration	1	LS		
106	Sidewalks / Pedestrian Medium Broom Finish (4" Thick)	2,100	SF		
107	Stairs & Risers	1	LS		
108	Salvaged Stone Treads	50	LF		
109	Alternate - New Stone Treads	50	LF		
110	Concrete Splash Block Assembly at Basin #6	1	LS		
111	Educational Signage	4	Ea.		
112	8-Foot Bench	3	Ea.		
113	Trash Receptacles	1	Ea.		
114	Corten Steel Channels	1	LS		
115	Stair Railing	1	LS		
116	Splash Block Tile Installation at Basin #6	1	LS		
117	Install Water Creatures (placed in Gabions)	25	Ea.		
118	Install Water Creatures (stone-mounted)	25	Ea.		
119	Install Water Creatures (with cast-in-place footer)	25	Ea.		
120	Install Sound Sculptures	6	Ea.		
121	Wood Deck & Elevated Path	1	LS		
122	Boulders	120	Ea.		
123	Engraved Seating Stones	17	Ea.		
	CANOPY TREES				
124	- American Sweetgum	2	Ea.		
125	- Tulip Poplar	2	Ea.		
126	- Black Tupelo	3	Ea.		
127	- Swamp White Oak	3	Ea.		
128	- Shagbark Hickory	1	Ea.		
129	- American Beach	1	Ea.		
130	- Eastern Sycamore	1	Ea.		
	ORNAMENTAL TREES				
131	- River Birch	4	Ea.		
132	- American Hornbeam	3	Ea.		
	SHRUBS				
133	- Blood Twig Dogwood	24	Ea.		
134	- Oakleaf Hydrangea	22	Ea.		
135	- Blue Beard	229	Ea.		
136	- Virginia Sweet Spire	70	Ea.		

Bid Tabulation
Liberty Green / River Roots
East Liberty Site Preparation Contract No. 4

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
137	- Purple Osier Willow (REMOVED - NOT USED)	0	Ea.	-----	-----
138	- Steeplebush (REMOVED - NOT USED)	0	Ea.	-----	-----
	- GRASSES				
139	- Switchgrass	450	Ea.		
140	- Prairie Drop seed	330	Ea.		
141	Lawn Area Grass	18,000	SF		
GENERAL ITEMS - APPLY TO LIBERTY GREEN AND RIVER ROOTS (ITEMS 142 & 143)					
142	Work Crew: Dump Truck and Operator, Excavator and Operator, and Laborer	40	Hr		
143	Deep Concrete Curb	40	LF		
TOTAL BASE BID (ITEMS 1 THROUGH 143)					

Bid Tabulation
Liberty Green / River Roots
East Liberty Site Preparation Contract No. 4

LIBERTY GREEN - ADD ALTERNATE "A" (AS SHOWN ON DRAWING L-127)					
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	GROUND COVER/GRASSES				
A.1	- Prairie Drop Seed (SH)	9700	Ea.		
A.2	- Switch Grass (PV)	f	Ea.		
A.3	- Hay-scented Fern (DP)	508	Ea.		
	HERBACEOUS PLANTS				
A.4	- Milkweed (AI)	110	Ea.		
A.5	- Great Blue Lobelia (GBL)	187	Ea.		
A.6	- Blue Stem Golden Rod (SC)	120	Ea.		
	SHRUBS	4	Ea.		
A.7	- Common Juniper (JUN)	3	Ea.		
LIBERTY GREEN - ADD ALTERNATE "A" TOTAL					

RIVER ROOTS - ALTERNATE SITE PLANTING PLAN "B" (FROM DRAWING L.5)					
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	CANOPY TREES				
B.1	- American Sweetgum	3	Ea.		
B.2	- Tulip Poplar	2	Ea.		
B.3	- Black Tupelo	3	Ea.		
B.4	- Swamp White Oak	3	Ea.		
B.5	- Shagbark Hickory	1	Ea.		
B.6	- American Beach	1	Ea.		
B.7	- Eastern Sycamore	2	Ea.		
	ORNAMENTAL TREES				
B.8	- River Birch	4	Ea.		
B.9	- American Hornbeam	3	Ea.		
	SHRUBS				
B.10	- Blood Twig Dogwood	23	Ea.		
B.11	- Oakleaf Hydrangea	28	Ea.		
B.12	- Blue Beard	102	Ea.		
B.13	- Virginia Sweet Spire	44	Ea.		
B.14	- Purple Osier Willow	19	Ea.		
B.15	- Steeplebush	46	Ea.		
	- GRASSES				
B.16	- Switchgrass	450	Ea.		
B.17	- Prairie Drop seed	330	Ea.		
RIVER ROOTS - ALTERNATE "B" ITEMS B.1 - B.17 (TOTAL X)					
RIVER ROOTS - ITEMS 124 - 140 (SUBTOTAL Y)					
DEDUCT ALTERNATE "B" (TOTAL X MINUS SUBTOTAL Y)					

Bid Tabulation
Liberty Green / River Roots
East Liberty Site Preparation Contract No. 4

BASE BID TOTAL	
ADD ALTERNATE "A" TOTAL	
DEDUCT ALTERNATE "B" TOTAL	

IN WITNESS WHEREOF, the undersigned Bidder has hereunto subscribed his name on this

_____ day of _____, 20 __, at _____.

(To be used when the Bidder is an individual doing business in his own name.)

(Witness)

(Signed)

(Business Address)

(City)

IN WITNESS WHEREOF, the undersigned Bidder has hereunto subscribed his name on this

_____ day of _____, 20 __, at _____.

(To be used when the Bidder is a partnership or an individual doing business under a fictitious or assumed name.)

_____ (is a partnership, is an individual) trading under a fictitious or assumed name and (has, has not) registered under the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 28.1 et seq.

(Fictitious or assumed name)*

(Witness)

(Signed)

(Witness)

(Signed)

(Business Address)

(City)

I, a partner of _____,
the partnership named as Bidder herein, certify that the following are the names and addresses of all the partners of said partnership.

Name: _____
Address: _____
City: _____
Name: _____
Address: _____
City: _____

Name: _____
Address: _____
City: _____
Name: _____
Address: _____
City: _____

(Witness)

(Signed)

* If the Bidder is a partnership, the Bid and Contract must be signed in the name of the partnership by at least two general partners, and the names and address of all the partners must be listed on the above Certificate.

IN WITNESS WHEREOF, the undersigned Bidder has hereunto subscribed his name on this

_____ day of _____, 20_____, at _____
_____.

(To be used when the Bidder is a corporation)

_____ is a corporation organized and existing under the laws of the State of _____ with its principal place of business at _____,

(Street Address)

(City)

(State)

Pennsylvania corporation, (has, has not) been granted a certificate of authority to do business in Pennsylvania as required by the Pennsylvania Business Corporation law, approved May 5, 1933, P.L. 364, as amended, 15 P.S. sec. 2005 et seq.

(SEAL)

and, if a non-

Attest:

_____ (Corporate Name) **

By _____

By _____

Title _____

Title _____

CORPORATION CERTIFICATE

I, _____, certify that I am the (Secretary, Assistant Secretary) of the corporation named as Bidder herein; that _____ who signed this Bid on behalf of the Corporation was then _____ of said corporation; that I know his signature and his signature thereto is genuine; and that said Bid was duly signed, sealed and attested in behalf of said corporation by authority of its governing body.

CORPORATE
SEAL

By _____
(Secretary, Assistant Secretary)

** If the Bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the above Certificate must be executed by the Secretary or Assistant Secretary.

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____)
)ss.
 County of _____)

(1) He is (owner, partner, officer, representative, or agent) of _____
 _____, the Bidder that has submitted the attached Bid;

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Urban Redevelopment Authority of Pittsburgh or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

Signed _____

 Title

Subscribed and sworn to before me

this _____ day of _____, 20____

My commission expires _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned _____
 _____ as **PRINCIPAL**, and _____ as **SURETY** are
 held and firmly bound unto the **URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH** (hereinafter
 called the URA") in the penal sum of _____ dollars (\$ _____)
 lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves,
 our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents:

WHEREAS, said Principal has submitted the accompanying bid, dated _____
 _____ 20 _____, for _____

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall
 not withdraw said bid after the opening of the same, and shall within the period specified therefor, or, if no
 period be specified, within ten (10) days after the prescribed forms are presented to him for signature, enter
 into a written contract with the URA in accordance with the bid as accepted, and give bonds with good and
 sufficient surety or sureties, as may be required for the faithful performance and proper fulfillment of such
 contract and for the payment of labor and materialmen, or in the event of the withdrawal of said bid, or the
 failure to enter into such contract and give such bonds within the time specified, and the Principal shall pay the
 URA the difference between the amount specified in said bid and the amount for which the URA may procure
 the required work or supplies or both, if the latter amount be in excess of the former, then this obligation shall
 be null and void, otherwise it shall remain in full force and effect.

Surety agrees that the issuance of this bid bond is a representation to the URA that it will also issue
 both a Performance Bond and a Payment Bond in the event the Principal shall be awarded the Contract.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, 20 __, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Witness:

(Individual Principals sign here)

Witness:

(Business Address)

(Business Address)

(Corporate Principal sign here)

(SEAL)

(Firm Name)

(Address)

By _____

By _____

Title _____

Title _____

(Surety sign here) NAIC# _____

(SEAL)

(Surety Company)

By _____

(Power-of-Attorney for person signing for surety company must be attached to bond)

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the (Secretary, Assistant Secretary) of the corporation named as Principal in the within bond; that _____, who signed the said bond on behalf of the Principal was then _____ of said corporation; that I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed, and attested to, for and in behalf of said corporation by authority of its governing body.

By _____ (SEAL)

PUBLIC WORKS EMPLOYMENT VERIFICATION ACT

(a) The Contractor shall utilize the E-Verify Program ("EVP") operated by the U.S. Department of Homeland Security ("DHS") to verify the employment eligibility of each new employee hired after January 1, 2013. EVP is a free Internet-based program operated by DHS that compares information from an employee's Form I-9, Employment Eligibility Verification, to data from DHS and Social Security Administration records to confirm employment eligibility. The Contractor and every subcontractor performing work under the Contract shall utilize the EVP system. EVP can be found at www.uscis.gov and clicking on E-Verify Homepage.

(b) As a precondition to the award of the Contract, the Contractor shall submit the Public Works Employment Verification Form (the "Form") to URA as required by the Public Works Employment Verification Act (the "Act") and shall maintain documentation of continued compliance with the Act by utilizing the EVP for new employees hired through the duration of the Contract.

(c) Until work under the Contract is completed, each new employee hired by the Contractor, regardless of whether the employee will be working onsite or offsite, shall be verified within five (5) business days of his or her start date. This requirement is also applicable to each subcontractor until the subcontractor has completed work under the Contract.

(d) Contractor shall require each of its subcontractors, prior to beginning either onsite or offsite work, to submit a completed Form to URA. Contractor shall also require each of its subcontractors to verify the employment eligibility through EVP of each new employee, regardless of whether the employee will be working onsite or offsite, within five (5) business days of his or her start date.

(e) Contractor's subcontracts shall contain notification of the applicability of the Act, information regarding the use of EVP and reference to the Pennsylvania Department of General Services ("DGS") website at www.dgs.state.pa.us to obtain a copy of the Form. Contractor's subcontracts shall also contain a statement that the Act is applicable to sub-subcontractors.

(f) Contractor shall cooperate with DGS, and shall require its subcontractors to cooperate with DGS, during an investigation or audit arising under the Act.



COMMONWEALTH OF PENNSYLVANIA

PUBLIC WORKS EMPLOYMENT VERIFICATION FORM

Date _____

Business or Organization Name (Employer) _____

Address _____

City _____ State _____ Zip Code _____

☐ Contractor ☐ Subcontractor (check one)

Contracting Public Body _____

Contract/Project No _____

Project Description _____

Project Location _____

As a contractor/subcontractor for the above referenced public works contract, I hereby affirm that as of the above date, our company is in compliance with the Public Works Employment Verification Act ('the Act') through utilization of the federal E-Verify Program (EVP) operated by the United States Department of Homeland Security. To the best of my/our knowledge, all employees hired post January 1, 2013 are authorized to work in the United States.

It is also agreed to that all public works contractors/subcontractors will utilize the federal EVP to verify the employment eligibility of each new hire within five (5) business days of the employee start date throughout the duration of the public works contract. Documentation confirming the use of the federal EVP upon each new hire shall be maintained in the event of an investigation or audit.

I, _____, authorized representative of the company above, attest that the information contained in this verification form is true and correct and understand that the submission of false or misleading information in connection with the above verification shall be subject to sanctions provided by law.

Authorized Representative Signature

NONDISCRIMINATION/SEXUAL HARASSMENT CLAUSE

Contractor agrees to the following:

1. In the hiring of any employee(s) for the manufacture of supplies, performance of work, or any other activity required under the Agreement or any subcontract, Contractor, each subcontractor, or any person acting on behalf of Contractor or subcontractor shall not discriminate in violation of the Pennsylvania Human Relations Act ("PHRA") and applicable federal laws against any citizen of this Commonwealth who is qualified and available to perform the work to which the employment relates.

2. Neither Contractor nor any subcontractor nor any person on their behalf shall in any manner discriminate in violation of the PHRA and applicable federal laws against or intimidate any employee involved in the manufacture of supplies, the performance of work, or any other activity required under the Agreement.

3. Contractor and each subcontractor shall establish and maintain a written nondiscrimination and sexual harassment policy and shall inform their employees of the policy. The policy must contain a provision that sexual harassment will not be tolerated and employees who practice it will be disciplined. Posting this Nondiscrimination/Sexual Harassment Clause conspicuously in easily-accessible and well-lighted places customarily frequented by employees and at or near where the services are performed pursuant to this Agreement shall satisfy this requirement.

4. Contractor and each subcontractor shall not discriminate in violation of PHRA and applicable federal laws against any subcontractor or supplier who is qualified to perform the work to which the contract relates.

5. Contractor and each subcontractor represents that it is presently in compliance with and will maintain compliance with all applicable federal, state, and local laws and regulations relating to nondiscrimination and sexual harassment. Contractor and each subcontractor further represents that it has filed a Standard Form 100 Employer Information Report ("EEO-1") with the U.S. Equal Employment Opportunity Commission ("EEOC") and shall file an annual EEO-1 report with the EEOC as required for employers subject to *Title VII of the Civil Rights Act of 1964*, as amended, that have 100 or more employees and employers that have federal government contracts or first-tier subcontracts and have 50 or more employees. Contractor and each subcontractor shall, upon request and within the time periods requested by the Commonwealth, furnish all necessary employment documents and records, including EEO-1 reports, and permit access to their books, records, and accounts by the contracting agency and the Bureau of Small Business Opportunities (BSBO), for purpose of ascertaining compliance with provisions of this Nondiscrimination/Sexual Harassment Clause.

6. Contractor shall include the provisions of this Nondiscrimination/Sexual Harassment Clause in every subcontract so that those provisions applicable to subcontractors will be binding upon each subcontractor.

7. Contractor's and each subcontractor's obligations pursuant to these provisions are ongoing from and after the effective date of the Agreement through the termination date thereof. Accordingly, Contractor and each subcontractor shall have an obligation to inform the URA if, at any time during the term of the Agreement, it becomes aware of any actions or occurrences that would result in violation of these provisions.

8. The URA may cancel or terminate the contract and all money due or to become due under the contract may be forfeited for a violation of the terms and conditions of this Nondiscrimination/Sexual Harassment Clause. In addition, the URA may proceed with debarment or suspension and may place the Contractor in the Contractor Responsibility File.

(Company)

(Name, Title)

(Date)

**Urban Redevelopment Authority of Pittsburgh
200 Ross Street
Pittsburgh, Pennsylvania 15219**

STATEMENT OF BIDDER'S QUALIFICATIONS

PLEASE) All questions must be answered and the data given must be clear and comprehensive. This
NOTE) statement must be notarized. If necessary, questions may be answered on separate attached
NOTE) sheets. The Bidder may submit any additional information he desires.

1. Name of Bidder:
2. Federal Tax Payer Identification No. _____
3. Phone No.
4. Permanent Main Office Address:
5. When Organized:
6. Check Type of Organization:
Individual Proprietorship _____ Partnership _____ Corporation _____
7. If a corporation, where incorporated:
8. How many years have you been engaged in the contracting business under your present firm or trade name?
9. Contracts on hand: (Schedule these, showing amount of each contract and the owner, the owner's phone number and the approximate anticipated dates of completion.)
10. Describe the general character of work performed by your company.
11. Have you ever failed to complete any work awarded to you?
If so, where and why?

12. Have you ever defaulted on a contract?
If so, where and why?
13. List the more important contracts recently completed by your company, stating the owner, the owner's phone number, the approximate cost for each, and the month and year completed.
14. List your major equipment available for this contract.
15. Cite experience in work similar in kind and scope to this contract.

16. List background and experience of the principal members of your organization including the officers.
17. Credit Available: \$ _____
18. Give bank reference:
19. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Urban Redevelopment Authority of Pittsburgh?
20. Do you have an Affirmative Action Program that meets the requirements of the Equal Employment Opportunity section of General Conditions, Part II?
21. Do you have a written Affirmative Action Plan, outlining your Affirmative Action Program, that will be made available to the Urban Redevelopment Authority upon request?
22. If you do not presently have such a Program and Plan, will you agree to establish a program and provide a plan, if requested by the Urban Redevelopment Authority?
23. Does your Affirmative Action Program actively support the training of minority group persons in the trade classifications which will be used in the execution of the contract?
24. Do all subcontractors proposed to be used in the execution of the contract have Affirmative Action Programs which could be outlined in written Affirmative Action Plans if requested by the Urban Redevelopment Authority?
25. Have you ever been denied an award of a contract or ever had funds withheld from your firm for failure to comply with the Federal Equal Employment Provisions required by Executive Order No. 11246 or the Commonwealth of Pennsylvania Affirmative Action Provisions required by Executive Order 1988-1?
26. List all of the Parties of Interest in the Business Entity and the extent of their respective interest and, in the event any other parties have a beneficial interest, their names and the extent of such interest.

27. For all Parties of Interest identified in No. 26, provide for each, the names of any contracting firms for which they ever had a beneficial interest and further state whether the contracting firm ever defaulted on a contract (and if so, where and why), whether the contracting firm ever failed to complete any work awarded to it (and if so, where and why), and whether the contracting firm ever filed for bankruptcy.

The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Urban Redevelopment Authority of Pittsburgh in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated this _____ day of _____, 20_____.

BIDDER

By _____

Title _____

State of _____)

)
)SS

County of _____)

_____ being duly sworn deposes and says that he is ____

_____ of _____

and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary

My commission expires _____, 20_____.

EAST LIBERTY

SITE PREPARATION CONTRACT NO. 4
(Liberty Green/River Roots Park)

THIS AGREEMENT FOR East Liberty Site Preparation Contract No. 4 ("Agreement"), made this _____ day of _____, 20____, by and between the URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH, a redevelopment authority established and existing under the Urban Redevelopment Law, 35 P.S. §§ 1701 *et. seq.* and located at 200 Ross St., Pittsburgh, Pennsylvania 15219 (the "URA"), and [NAME OF CONTRACTOR], a ([STATE] Corporation located at _____), (a partnership consisting of _____), (an individual trading as _____) hereinafter called the ("CONTRACTOR"). Contractor's employment identification number is _____. Each of the foregoing is also referred to in this Agreement as a "Party" and collectively as the "Parties."

RECITALS

WHEREAS, the URA wishes to retain Contractor to perform Site Preparation, in the City of Pittsburgh, Pennsylvania, and Contractor has agreed to do so on the terms and conditions set forth below; and

WHEREAS, the URA is authorized to enter into this Agreement pursuant to Resolution No. _____ of [month], 2018.

AGREEMENT

NOW, THEREFORE, for and in consideration of their mutual promises as stated herein, and intending to be legally bound hereby, the Parties agree as follows:

1. Recitals. The recitals appearing above constitute a material part of this Agreement and are incorporated herein by reference.

2. Statement of Work. The Contractor shall furnish all supervision, technical personnel, labor, materials, machinery, tools, appurtenances, equipment, and services including utility and transportation services and perform all work required to complete the East Liberty Site Preparation Contract No. 4, and all other work incidental thereto, in the City of Pittsburgh, all in strict accordance with the contract documents for site preparation including Addendum Number _____ dated _____ and Addendum Number _____ dated _____.

3. Contract Price. The URA will pay the Contractor for the performance of the Contract in current funds at the unit prices stipulated in the Bid the sum of _____ subject to additions and deductions as provided in the Section - CHANGES IN WORK under GENERAL CONDITIONS, Part I.

4. Mechanics' Liens. Once the Labor and Materialmen's Bond is in place, Contractor shall (i) prior to commencing the Work, 1) execute and deliver to URA for filing in the Prothonotary's Office of Allegheny County, a Waiver of Mechanics' Liens; (ii) within five (5) days of the execution of a contract (each, a "Subcontract") with any person, firm or corporation for labor and/or materials to be supplied in connection with the Work (each, a "Subcontractor"), 2) obtain and deliver to URA for filing in the Prothonotary's Office of Allegheny County a duly executed Waiver of Mechanics' Liens from such Subcontractor; (iii) require each Subcontract to contain a provision whereby Subcontractor, upon entering into a contract (each, a "Sub-subcontract") with any person, firm or corporation for labor and/or materials to be supplied in connection with the Work (each, a "Sub-subcontractor"), 3) obtain and deliver a duly executed Waiver of Liens from each Sub-subcontractor to Subcontractor, which shall be deliverable by the Subcontractor to URA upon demand.

9. Compliance with Laws. Contractor agrees that it will comply with all ordinances, regulations, and laws of the municipal, state, and federal governments, in the provision of services under this Agreement, including, but not limited to, the Pennsylvania Trade Practices Act, 71 P.S. §§ 773.101 *et seq.*

10. Ambiguous Language. This Agreement has been negotiated jointly by and between the Parties. The principle of contract interpretation that ambiguous language is construed against the drafter shall not apply to the interpretation of this Agreement.

11. Fees and Costs. If Contractor breaches, in any way, the terms of this Agreement, and litigation is necessary to enforce the terms of this Agreement, in such litigation the URA shall be entitled to recover from Contractor all legal fees and costs incurred by the URA.

12. Severability. If a provision of this Agreement is declared null and void, the remaining provisions of this Agreement shall remain in effect and be binding upon the parties hereto.

13. Notice. Any notice required or permitted under this Agreement shall be effective when mailed by United States Certified Mail, Return Receipt Requested, to the URA or Contractor at the addresses set forth on page 1 of this Agreement.

14. Choice of Law and Venue. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania, without regard to its principles of conflicts of law. Any dispute arising from, relating to, or otherwise concerning this Agreement shall only be brought in the Court of Common Pleas of Allegheny County Pennsylvania, and/or the United States District Court for the Western District of Pennsylvania.

15. No Waiver or Modification. No waiver of any provision of this Agreement shall be effective unless made in writing and executed by the Party charged with making the waiver. This Agreement may not be amended or modified except in a writing signed by all Parties.

16. Multiple Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original and all of which taken together shall constitute a single agreement and shall be binding upon delivery to all Parties. Facsimile signatures and/or electronically submitted signatures shall be deemed originals.

17. Entire Agreement. This Agreement together with the other documents enumerated herein contains the entire agreement between the Parties with regard to the matters set forth in it and supersedes all prior contemporaneous agreements, whether written or oral, of the Parties. Each Party represents and warrants to the other that it has relied on no representation or promise, written or oral, made by any other Party, except as expressly set forth herein. In the event of a conflict between the terms of this Agreement and any attachments or exhibits attached hereto, the terms of this Agreement shall control.

[SIGNATURES APPEAR ON FOLLOWING PAGE]

IN WITNESS WHEREOF, the Urban Redevelopment Authority of Pittsburgh has caused this Agreement to be executed by its Acting Executive Director and attested to by its Assistant Secretary and the Contractor has caused this Agreement to be executed on the day, month and year first above written

Individual Name

(Witness)

(Signed)

(SEAL)
Attest

**URBAN REDEVELOPMENT AUTHORITY
OF PITTSBURGH**

Assistant Secretary

By _____
Robert Rubinstein
Executive Director

APPROVED AS TO LEGAL FORM:

Attorney – Urban Redevelopment Authority

IN WITNESS WHEREOF, the Urban Redevelopment Authority of Pittsburgh has caused this Agreement to be executed by its Acting Executive Director and attested to by its Assistant Secretary, and the Contractor has caused this Agreement to be executed on the day, month and year first above written

(SEAL)
Attest

By _____

Title _____

(SEAL)
Attest

Assistant Secretary

(Corporate Name)**

By _____

Title _____

**URBAN REDEVELOPMENT AUTHORITY
OF PITTSBURGH**

By _____
Robert Rubinstein
Executive Director

APPROVED AS TO LEGAL FORM:

Attorney – Urban Redevelopment Authority

CORPORATION CERTIFICATE

I, _____, certify that I am the (Secretary, Assistant Secretary) of the corporation named as Contractor herein; that _____ who signed this Agreement on behalf of the corporation was then _____ of said corporation; that I know his signature thereto is genuine; and that said Agreement was duly signed, sealed and attested for in behalf of said corporation by authority of its governing body.

CORPORATE
SEAL

BY _____
(Secretary, Assistant Secretary)

**If the Bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certificate must be executed by the Secretary or Assistant Secretary.

IN WITNESS WHEREOF, the Urban Redevelopment Authority of Pittsburgh has caused this Agreement to be executed by its Acting Executive Director and attested to by its Assistant Secretary, and the Contractor has caused this Agreement to be executed on the day, month and year first above written

(Fictitious or Assumed Name)*

(Witness)

(Signed)

(Witness)

(Signed)

(SEAL)
Attest

**URBAN REDEVELOPMENT AUTHORITY
OF PITTSBURGH**

Assistant Secretary

By _____
Robert Rubinstein
Executive Director

APPROVED AS TO LEGAL FORM:

Attorney
Urban Redevelopment Authority

*If the Bidder is a partnership, the Bid and the Contract must be signed in the name of the partnership by at least two general partners.

IN WITNESS WHEREOF, the Urban Redevelopment Authority of Pittsburgh has caused this Agreement to be executed by its Acting Executive Director and attested to by its Assistant Secretary, and the Contractor has caused this Agreement to be executed on the day, month and year first above written.

(SEAL)
Witness:

(Limited Liability Company Name)**

By _____

Title _____

(SEAL)
Attest

**URBAN REDEVELOPMENT AUTHORITY
OF PITTSBURGH**

Assistant Secretary

By _____
Robert Rubinstein
Executive Director

APPROVED AS TO LEGAL FORM:

Attorney – Urban Redevelopment Authority

CERTIFICATE

I, _____, certify that I am the _____
of the limited liability company named as Contractor herein; that _____
who signed this Agreement on behalf of the company was then _____
of the company; that I know his signature thereto is genuine; and that said Agreement was duly executed for and on
behalf of said company by authority of its governing body.

CORPORATE
SEAL

BY _____

Title _____

****If the Bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certificate must be executed by the Secretary or Assistant Secretary.**

CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representative of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Bidder

ATTEST

By _____

Title _____

Title _____

WAIVER OF MECHANICS' LIENS

(For a Contractor in connection with a bonded project)

THIS AGREEMENT is made and entered into on _____, 20____, by and between URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH ("URA") and _____ (the "Contractor") in connection with the performance of certain public improvements work (the "Work") upon property described in EXHIBIT "A" attached hereto and made part hereof (the "Property") owned by the URA (the "Owner"); and

WHEREAS, URA and Contractor entered into _____, a unit price contract, dated the date hereof (the "Contract") to perform the Work on the Property; and

WHEREAS, the total amount of the Contract price is \$ _____ (exclusive of future change orders), and the time of payment is set forth in EXHIBIT "B", and

WHEREAS, pursuant to the Contract, Contractor has posted a bond guaranteeing payment for labor and materials provided by subcontractors and sub-subcontractors, a copy of which is attached hereto, made part hereof and marked EXHIBIT "C"; and

WHEREAS, pursuant to the Contract, Contractor has agreed to execute a waiver of liens, waiving on behalf of all of its subcontractors, sub-subcontractors, suppliers and materialmen all liens against the Property;

NOW, THEREFORE, Contractor, intending to be legally bound, expressly agrees, as part of the Contract and for the consideration therein set forth, as follows:

1. Contractor waives, on behalf of anyone else who may act or assert claims, including, but not limited to, Contractor's subcontractors, sub-subcontractors, materialmen, suppliers and engineers, together with their employees and agents, any and all right to file or cause to be filed a mechanics' lien, materialmen's lien, claims of mechanics' or materialmen's lien, notice of intention to file a mechanics' or materialmen's lien or any other lien or claim in connection with the Work upon the Property (collectively, the "Lien Rights").

2. Contractor agrees to be solely liable for any labor and materials presented by subcontractors, sub-subcontractors, materialmen, suppliers and engineers, together with their employees and agents, and to indemnify, defend and hold Owner(s) harmless from any such claims.

3. Contractor agrees to obtain appropriate waivers of Lien Rights from all parties with whom Contractor has a contract or agreement in connection with the Work, including, but not limited to, subcontractors, materialmen, suppliers and engineers, providing that no mechanics' lien, materialmen's lien or other lien shall be filed against the Property by any such other parties.

4. IT IS ALSO THE INTENT OF THE OWNER(S) TO LIMIT THE CLAIMS OF ALL SUBCONTRACTORS AND MATERIALMEN TO THE UNPAID BALANCE OF THE CONTRACT PRICE SPECIFIED IN THE CONTRACT, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW.

5. This Agreement may be executed in one or more counterparts, all of which when taken together shall be construed as one and the same document.

WITNESS the due execution hereof on the date first above written.

ATTEST:

URBAN REDEVELOPMENT AUTHORITY
OF PITTSBURGH

Assistant Secretary

By: _____
Robert Rubinstein
Executive Director

ATTEST/WITNESS:

[CONTRACTOR]

By: _____
Print Name: _____
Title: _____

EXHIBIT "A"
PROPERTY DESCRIPTION

EXHIBIT "A"

Property Description

All that certain property situated in the 11th Ward, Lot and Block numbers 83-S-146, 83-2-196 and 83-S-202 in the East Liberty section of the City of Pittsburgh, Allegheny County, Pennsylvania, owned by the Urban Redevelopment Authority of Pittsburgh.

EXHIBIT "B"

108. PAYMENTS TO CONTRACTOR

1. Partial Payments

a. The Contractor shall prepare his requisition for partial payment as of the last day of the month and submit it with the required number of copies to the Engineer for his approval. The Contractor's requisition for partial payment shall be submitted on estimate forms which shall be furnished by the URA. The Contractor shall submit to the Engineer four (4) copies of each monthly requisition for partial payment. One approved copy of the monthly requisition will be returned together with the check to the Contractor.

The amount of the payment due the Contractor shall be determined as follows:

- (1) From the total value of the work completed to date, deduct ten per cent (10%). Upon completion of fifty per cent (50%) of the total value of work this retainage will be reduced to five per cent (5%).
- (2) Add to the net total of (1) eighty per cent (80%) of the value of construction materials properly stored upon the site.
- (3) Deduct from the total of (2) the amount of all previous payments.

The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit prices contained in the agreement. The value of construction materials properly stored on the site shall be based upon the estimated quantities of such materials (the extent of which materials is to be agreed upon between the Engineer and the Contractor) and the invoice prices. Copies of all invoices shall be submitted with the monthly requisition form.

b. Monthly or partial payments made by the URA to the Contractor are moneys advanced for the purpose of assisting the Contractor to expedite the work of construction. All material and completed work covered by such monthly or partial payments shall remain the property of the Contractor and he shall be responsible for the care and protection of all materials and work upon which payments have been made. Such payments shall not constitute a waiver of the right of the URA to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the URA in all details.

2. Final Payment

a. After final inspection and acceptance by the URA of all work under the Contract, the Contractor shall prepare his requisition for final payment, which shall be based upon the carefully measured or computed quantity of each item of work at the applicable unit prices stipulated in the Agreement. The total amount of the final payment due the Contractor under this Contract shall be the amount computed as described above less all previous payments. Final payment to the Contractor shall be made subject to his furnishing the URA with a release in satisfactory form of all claims against the URA arising under and by virtue of his Contract, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release as provided under Section 113 hereof.

b. The URA, before paying the final estimate, may require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project), and services to the Contractor, if the URA deems the same necessary in order to protect its interest. The URA, however, may if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments so made shall in nowise impair the obligations of any surety or sureties furnished under this Contract.

c. Withholding of any amount due the URA under the Section entitled "Liquidated Damages" under SPECIAL CONDITIONS, shall be deducted from the final payment due the Contractor.

3. Withholding Payments

The URA may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the URA and if it so elects may also withhold any amounts due from the Contractor to any subcontractors or material dealers for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the URA, and will not require the URA to determine or adjust any claims or disputes between the Contractor and his subcontractors or material dealers, or to withhold any moneys for their protection unless the URA elects to do so. The failure or refusal of the URA to withhold any moneys from the Contractor shall in nowise impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

4. Payments Subject to Submission of Certificates

Each payment to the Contractor by the URA shall be made subject to submission by the Contractor of all written certifications required of him and his subcontractors under General Conditions, Part II.

EXHIBIT "C"

LABOR AND MATERIALMEN'S PAYMENT BOND

DIRECTIONS FOR PREPARATION OF PERFORMANCE AND LABOR MATERIALMEN'S BONDS

1. Individual sureties, partnerships, or corporations not in the surety business will not be acceptable.
2. The name of the Principal shall be shown exactly as it appears in the Contract.
3. The penal sum shall be not less than that required by the Specifications.
4. If the Principals are partners, or joint ventures, each member shall execute the bond as an individual, with his place of residence shown.
5. If the Principal is a corporation, the bond shall be executed under its corporate seal. If the corporation has no corporate seal the fact shall be stated, in which case a scroll or adhesive seal shall be affixed following the corporate name.
6. The official character and authority of the person(s) executing the bond for the Principal, if a corporation, shall be certified by the secretary or assistant secretary thereof under the corporate seal, or there may be attached copies of so much of the records of the corporation as will evidence the official character and authority of the officer signing, duly certified by the secretary or assistant secretary, under the corporate seal, to be true copies.
7. The current Power-of-Attorney of the person signing for the surety company must be attached to the bond.
8. The date of the bond must be the same as, or subsequent to, the date of the Contract.
9. The following information must be placed on the bond by the surety company:
 - a. The rate of premium in dollars per thousand; and
 - b. The total dollar amount of premium charged.
10. The signature of a witness shall appear in the appropriate place, attesting to the signature of each party to the bond.
11. Type or print the name underneath each signature appearing on the bond.
12. An executed copy of the bond must be attached to each copy of the Contract (original counterpart) intended for signing.
13. The bond must be secured by a surety company listed in the latest revision of U.S. Department of the Treasury Circular 570 and the underwriting limitations set forth in Circular 570 shall be equal to or exceed the amount of the agreed upon Contract price.

LABOR AND MATERIALMEN'S BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

_____ as principal, and _____

_____ as sureties are held and firmly bound unto the Urban
Redevelopment Authority of Pittsburgh and the Pittsburgh Water and Sewer Authority, its certain attorney, successors, or
assigns (hereinafter called the Obligee) in the penal sum of _____

Dollars (\$ _____) lawful money of the United States, for the payment of which sum well and truly to
be made, we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly severally, firmly by these
presents:

WHEREAS, said principal has entered into a certain contract with said Obligee, dated _____
_____, 20 ____, (hereinafter called the Contract) for _____

which Contract and the Specifications for said work shall be deemed a part thereof as fully as if set out herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said principal and all
subcontractors to whom any portion of the work provided for in said Contract is sublet and all assignees of said principal
and of such subcontractors shall promptly make payment for all material furnished, labor supplied or performed, rental
for equipment employed, including sub-subcontractors, and services rendered by public utilities in or in connection with
the prosecution of the work, whether or not the said material, labor, equipment or services enter into and become
component parts of the work or improvement contemplated in said Contract, or in any amendment or extension of or
addition to said Contract, then the above obligation shall be void; otherwise to remain in full force and effect.
PROVIDED, however, that this bond is subject to the following conditions and limitations.

(a) All persons who have performed labor, rendered services or furnished materials or machinery, shall
have a direct right of action against the principal and surety on this bond, which right of action shall be asserted in
proceedings instituted in the State in which such labor was performed, services rendered or materials furnished (or where
labor has been performed, services rendered or materials furnished under said Contract in more than one State, then in
any such State). Insofar as permitted by the laws of such State, such right of action shall be asserted in a proceeding
instituted in the name of the Obligee to the use and benefit of the person instituting such action and any or all other
persons having claims hereunder, and any other person having a claim hereunder shall have the right to be made a party
to such proceeding (but not later than one year after the complete performance of said Contract and final settlement
thereof) and to have such claim adjudicated in such action and judgment rendered thereon.

(b) The surety shall not be liable hereunder for any damages or compensation recoverable under any
workmen's compensation or employer's liability statute.

(c) In no event shall the surety be liable for a greater sum than the penalty of this bond, or subject to any
suit, action or proceeding thereon that is instituted later than one year after the complete performance of said Contract
and final settlement thereof.

(d) As used herein: The term "person" refers to any individual, firm or corporation who have furnished
materials or machinery or public utility services to be used on or incorporated in the work or the prosecution thereof
provided for in said Contract or in any amendment or extension of or addition to said

Contract, and/or to any person engaged in the prosecution of the work provided for in said Contract or in any amendment or extension of or addition to said Contract, who is an agent, servant or employee of the principal, or of any subcontractor, or of any assignee of said principal or of any subcontractor, including sub-subcontractors, and also anyone so engaged who performs the work of a laborer or of a mechanic regardless of any contractual relationship between the principal, or any subcontractor, or any assignee of said principal or of said subcontractor, and such laborer or mechanic, but shall not include office employees not regularly stationed at the site of the work.

(e) This bond shall be subject to all the provisions of the Public Works Contractor's bond law of 1967, Act No. 305 of the General Assembly of Pennsylvania.

The said surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder or the Specifications accompanying the same, shall in any wise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the Specifications.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS

This _____ day of _____, 20 ____.

Witness:

Individual Principals Sign Here:

Title _____ (SEAL)

Title _____ (SEAL)

Title _____ (SEAL)

Title _____ (SEAL)

Attest:

By _____

Title _____

Corporate Principal Sign Here:

By _____
Title _____ (SEAL)

Surety Sign Here:

By _____
Title _____ (SEAL)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____
 _____ as principal, and _____
 _____ as sureties are held and firmly bound unto the Urban Redevelopment Authority of Pittsburgh
 and the Pittsburgh Water and Sewer Authority, its certain attorney, successors, or assigns (hereinafter called
 the Obligee), in the full and just sum of _____
 Dollars (\$ _____) lawful money of the United States, for the payment of which sum well and
 truly to be made, we bind ourselves, our heirs, administrators, executors, successors, and assigns, jointly and
 severally, firmly by these presents:

WHEREAS, said principal has entered into a certain contract with said Obligee, dated _____
 _____, 20 _____ hereinafter called the contract) for _____
 which contract and the specifications for said work shall be deemed a part hereof as fully as if set out herein:

NOW, therefore, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the principal shall
 faithfully perform the contract on his part as of the time and in the manner therein provided and satisfy all
 claims and demands incurred in or for the same, or growing out of the same, or for injury or damages to
 persons or property in the performance thereof, and shall fully indemnify and save harmless the said Obligee
 from any and all cost and damage which the said Obligee may suffer by reason of the principal's failure to do
 so, and shall fully reimburse and repay the said Obligee any and all outlay and expense which it may incur by
 reason of any such default, then this obligation shall be null and void, otherwise it shall remain in full force and
 virtue.

It is further understood and agreed that the principal shall guarantee for a period of one (1) year from
 completion date of the contract against defects in workmanship or materials in accordance with the terms of
 the contract.

The said surety, for value received, hereby stipulates and agrees that no change, extension of time,
 alteration or addition to the terms of the contract or to the work to be performed thereunder or the
 Specifications accompanying the same shall in any wise affect its obligations on this bond, and it does hereby
 waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the
 work or to the Specifications.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL
COUNTERPARTS THIS

_____, 20 ____.

(Individual Principals sign here)

_____(SEAL)

In the presence of:

_____(SEAL)

_____(SEAL)

_____(SEAL)

Attest:

(Corporate Principal sign here)

By _____

Attest:

(Surety sign here)

The rate of premium charged is \$ _____ per thousand. The total
amount of premium charged is \$ _____ (The above must be filled in by the
Corporate surety).

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____ certify that I am the
_____ Secretary of the corporation named as Principal in the within
Performance and Labor and Materialmen's Bonds; that _____
who signed the said Performance and Labor and Materialmen's Bonds on behalf of the Principal was then
_____ of said corporation; that I know his signature, and
that his signature thereto is genuine; and that said Performance and labor and Materialmen's Bonds were duly
signed, sealed, and attested to, for and in behalf of said corporation by authority of its governing body.

(Contractor)

(SEAL)

By _____

Title _____

GENERAL SPECIFICATIONS**GENERAL CONDITIONS FOR SITE PREPARATION****PART I****101. DEFINITIONS**

Wherever used in any of the Contract Documents, the following meanings shall be given to the terms herein defined:

a. The term "Contract" means the Contract executed by the Urban Redevelopment Authority of Pittsburgh and the Contractor, of which these GENERAL CONDITIONS, Parts I and II form a part.

b. The term "URA" means the Urban Redevelopment Authority of Pittsburgh, which is authorized to undertake this Contract.

c. The term "Contractor" means the person, firm or corporation entering into the Contract with the URA to construct and install the improvements embraced in this Site Preparation Contract.

d. The term "Project Area" means the site of the Urban Redevelopment Project (or the Urban Renewal Project) within which are the specified contract limits of the Improvements contemplated to be constructed in whole or in part under this Contract.

e. The term "Engineer" means that person or firm designated by the URA as Engineer for the sole purpose of determining compliance by the Contractor with the drawings and specifications which are part of the Contract.

f. The term "Local Government" means the government of the City of Pittsburgh, Pennsylvania, within which the Project Area is situated.

g. The term "Contract Documents" means and shall include the following: Executed Agreement, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, General Conditions, Parts I and II, Special Conditions, Parts I and II, Technical Specifications, Drawings (as listed in the Schedule of Drawings); City of Pittsburgh Standard Specifications, and City of Pittsburgh Standards of Construction.

h. The term "Drawings" means the drawings listed in the Schedule of Drawings.

i. The term "Technical Specifications" means that part of the Contract Documents which describes, outlines, and stipulates: the quality of the materials to be furnished; the quality of workmanship required; and the methods to be used in carrying out the construction work to be performed under this Contract.

j. The term "Addendum" or "Addenda" means any changes, revisions, or clarifications of the Contract Documents which have been duly issued by the URA to prospective Bidders prior to the time of receiving Bids.

102. SUPERINTENDENCE BY CONTRACTOR

a. Except where the Contractor is an individual and gives his personal superintendence to the work, the Contractor shall provide a competent superintendent, satisfactory to the URA and the Engineer, on the work at all times during working hours with full authority to act for him. The Contractor shall also provide an adequate staff for the proper coordination and expediting of his work. Upon written request by the URA and based on the URA's sole decision and discretion, the Contractor agrees to remove and replace its superintendent.

b. The Contractor shall lay out his own work, and he shall be responsible for all work executed by him under the Contract. He shall verify all figures and elevations before proceeding with the work and will be held responsible for any error resulting from his failure to do so. The Contractor and each of its subcontractors shall evaluate and satisfy themselves as to the conditions and limitations under which the work is to be performed, including, without limitation (1) the location, condition, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools and equipment and (5) other similar issues. URA assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site.

c. Prior to the start of construction, the Contractor will mark the center line or baseline of the proposed construction on the ground and will establish bench marks. The Contractor shall be responsible for the referencing of the center line for his use during construction and for the protection and preservation of the bench marks. If any center line survey points or bench marks are destroyed, the URA will order the Engineer to replace the destroyed points or bench marks and will charge the cost of such service to the Contractor.

103. SUBCONTRACTS

a. The Contractor shall not execute an agreement with any subcontractor or permit any subcontractor to perform any work included in this Contract until he has submitted: the form of Approval of Subcontractor, the form of Statement of Subcontractor's Qualifications, the Subcontract, the form of Non-collusive Affidavit of Subcontractor, the Certificates of Insurance, all in the required number of copies, and until he has received written approval of such said Subcontractor from the URA.

b. No proposed subcontractor shall be disapproved by the URA except for cause.

c. The Contractor shall be as fully responsible to the URA for the acts and omissions of his subcontractor, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

d. The Contractor shall cause appropriate provision to be inserted in all subcontracts relative to the work to require compliance by each subcontract with the applicable provisions of the Contract for the Improvements embraced in the Site Preparation.

e. Nothing contained in the Contract shall create any contractual relation between any subcontractor and the URA.

104. OTHER CONTRACTS

The URA may award or may have awarded other contracts for additional work, and the Contractor shall cooperate fully with such other Contractors, by scheduling his own work with that to be performed under other Contracts. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor as scheduled.

105. FITTING AND COORDINATION OF THE WORK

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, subcontractors, or materialmen engaged upon this Contract. He shall be prepared to guarantee to each of his subcontractors the location and measurements which they may require for the fitting of their work to all surrounding work.

106. DISPUTES OR ACTIONS BETWEEN CONTRACTORS

Should the Contractor, either itself or by its subcontractor or sub-subcontractors or their respective agents, servants, or employees, cause damage or injury to the property or work of any contractor or contractors, or by failing to perform its work (including the work of its subcontractor or sub-subcontractors) with due diligence, delay any contractor or contractors, which suffer additional expense or damage as a result, the parties involved in such dispute shall settle by agreement or arbitrate said claim, dispute or disputes by referring same to the American Arbitration Association. Said dispute or disputes shall be determined pursuant to the Construction Industry Arbitration Rules of the American Arbitration Association then in effect. The URA will not be a party to disputes or actions between contractor and subcontractors concerning such additional expense or damage. It is agreed by all parties that disputes or actions between contractors concerning the additional expense or damage will not delay completion of the work, which shall be continued by the parties, subject to the rights herein before provided. It is agreed by the parties to this Contract (URA as promisee and the Contractor as promisor) that the intent of this clause is to benefit the other contractors on the project or related projects and to serve as an indication of the mutual intent of the URA and the Contractor that this clause raise such other contractors to the status of third party beneficiaries only as to the terms and conditions herein. The Contractor agrees that this section is provided as a benefit to the Contractor and, that they specifically exclude claims against the URA for delay or other damages.

107. PROGRESS SCHEDULE

a. The Contractor shall submit for approval, immediately after execution of the Agreement, a carefully prepared CPM Construction Schedule as described in the Special Conditions and which, at a minimum, shows the proposed dates of starting and completing each of the various sections of the work, the anticipated monthly payments to become due to the Contractor, and the accumulated percentage of progress each month.

b. For lump-sum contracts only, the Contractor shall submit to the URA a breakdown of his estimated cost of all Site Preparation work, so arranged and itemized as to meet the approval of the URA. This breakdown shall be submitted promptly after execution of the Agreement and before any payment is made to the Contractor for work performed under the Contract. After approval by the URA, the unit prices established in the breakdown shall be used in estimating the amount of partial payments to be made to the Contractor.

108. PAYMENTS TO CONTRACTOR

1. Partial Payments

a. The Contractor shall prepare his requisition for partial payment as of the last day of the month and submit it with the required number of copies to the Engineer for his approval. The Contractor's requisition for partial payment shall be submitted on estimate forms which shall be furnished by the URA. The Contractor shall submit to the Engineer four (4) copies of each monthly requisition for partial payment. One approved copy of the monthly requisition will be returned together with the check to the Contractor.

The amount of the payment due the Contractor shall be determined as follows:

- (1) From the total value of the work completed to date, deduct ten per cent (10%). Upon completion of fifty per cent (50%) of the total value of work this retainage will be reduced to five per cent (5%).
- (2) Add to the net total of (1) eighty per cent (80%) of the value of construction materials properly stored upon the site.
- (3) Deduct from the total of (2) the amount of all previous payments.

The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit prices contained in the agreement. The value of construction materials properly stored on the site shall be based upon the estimated quantities of such materials (the extent of which materials is to be agreed upon between the Engineer and the Contractor) and the invoice prices. Copies of all invoices shall be submitted with the monthly requisition form.

b. Monthly or partial payments made by the URA to the Contractor are moneys advanced for the purpose of assisting the Contractor to expedite the work of construction. All material and completed work covered by such monthly or partial payments shall remain the property of the Contractor and he shall be responsible for the care and protection of all materials and work upon which payments have been made. Such payments shall not constitute a waiver of the right of the URA to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the URA in all details.

2. Final Payment

a. After final inspection and acceptance by the URA of all work under the Contract, the Contractor shall prepare his requisition for final payment, which shall be based upon the carefully measured or computed quantity of each item of work at the applicable unit prices stipulated in the Agreement. The total amount of the final payment due the Contractor under this Contract shall be the amount computed as described above less all previous payments. Final payment to the Contractor shall be made subject to his furnishing the URA with a release in satisfactory form of all claims against the URA arising under and by virtue of his Contract, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release as provided under Section 113 hereof.

b. The URA, before paying the final estimate, may require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project), and services to the Contractor, if the URA deems the same necessary in order to protect its interest. The URA, however, may if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any

payments so made shall in nowise impair the obligations of any surety or sureties furnished under this Contract.

c. Withholding of any amount due the URA under the Section entitled "Liquidated Damages" under SPECIAL CONDITIONS, shall be deducted from the final payment due the Contractor.

3. Withholding Payments

The URA may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the URA and if it so elects may also withhold any amounts due from the Contractor to any subcontractors or material dealers for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the URA, and will not require the URA to determine or adjust any claims or disputes between the Contractor and his subcontractors or material dealers, or to withhold any moneys for their protection unless the URA elects to do so. The failure or refusal of the URA to withhold any moneys from the Contractor shall in nowise impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

4. Payments Subject to Submission of Certificates

Each payment to the Contractor by the URA shall be made subject to submission by the Contractor of all written certifications required of him and his subcontractors under General Conditions, Part II.

109. CHANGES IN THE WORK

a. The URA may make changes in the scope of the work required to be performed by the Contractor under the Contract by making additions thereto or by omitting work therefrom, without invalidating the Contract, and without relieving or releasing the Contractor from any of his obligations under the Contract or any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is expressly provided otherwise.

b. Except for the purpose of affording protection against any emergency endangering health, life, limb, or property, the Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services, or materials beyond that actually required for the execution of the Contract, unless in pursuance of a written order from the URA authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract Price will be valid unless so ordered.

c. If applicable unit prices are contained in the Agreement (established as a result of either a unit price bid or a Supplemental Schedule of Unit Prices) the URA may order the Contractor to proceed with desired changes in the work, the value of such changes to be determined by the measured quantities involved and the applicable unit prices specified in the Contract.

d. If applicable unit prices are not contained in the Agreement, the URA shall, before ordering the Contractor to proceed with the desired changes, request an itemized proposal from him covering the work involved in the change after which the procedure shall be as follows:

(1) If the proposal is acceptable, the URA will prepare the change order in accordance therewith for acceptance by the Contractor and;

(2) If the proposal is not acceptable and prompt agreement between the two parties cannot be reached, the URA may order the Contractor to proceed with the work on a cost-plus-limited basis. The total cost should not exceed a specified limit. A cost-plus-limited basis is defined as:

- (a) The net cost of the Contractor's labor, materials, and insurance plus fifteen percent (15%) of said net cost to cover overhead and profit. If work is performed by a subcontractor, an additional five percent (5%) may be included to cover the Contractor's overhead and profit for the subcontractor's work, plus;
- (b) The cost of the equipment (not including operators) shall be based on the rental rate agreed upon in writing before the start of such work. Equipment rental rates shall be based on the current Rental Rate Blue Book monthly rate on the Notice to Proceed date, multiplied by the depreciation factor for the age of the equipment, then divided by 176. This hourly rate will then be multiplied by the regional adjustment factor. The operating cost as specified in the "Blue Book" will be added to the adjusted rate to obtain an operating hourly rate. Standby time, during which a piece of equipment is assigned to the operation but is not in use, shall be calculated as stated above less the operating cost. (Use of the Rental Rate Blue Book for purposes of determining costs on disputed change orders shall not constitute an acknowledgement or waiver by the URA of its requirement that the Contractor may otherwise be required to prove its costs as a function of actual, incurred costs, in the discretion of the URA.)

Prior to the start of extra work on the Project, the Contractor shall submit to the URA a list of the equipment which is expected to be used on the Project along with the hourly operating and standby rental rates for each piece of equipment. The corresponding page from the current Blue Book as defined above must be attached to verify the rental rates. The equipment rates must be approved by the URA before any extra cost can be accepted. During the performance of the extra work, the Engineer shall approve all labor and equipment assigned to the work. All costs for work performed on a cost-plus-limited basis must be submitted for approval on forms supplied by the URA.

e. Each change order shall include in its final form:

- (1) A detailed description of the change in the work.
- (2) The Contractor's proposal (if any) or a conformed copy thereof.
- (3) A definite statement as to the resulting change in the Contract price and/or time.
- (4) The statement that all work involved in the change shall be performed in accordance with Contract requirements except as modified by the change order.

f. Agreement on any change order shall constitute a final settlement of all matters relating to the change in the work which is the subject of the change order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract sum and the construction schedule. In the event a change order increases the Contract sum, the Contractor shall include the work covered by such change orders in applications for payment as if such work were originally part of the Contract.

g. No allowance will be made for loss of anticipated profit on any portion of the work not performed by reason of a change in the work.

110. CLAIMS FOR EXTRA COST

a. If the contractor claims that any instructions by Drawings or otherwise involve extra cost or extension of time, he shall, within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the work, submit his protest thereto in writing to the URA, stating clearly and in detail the basis of his objections. No such claim will be considered unless so made.

b. Claims for additional compensation for extra work, due to alleged errors in ground elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material or performing more work than would be reasonably estimated from the Drawings and maps issued. No adjustment in the Contract time or Contract sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, or (2) inspections, tests, reviews, and preconstruction services which the Contractor had the opportunity to make or should have performed in connection with the Project.

c. Any discrepancies which may be discovered between actual conditions and those represented by the Drawings and maps shall at once be reported to the URA, and work shall not proceed except at the Contractor's risk until written instructions have been received by him from the URA.

d. If, on the basis of the available evidence, the URA determines that an adjustment of the Contract Price and/or Time is justifiable, the procedure shall be as provided in Section 109 hereof.

e. URA shall have the authority to stop work at any time if the work is not in compliance with the Contract Documents and to correct any deficiencies prior to continuing work. The Contract Time shall not be extended due to any period hereunder and the Liquidated Damages will be applicable in the event the Contract Time is exceeded.

111. TERMINATION, DELAYS, AND LIQUIDATED DAMAGES

a. Termination of Contract. If, after seven days written notice, the Contractor refuses or fails to satisfactorily perform work or remedy poor or improper work or fails to prosecute the work with such diligence as will insure its completion within the time specified in the Contract, or as modified as provided in the Contract, URA may terminate this Contract. Upon such termination, the URA may take over the work and prosecute the same to completion, by contract or otherwise, and the Contractor and his sureties shall be liable to the URA for any additional cost incurred by the URA in its completion of the work, and they shall also be liable to the URA for liquidated damages for any delay in the completion of the work as provided below. If the Contractor's right to proceed is so terminated, the URA may take possession of and utilize in completing the work such materials, tools, equipment, and plant as may be on the site of the work and necessary therefor.

b. Liquidated Damages for Delays. If the work is not completed within the time stipulated in Special Conditions hereof, including any extensions of time for excusable delays as herein provided, the Contractor shall pay to the URA as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) for each calendar day of delay, until the work is completed, the amount as set forth in Special Conditions hereof, and the Contractor and his sureties shall be liable to the URA for the amount thereof.

c. Excusable Delays. The right of the Contractor to proceed shall not be terminated nor shall the Contractor be charged with liquidated damages for any delays in the completion of the work due:

(1) To any acts of the Government, including controls or restrictions upon or requisitioning of materials, equipment, or tools, or labor by reason of war, National Defense, or any other national emergency;

(2) To any acts of the URA;

(3) To causes not reasonably foreseeable by the parties to this Contract at the time of the execution of the Contract which are beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in the performance of some other contract with the URA, fires, floods, epidemics, quarantine, restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones, and other extreme weather conditions; and

(4) To any delay of any subcontractor occasioned by any of the causes specified in subparagraphs (1), (2), and (3) of this paragraph "c".

Provided, however, that the Contractor promptly notify the URA within ten (10) days in writing of the cause of the delay. Upon receipt of such notification the URA shall ascertain the facts and the cause and extent of delay. If, upon the basis of the facts and the terms of this Contract, the delay is properly excusable, the URA shall extend the time for completing the work for a period of time commensurate with the period of excusable delay.

d. Notwithstanding anything to the contrary in the Contract, an extension in the Contract time, to the extent permitted under this section, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the work, (2) hindrance or obstruction in the performance of the work, (3) loss of productivity, or (4) other similar claims (collectively referred to in this paragraph as Delays) whether or not such Delays are foreseeable, unless a Delay is caused by acts of the URA constituting active interference with the Contractor's performance of the work, and only to the extent such acts continue after the Contractor furnishes the URA with notice of such interference. In no event shall the Contractor be entitled to any compensation or recovery of any damages, in connection with any Delay, including, without limitation, consequential damages, lost opportunity costs, impact damages or other similar remuneration. URA's exercise of any of its rights or remedies under the Contract (including, without limitation, ordering changes in the work, or directing suspension, rescheduling or correction of the work), regardless of the extent or frequency of URA's exercise of such rights or remedies, shall not be construed as active interference with the Contractor's performance of the work.

e. If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the work prior to any completion date required by the Contract or expiration of the Contract time, no liability of the URA to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

f. URA's Termination for Convenience

(a) The URA may, at any time, terminate the Contract in whole or in part for the URA's convenience and without cause. Termination by the URA hereunder shall be by a notice of termination delivered to the Contractor specifying the extent of termination and the effective date.

(b) Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the URA, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due hereunder:

- .1 cease operation as specified in the notice;
- .2 place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
- .3 terminate all subcontracts and orders to the extent they relate to the Work terminated;
- .4 proceed to complete the performance of work not terminated; and
- .5 take actions that may be necessary, or that the URA may direct, for the protection and preservation of the terminated work.

c.) Upon such termination, the Contractor shall recover as its sole remedy payment for work properly performed in connection with the terminated portion of the work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the URA's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits.

d.) The URA shall be credited for (1) payments previously made to the Contractor for the terminated portion of the work, (2) claims which the URA has against the Contractor under the Contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract sum.

112. ASSIGNMENT OR NOVATION

The Contractor shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities or responsibilities, under this Contract without the written consent of the URA; provided, however, that assignments to banks, trust companies, or other financial institutions may be made without the consent of the URA. No assignment or novation of this contract shall be valid unless the assignment or novation expressly provides that the assignment of any of the Contractor's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered, and materials, tools, and equipment supplied for the performance of the work under this Contract in favor of all persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

113. DISPUTES

a. All disputes arising under this Contract or its interpretation except those disputes covered under GENERAL CONDITIONS, PART II, whether involving law or fact or both, or extra work, and all claims for alleged breach of contract shall within ten (10) days of commencement of the dispute be presented by the Contractor to the URA for decision. All papers pertaining to claims shall be filed in quadruplicate. Such notice need not detail the amount of the claim but shall state the facts surrounding the claim in sufficient detail to identify the claim, together with its character and scope. In the meantime, the Contractor shall proceed with the work as directed. Any claim not presented within the time limit specified in this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given

within ten (10) days of its commencement, the claim will be considered only for a period commencing ten (10) days prior to the receipt by the URA of notice thereof.

b. The Contractor shall submit in detail his claim and his proof thereof. Each decision by the governing body of the URA will be in writing and will be mailed to the Contractor by registered or certified mail, return receipt requested, directed to his last known address.

c. If the Contractor does not agree with any decision of the URA, he shall in no case allow the dispute to delay the work but shall notify the URA promptly that he is proceeding with the work under protest, and he may then accept the matter in question from the final release.

d. Any controversy or claim arising out of or relating to this contract, or the breach thereof, shall be settled by arbitration administered by the American Arbitration Association under its Construction Arbitration Rules, and judgment on the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof. Any such arbitration shall be held in Pittsburgh, PA. Contractor consents to the joinder to any such arbitration of any other persons or parties whose presence is necessary, in the judgment of the URA, to a full and complete resolution of any such controversies or claims. Notwithstanding anything herein to the contrary, however, the URA retains the option to elect to litigate any controversies or claims in the appropriate state or federal court located in Allegheny County, Pennsylvania, which venue shall be the exclusive forum for any and all such litigation. Contractor agrees to the jurisdiction of such courts located in Allegheny County, Pennsylvania, over it and expressly waives any such challenge to jurisdiction or venue.

114. TECHNICAL SPECIFICATIONS AND DRAWINGS

Anything mentioned in the Technical Specifications and not shown on the Drawings or shown on the Drawings and not mentioned in the Technical Specifications, shall be of like effect as if shown on or mentioned in both. In case of difference between Drawings and Technical Specifications, the Technical Specifications shall govern. In case of any discrepancy in Drawings or Technical Specifications, the matter shall be immediately submitted to the URA, without whose decision, said discrepancy shall not be adjusted by the Contractor, save only at his own risk and expense.

115. SHOP DRAWINGS

a. All required shop drawings, machinery details, layout drawings, etc. shall be submitted to the Engineer in electronic format for approval sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. The Contractor may proceed, only at his own risk, with manufacture or installation of any equipment or work covered by said shop drawings, etc. until they are approved, and no claim by the Contractor for extension of the contract time will be granted by reason of his failure in this respect.

b. Any drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of contract price and/or time, otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been approved.

c. If a shop drawing is in accord with the Contract or involves only a minor adjustment in the interest of the URA not involving a change in Contract price or time, the Engineer may approve the drawing. The approval shall be general, shall not relieve the Contractor from his responsibility for adherence to the Contract, or for any error in the drawing and shall contain in substance the following:

"The modification shown on the attached drawing is approved in the interest of the URA to effect an improvement for the project and is ordered with the understanding that it does not involve any change in the Contract price or time; that it is subject generally to all Contract stipulations and covenants; and that it is without prejudice to any and all rights of the URA under the Contract and surety bond or bonds."

d. After the Contractor's drawings are approved, the Contractor must deliver to the URA the original tracings which have been corrected to agree with the approved prints.

116. REQUESTS FOR SUPPLEMENTARY INFORMATION

It shall be the responsibility of the Contractor to make timely requests of the URA for any additional information not already in his possession which should be furnished by the URA under terms of this Contract, and which he will require in the planning and execution of the work. Such requests may be submitted from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. Each request shall be in writing, and list the various items and the latest date by which each will be required by the Contractor. The first list shall be submitted within two weeks after Contract award and shall be as complete as possible at that time. The Contractor shall, if requested, furnish promptly any assistance and information the Engineer may require in responding to these requests of the Contractor. The Contractor shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this Section.

117. MATERIALS AND WORKMANSHIP

a. Unless otherwise specifically provided for in the Technical Specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the Technical Specifications as "equal to" any particular standard, the Engineer shall decide the question of equality.

b. The Contractor shall furnish to the URA for approval the manufacturer's detailed specifications for all machinery, mechanical, and other special equipment, which he contemplates installing, together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work. (See Section 118 hereof).

c. Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall be at the risk of subsequent rejection.

d. Materials specified by reference to the number or symbol of a specific standard, such as an A.S.T.M. Standard, a Federal Specification or other similar standard, shall comply with the requirements in the latest revision thereof, and any amendment or supplement thereto in effect on the date of the Invitation for Bids, except as limited to type, class or grade, or modified in such reference. The standards referred to, except as modified in the Technical Specifications shall have full force and effect as though printed therein.

118. SAMPLES, CERTIFICATES, AND TESTS

a. The Contractor shall submit all material or equipment samples, certificates, affidavits, etc. as called for in the Contract Documents or required by the Engineer, promptly after award of the Contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the Contract time.

Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with Contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which will assist the Engineer in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

The Engineer will call the various plants for the release of concrete, asphalt, etc.

b. Approval of any materials shall be general only and shall not constitute a waiver of the URA's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer will have such check tests made as he deems necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment, or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable.

c. Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

- (1) The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the Engineer;
- (2) The Contractor shall assume all costs of re-testing materials that fail to meet Contract Requirements;
- (3) The Contractor shall assume all costs of testing materials offered in substitution for those found deficient.

d. The Contractor shall also submit to the URA for approval the names and addresses of all material Manufacturers and Dealers.

119. PERMITS AND CODES

a. The Contractor shall give all notices required by and comply with all applicable laws, ordinances and codes of the Local Government. All construction work and/or utility installations shall comply with all applicable ordinances and codes including all written waivers. Before installing any work, the Contractor shall examine the Drawings and Technical Specifications for compliance with applicable ordinances and codes and shall immediately report any discrepancy to the URA. Where the requirements of the Drawings and Technical Specifications fail to comply with such applicable ordinances or codes, the URA

will adjust the Contract by Change Order to conform to such ordinances or codes (unless waivers in writing covering the difference have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated unit prices.

Should the Contractor fail to observe the foregoing provisions and proceed with the construction and/or install any utility at variance with any applicable ordinance or code, including any written waivers (notwithstanding the fact that such installation is in compliance with the Drawings and Technical Specifications), the Contractor shall remove such work without cost to the URA, but a Change Order will be issued to cover only the excess cost the Contractor would have been entitled to receive if the change had been made before the Contractor commenced work on the items involved.

b. The Contractor shall, at his own expense, secure and pay to the appropriate department of the Local Government the fees or charges for all permits for street pavement, sidewalks, sheds, removal of abandoned water taps, sealing of house connection drains, pavement cuts, building, electrical, plumbing, water, gas and sewer permits required by the local regulatory body or any of its agencies.

c. The Contractor shall comply with applicable local laws and ordinances governing the disposal of surplus excavation, materials, debris and rubbish on or off the project area and commit no trespass on any public or private property in any operation due to or connected with the Improvements embraced in this Contract.

120. CARE OF WORK

a. The Contractor shall be responsible for all damages to person or property that occur as a result of his fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the URA.

b. The Contractor shall provide sufficient competent watchmen, both day and night, including Saturdays, Sundays, and holidays, from the time the work is commenced until final completion and acceptance.

c. The Contractor shall avoid damage as a result of his operations to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, etc. and he shall at his own expense completely repair any damage thereto caused by his operations.

d. The Contractor shall shore up, brace, underpin, secure and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with the construction of the Improvements embraced in this Contract. The Contractor shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. The Contractor shall indemnify and save harmless the URA from any damages on account of settlements or the loss of lateral support of adjoining property and from all loss or expense and all damages for which the URA may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

121. ACCIDENT PREVENTION

a. The Contractor shall exercise proper precautions at all times for the protection of persons or property and shall be responsible for damages which occur as a result of his prosecution of the work.

b. The Contractor shall maintain an accurate record of all cases of death, occupational disease, or injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the URA with reports concerning these matters.

c. The Contractor shall indemnify and save harmless the URA and the City of Pittsburgh, as their interests may appear, from any claims for damages resulting from property damage, personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this Contract.

122. SANITARY FACILITIES

The Contractor shall furnish, install, and maintain ample sanitary facilities for the workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the sanitary codes of the State and Local Government. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service container or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

123. USE OF PREMISES

a. The Contractor shall confine his equipment, storage of materials and conduct his construction operations within the contract limits as shown on the drawings and as prescribed by ordinances and permits and shall not unreasonably encumber the site or public rights-of-way with his materials and construction equipment.

b. The Contractor shall comply with all ordinances and codes of the Local Government regarding signs, advertising, traffic, fires, explosives, danger signals and barricades.

124. REMOVAL OF DEBRIS, CLEANING, ETC.

The Contractor shall, periodically and as necessary, remove and legally dispose of all surplus excavated material and debris, and keep the Project Area and public rights-of-way reasonably clear. Upon completion of the work, he shall remove all temporary construction facilities, debris and unused materials provided for the work, and put the whole site of the work and public rights of way in a neat and clean condition. There shall be no trash burning on the site. If, after 48 hours from receipt of written notice from the URA, Contractor fails to fulfill its obligations under this section, the URA may engage others to do the work and may backcharge the Contractor for the costs.

125. INSPECTION

a. All materials and workmanship shall be subject to inspection, examination, or test by the URA and the Engineer at any and all times during manufacture or construction and at any and all places where such manufacture or construction is carried on. The URA shall have the right to reject defective material and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Project Area and replaced with material of

specified quality without charge therefor. If the Contractor fails to proceed at once with the correction of rejected workmanship or defective material, the URA may contract or otherwise have the defects remedied or rejected materials removed from the Project Area and charge the costs of the same against any moneys which may be due the Contractor, without prejudice to any other rights or remedies of the URA.

b. The Contractor shall furnish promptly all materials reasonably necessary for any tests which may be required. (See Section 118 hereof.) All tests by the URA will be performed in such manner as not to delay the work unnecessarily and will be made in accordance with the provisions of the Technical Specifications.

c. The Contractor shall notify the URA sufficiently in advance of backfilling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the URA, the Contractor shall uncover for inspection and recover such facilities all at his own expense, when so requested by the URA.

Should it be considered necessary or advisable by the URA at any time before final acceptance of the entire work to make an examination of work already completed by uncovering the same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any important or essential respect due to fault of the Contractor or his subcontractors, the Contractor shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, plus 15 percent of such costs to cover superintendence, general expenses and profits, shall be allowed the Contractor and he shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

d. Inspection of materials and appurtenances to be incorporated in the Improvements embraced in this Contract may be made at the place of production, manufacture or shipment whenever the quantity justifies it, and such inspection and acceptance, unless otherwise stated in the Technical Specifications, shall be final, except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Project Site.

e. Neither inspection, testing, approval, nor acceptance of the work in whole or in part by the URA or its agents shall relieve the Contractor or his sureties of full responsibility for materials furnished or work performed not in strict accordance with the Contract.

f. The duly authorized representative of the City of Pittsburgh shall at all times have full access to the project in order to inspect the various materials used and to inspect all phases of the construction.

126. REVIEW BY URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH

The URA, its authorized representatives and agents and the Representatives for the Secretary (as defined under GENERAL CONDITIONS, PART II) shall, at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however, that all instructions and approval with respect to the work will be given to the Contractor only by the URA through its authorized representatives or agents.

127. FINAL INSPECTION

When the Improvements embraced in this Contract are completed, the Contractor shall notify the URA in writing that the work will be ready for final inspection on a definite date which shall be stated in the notice. The notice will be given at least ten (10) days prior to the date stated for final inspection and bear the signed concurrence of the representative of the URA having charge of inspection. If the URA determines that the status of the Improvements is as represented, it will make the arrangements necessary to have final inspection commenced on the date stated in the notice or as soon thereafter as is practicable. The inspection party will also include representatives of each department of the State/Local Government that will be responsible for owning and maintaining the improvements constructed under the contract.

128. DEDUCTION FOR UNCORRECTED WORK

If the URA deems it not expedient to require the Contractor to correct work not done in accordance with the Contract Documents, an equitable deduction from the Contract Price will be made by agreement between the Contractor and the URA and subject to settlement, in case of dispute as herein provided.

129. INSURANCE

a. The Contractor shall purchase and maintain such insurance as set forth below which will protect him, the Urban Redevelopment Authority of Pittsburgh, the Pittsburgh Parking Authority, and the City of Pittsburgh from claims which may arise out of or result from Contractor's operations under this Contract, whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. The Urban Redevelopment Authority of Pittsburgh, the Pittsburgh Parking Authority, and the City of Pittsburgh shall be named as additional insured on the Contractor's policies; however, the Workmen's Compensation and Contractual Liability insurance coverage required hereunder shall name only the Contractor as the insured party thereunder. The insurance must cover the legal liability of the Urban Redevelopment Authority of Pittsburgh as owner. The Contractor shall require his subcontractors to purchase and maintain insurance of like coverage and amounts.

1. Workmen's Compensation Insurance as required by law together with Employer's Liability Insurance in an amount not less than the amount specified in the SPECIAL CONDITIONS.
2. Comprehensive General Liability Insurance, and Contractual Liability Insurance for any one occurrence and in the aggregate in amounts not less than the amounts specified in the SPECIAL CONDITIONS. Contractor's Completed Operations Insurance in the aggregate in an amount not less than the amount specified in the SPECIAL CONDITIONS. At a minimum, the policy shall include the following extensions of coverage:
 - a. Property Damage Liability Insurance shall include coverage for explosion, collapse, and underground (XCU) hazards.
 - b. The Contractual Liability Insurance shall specifically insure the Hold Harmless Clause (Section 121c herein) which is incorporated in this Agreement.
 - c. Property Damage Liability coverage shall be Broad Form Property Damage.

3. Comprehensive Automobile Liability Insurance to cover the Contractor for claims arising from all owned, hired, and non-owned vehicles which would include coverage per person and for any one occurrence for Bodily Injury and for any one occurrence for Property Damage with limits of not less than the amounts specified in the SPECIAL CONDITIONS. The policy shall carry an extension for Contractual Liability coverage to insure the Hold Harmless Clause (Section 121c herein) which is incorporated in this Agreement.
4. Umbrella Liability Insurance to provide coverage with limits of no less than the amount specified in the SPECIAL CONDITIONS for any one occurrence, combined Bodily Injury and Property Damage, excess over the Comprehensive General Liability Insurance and the Comprehensive Automobile Liability Insurance required above. The policy form shall be the standard printed form of a company satisfactory to the URA, without any special endorsements limiting coverage.

b. Before commencing work, the Contractor shall submit Certificates of Insurance detailing the insurance coverage specified to the URA for review and approval. He shall similarly submit Certificates of Insurance for each of his subcontractors. All policies shall be endorsed to provide for 30 days prior written notice of policy cancellation or material change directed to the URA. The URA may request copies of the actual policies should the need arise to review them. Upon review of the insurance coverage, the URA will indicate its approval or disapproval of the policies. New policies from other companies shall be provided in place of those disapproved. The required insurance shall be carried with financially responsible insurance companies, licensed in Pennsylvania and approved by the URA, and shall be kept in force until the Contractor's work is accepted by the URA. Contracts of insurance which expire before the Contractor's work is accepted by the URA shall be renewed and submitted to the URA for its approval.

130. PATENTS

The Contractor shall hold and save the URA, its officers, and employees, harmless from liability of any nature or kind, including costs and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the URA, unless otherwise specifically stipulated in the Technical Specifications.

131. WARRANTY OF TITLE

No material, supplies or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease-purchase or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the URA free from any claims, liens or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the URA. The provisions of this paragraph shall be inserted in all subcontracts and material contracts, and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

132. GENERAL GUARANTY

Neither the final certificate of payment nor any provision in the Contract nor partial or entire use of the Improvements embraced in this Contract by the URA or the public shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within the periods listed in the SPECIAL CONDITIONS for various items of construction. Such guaranty periods will start from the date of final acceptance of the work. The URA or the City of Pittsburgh will give notice of defective materials and work with reasonable promptness. If at any time during the guaranty period of the Guaranteed Items of Work listed in the SPECIAL CONDITIONS, the guaranteed items or any parts thereof, in the opinion of the URA or the City of Pittsburgh, require repairs due to faulty material or workmanship and the URA or City of Pittsburgh notifies the Contractor to make the required repairs, the Contractor shall immediately commence and complete the same to the satisfaction of the URA and the City of Pittsburgh. In case of failure or neglect of the Contractor within five (5) days from the date of the service of the notice to begin the repairs and faithfully prosecute the same to completion, the URA or the City of Pittsburgh shall have the right to purchase such materials as may be necessary and to employ the person or persons as may be proper and to undertake and complete the necessary repairs. The expense thereof shall be charged to the Contractor. When any final repairs on the items of work laid under the Contract are ordered by the URA or the City of Pittsburgh before the expiration of the guaranty period, and the Contractor, for any reason, is unable to or unwilling to complete such repairs before the expiration of the guaranty period, the guaranty period shall be extended and this Contract shall be in full force until such time as the repairs are completed in accordance with the specifications and accepted in writing by the URA and/or City of Pittsburgh.

133. JURISDICTIONAL DISPUTES

The Engineer or the URA shall not be brought into any dispute or controversy by reason of inadvertence or seeming necessity for issuing this specification in the form herewith presented. No arrangement of topics or other interrelation or reference used throughout in connection with any contract documents shall be construed by anyone to be interference on the part of either the Engineer or the URA with any jurisdictional or other trade rules or agreement.

134. EXPLOSIVES AND BLASTING

It is the responsibility of the Contractor to comply with all laws, rules and regulations with respect to the work to be done including the rules and regulations of the State Department of Labor and Industry and local municipalities governing the keeping, storage, use, manufacture, sale, handling, transportation or other disposition of explosives.

135. USE OF STEEL PRODUCED IN THE UNITED STATES

Steel Products Procurement Act. In the performance of this Agreement, Contractor and its subcontractors, materialmen, and suppliers shall use only steel products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two or more of such operations, from steel made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer, or other steel-making process. Steel products include not only cast-iron products, but also machinery and equipment listed in United States Department of Commerce Standard Industrial Classifications

25 (furniture and fixtures), 35 (machinery, except electrical), and 37 (transportation equipment), and made of, fabricated from, or containing, steel components. If a product contains both foreign and United States steel, it shall be determined to be a United States steel product only if at least 75 percent of the cost of the articles, materials, and supplies have been mined, produced, or manufactured, as the case may be, in the United States. Transportation equipment shall be determined to be a United States steel product only if it complies with Section 165 of P.L. 97-424 (96 Stat. 2136).

If unidentified steel products are supplied under this Agreement, before any payment will be made, Contractor must provide documentation including, but not limited to, invoices, bills of lading, and mill certification that the steel was melted and manufactured in the United States. If a steel product is identifiable from its face, Contractor must submit certification which satisfies the URA that Contractor has fully complied with this provision. URA shall not provide for or make any payments to any person who has not complied with the Pennsylvania Steel Products Procurement Act, 73 P.S. §§ 1881, *et seq.* (the "SPPA"). Any such payments made to any person by URA that should not have been made due to the SPPA shall be recoverable directly from the contractor, subcontractor, manufacturer, or supplier who did not comply with the SPPA. Contractor shall include the provisions of the SPPA in every subcontract and supply contract so that the provisions of the SPPA shall be binding upon each subcontractor and supplier.

136. CONFLICT OF INTERESTS

a. No member, official, or employee of the Urban Redevelopment Authority of Pittsburgh shall have any personal interest, direct or indirect, in this Contract, nor shall any such member, official, or employee participate in any decision relating to this Contract, which affects his personal interests or the interest of any corporation, partnership, or association in which he is, directly or indirectly, interested.

b. No member of, or delegate to, the Congress of the United States, and no Resident Commissioner, shall be admitted to any share or part of this Contract or to any benefit to arise from the same.

c. The Contractor shall incorporate or cause to be incorporated paragraphs a, b, and c of this section in all subcontracts.

d. Noncompliance by the Contractor with any or all of paragraphs a, b, and c of this section shall constitute a material breach of this agreement, and in such event, the URA shall have the right to at once cancel and terminate this Contract without being in any way obligated to the Contractor to reimburse him for any costs or expenses he may have or claim to have paid or incurred by reason of this Contract.

137. OTHER PROVISIONS

In addition to the stated provisions, the parties to this Contract agree to and are subject to all of the applicable conditions of the regulations issued pursuant to Title I of the Housing and Community Development Act of 1974, including, but not limited to, 24 CFR Part 570, and to all applicable laws, regulations and other requirements of HUD.

138. TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

This Contract is subject to the requirements of Title VI of the Civil Rights Act of 1964 (P.L. 88-352) and all HUD regulations pertaining thereto, including but not limited to, 24 CFR Part 1.

139. AIR AND WATER ACTS

a. The Contractor does hereby certify that no building, plant, installation, structure, mine, location or site of operations owned, leased or supervised by the Contractor to be utilized in the performance of this Contract is listed on the List of Violating Facilities issued by the Environmental Protection Agency ("EPA") pursuant to 40 CFR 15.20, nor has given rise to a conviction under Section 113 (c) (1) of the Clean Air Act or Section 309 (c) of the Federal Water Pollution Control Act.

b. The Contractor agrees to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 U.S.C. 1857 c-8) and Section 308 of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1318) including, but not limited to the requirements relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.

c. The award of the Contract is conditioned upon prompt notices being given by the Contractor of any notification received from the Director, Office of Federal Activities, EPA, indicating that any building, plant, installation, structure, mine location or site of operations owned, leased or supervised by the Contractor utilized or to be utilized for the performance of this Contract is under consideration to be listed on the EPA List of Violating Facilities.

d. The Contractor will include or cause to be included in every subcontract in excess of \$100,000, the criteria and requirements in paragraphs a through d of this part, and will take such action as the Government may direct as a means of enforcing such provisions.

e. In the event that the Contractor fails to comply with any or all of the paragraphs of this part, the URA may cancel, terminate, suspend or cause to be canceled, terminated or suspended, this Contract, or any portion or portions thereof.

140. HISTORICAL AND ARCHAEOLOGICAL DATA PRESERVATION ACT OF 1974

The Contractor agrees to facilitate the preservation and enhancement of structures and objects of historical, architectural or archaeological significance and when such items are found and/or unearthed during the course of project construction, to consult with the State Historic Preservation Officer for recovery of the items. Reference: National Historic Preservation Act of 1966 (80 Stat 915, 16 USC 470) and Executive Order No. 11593 of May 31, 1971.

141. DEBARMENT CERTIFICATION

a. Contractor/Subcontractor certifies that it and its principals have not been debarred, suspended, proposed for debarment, declared ineligible, are not in the process of being debarred, or are voluntarily excluded from conducting business with a federal department or agency of the federal government. Contractor/Subcontractor will include this certification in all contracts and subcontracts funded by the Loan/Grant/Agreement in accordance with Subpart C of the OMB guidance in 2 CFR part 180, as supplemented by HUD regulations in 2 CFR 2424.10 through 2424.1165..

b. Contractor/Subcontractor further certifies, for itself and all its contractors and subcontractors, that as of the date of its execution of this Agreement, neither Contractor/Subcontractor or any of its contractors, subcontractors or suppliers are under suspension or debarment by the Commonwealth of Pennsylvania or any governmental entity, instrumentality or authority and, if Contractor/Subcontractor cannot so certify, then it agrees to submit with this Agreement a written explanation of why such certification cannot be made.

c. Contractor/Subcontractor obligations pursuant to these provisions are ongoing from and after the effective date of this Agreement through the termination date hereof. Accordingly, Contractor/Subcontractor shall have an obligation to inform the URA if, at any time during the term of this Agreement, it or any of its contractors or subcontractors are suspended or debarred by the Commonwealth, the federal government or any other state or governmental entity. Such notification shall be within 15 days of suspension or debarment.

d. The failure of the Contractor/Subcontractor to notify the URA of its suspension or debarment by the federal government, the Commonwealth, any other state or governmental entity shall constitute an event of default under this Agreement.

GENERAL SPECIFICATIONS**GENERAL CONDITIONS****PART II****(FEDERAL LABOR STANDARDS PROVISIONS)****201. THE PROJECT TO WHICH THE WORK COVERED BY THIS CONTRACT PERTAINS**

The United States of America is assisting the Project or Program to which the construction work covered by this contract pertains and the following Federal Labor Standards Provisions are included in this contract pursuant to the provisions applicable to such Federal assistance.

202. MINIMUM WAGE RATES FOR LABORERS AND MECHANICS

a. All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act 29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or cost reasonably anticipated for bona fide fringe benefits under Section 1(b) (2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5 (a) (1) (iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5 (a) (4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR Part 5.5 (a) (1) (ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits bears a reasonable relationship to the wage rates contained in the wage determination.

c. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

d. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs b. or c. of this section shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

f. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

g. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the contractor, that applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

203. WITHHOLDING

HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic including any apprentice, trainee or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project) all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

204. PAYROLLS AND BASIC PAYROLL RECORDS OF THE CONTRACTOR AND SUBCONTRACTORS

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work, preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address and social security number of each worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b) (2) (B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a) (1) (iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1 (b) (2) (B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5 (a) (3) (I). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

c. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 29 CFR Part 5.5 (a) (3) (I) and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

d. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph b. of this section.

e. The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

f. The contractor or subcontractor shall make the records required under this section available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.

205. APPRENTICES AND TRAINEES

a. Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does

not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal Employment Opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

206. COMPLIANCE WITH COPELAND ACT REQUIREMENTS

The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

207. SUBCONTRACTS

The contractor or subcontractor will insert in any subcontracts the clauses contained in 29 CFR 5.5(a) (1) through (10) and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

208. CONTRACT TERMINATION; DEBARMENT

A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

209. COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REQUIREMENTS

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3 and 5 are herein incorporated by reference in this contract.

210. DISPUTES CONCERNING LABOR STANDARDS

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

211. CERTIFICATION OF ELIGIBILITY

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12 (a) (1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3 (a) of the Davis-Bacon Act or 29 CFR 5.12 (a) (1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions," provides in part: "Whoever, for the purpose of ...influencing in any way the action of such Administration ...makes, utters or publishes any statement, knowing the same to be false ...shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

212. COMPLAINTS, PROCEEDINGS, OR TESTIMONY BY EMPLOYEES

No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this contract are applicable shall be discharged or in any other manner discriminated against by the contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this contract to his employer.

213. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

a. Overtime Requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

b. Violation; Liability for Unpaid Wages; Liquidated Damages. In the event of any violation of the clause set forth in paragraph a. of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph a. of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph a. of this section.

c. Withholding for Unpaid Wages and Liquidated Damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor such sums

as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph b. of this section.

d. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs a. through d. of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs a. through d. of this section.

214. HEALTH AND SAFETY

a. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

b. The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 (formerly part 1518) and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96).

c. The contractor shall include the provisions of this Article in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

FEDERAL CONTRACT COMPLIANCE
(AFFIRMATIVE ACTION REQUIREMENTS)

301 SCOPE AND APPLICATION

This part applies to all contractors and subcontractors who hold any Federal or federally assisted construction contract in excess of \$10,000. The regulations in this part are applicable to all of a construction contractor's or subcontractor's construction employees who are engaged in on site construction including those construction employees who work on a non-Federal or non-federally assisted construction site.

302 EQUAL EMPLOYMENT OPPORTUNITY (Executive Order #11246)

During the performance of this contract, the Contractor agrees as follows:

- (1) Executive Order 11246, as amended, prohibits covered Federal contractors and subcontractors from discriminating against any employee or applicant for employment based on age, race, sex, religion, national origin, physical handicap - including those with impaired vision or hearing - or political or union affiliation. In addition, contractors and subcontractors are required to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their age, race, sex, religion, national origin, physical handicap - including those with impaired vision or hearing - or political or union affiliation. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
- (2) Contractors and subcontractors will, in all solicitations or advertisements for employees placed by or on behalf of contractors and subcontractors, state that all qualified applicants will receive consideration for employment without regard to age, race, sex, religion, national origin, physical handicap - including those with impaired vision or hearing - or political or union affiliation.
- (3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

- (5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (6) In the event of the contractor's non-compliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 for September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (7) The contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

303 **AFFIRMATIVE ACTION STANDARDS**

The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

- (1) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
- (2) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- (3) Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

- (4) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- (5) Development on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under (2) above.
- (6) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- (7) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- (8) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- (9) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- (10) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
- (11) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- (12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

- (13) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- (14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- (15) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- (16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

WAGE RATES

General Decision Number: PA180004 06/15/2018 PA4

Superseded General Decision Number: PA20170004

State: Pennsylvania

Construction Types: Heavy and Highway

Counties: Allegheny, Armstrong, Beaver, Bedford, Blair, Butler, Cambria, Cameron, Centre, Clarion, Clearfield, Clinton, Crawford, Elk, Erie, Fayette, Forest, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Lawrence, McKean, Mercer, Mifflin, Potter, Somerset, Venango, Warren, Washington and Westmoreland Counties in Pennsylvania.

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS (excluding sewer grouting projects and excluding sewage and water treatment plant projects)

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018
1	01/12/2018
2	01/26/2018
3	02/09/2018
4	03/16/2018
5	04/20/2018
6	06/01/2018
7	06/15/2018

BOIL0013-005 03/01/2018

CENTRE, FRANKLIN, POTTER, CLINTON, FULTON, HUNTINDON AND MIFFLIN COUNTIES

	Rates	Fringes
BOILERMAKER.....	\$ 45.89	33.39

BOIL0154-004 01/01/2017		

ALLEGHENY, ARMSTRONG, BEAVER, BEDFORD, BLAIR, BUTLER, CAMBRIA, CAMERON, CLARION, CLEARFIELD, CRAWFORD, ELK, FAYETTE, FOREST, GREENE, INDIANA, JEFFERSON, LAWRENCE, MCKEAN, MERCER, SOMERSET,

VENANGO, WARREN, WASHINGTON AND WESTMORELAND COUNTIES

	Rates	Fringes
BOILERMAKER.....	\$ 40.90	27.27

BOIL0744-003 07/01/2008		

ERIE COUNTY

	Rates	Fringes
BOILERMAKER.....	\$ 35.34	18.48

BRPA0005-033 05/01/2016		

MIFFLIN COUNTY

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 30.81	15.71

BRPA0005-046 05/01/2016		

FRANKLIN COUNTY

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 32.21	14.18

BRPA0005-071 05/01/2014		

CLINTON COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 31.35	13.85

* BRPA0009-004 06/01/2018		

BEDFORD, BLAIR, CAMBRIA, CENTRE COUNTY (Halfmoon, Houston, Patton, Rush, Taylor and Worth Townships), FULTON, HUNTINGDON, and SOMERSET COUNTIES

	Rates	Fringes
Bricklayer, Stonemason & Marble Setter.....	\$ 29.11	18.88

* BRPA0009-006 06/01/2018		

CLEARFIELD, FOREST, JEFFERSON, VENANGO, AND CLARION (Except Brady, Madison, Perry, Porter, Redbank, and Toby Townships) COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.55	19.26
Marble mason.....	\$ 29.55	19.26

* BRPA0009-023 06/01/2018		

BEAVER COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 30.16	21.41

BRPA0009-025 12/01/2017		

BUTLER, LAWRENCE, AND MERCER COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 29.45	20.70

BRPA0009-032 06/01/2017		

FAYETTE (Jefferson & Washington Twps), GREENE (Except Cumberland, Dunkirk, Greene, Monongahelia Twps), INDIANA, AND WESTMORELAND (Rostraver Twp) COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 31.00	20.66

BRPA0009-033 12/01/2017		

ARMSTRONG, CLARION (Brady, Madison, Perry, Tobe, Porter, Redbank Twps), FAYETTE (Except Jefferson & Washington Twps), GREENE (Cumberland, Dunkirk, Greene, Monongahelia Twps), INDIANA, AND WESTMORELAND (Except Rostrave Twp) COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 31.55	20.76

BRPA0009-034 11/01/2017		

ERIE COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 27.55	19.76

BRPA0009-058 12/01/2017		

ALLEGHENY, WASHINGTON (Cross Creek, Hanover, Jefferson, Mt Pleasant, Nottingham, Peters, Robinson, Smith, Union Twps) COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 31.69	21.27

BRPA0009-059 12/01/2017		

CAMERON, ELK, MCKEAN, POTTER AND WARREN COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 27.18	18.65

CARP2235-005 01/01/2018		

	Rates	Fringes
PILEDRIVERMAN		
Piledriverman (welder).....	\$ 34.50	18.55
Piledriverman.....	\$ 33.55	18.55

CARP2235-006 01/01/2018

	Rates	Fringes
Diver.....	\$ 50.33	18.55
Tender.....	\$ 33.55	18.55

CARP2274-001 01/01/2018

	Rates	Fringes
CARPENTER (ALLEGHENY, ARMSTRONG, BEAVER, BUTLER, ERIE, FAYETTE, GREENE, LAWRENCE, MERCER, WASHINGTON, AND WESTMORELAND COUNTIES)		
Carpenters (Welders).....	\$ 34.12	17.77
Carpenters.....	\$ 33.17	17.77

CARPENTER (BEDFORD, BLAIR, CAMBRIA, CAMERON, CENTRE, CLARION, CLINTON, CLEARFIELD, CRAWFORD, ELK, FOREST, FRANKLIN, FULTON, HUNTINGDON, INDIANA, JEFFERSON, MCKEAN, MIFFLIN, POTTER, SOMERSET, VENANGO, AND WARREN COUNTIES)		
Carpenters (Welders).....	\$ 33.87	17.77
Carpenters.....	\$ 32.92	17.77

ELEC0005-006 12/23/2017

ALLEGHENY, ARMSTRONG, BEDFORD, BLAIR, BUTLER CAMBRIA, CAMERON,
CENTRE (Remainder), CLARION, CLEARFIELD, ELK, FAYETTE, FULTON,
GREENE, HUNTINGDON, INDIANA, JEFFERSON, MCKEAN, SOMERSET,
VENANGO, WASHINGTON, AND WESTMORELAND COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 39.76	25.43

ELEC0056-004 06/05/2017

ERIE, FOREST AND WARREN COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 32.43	3%+22.65

* ELEC0126-005 05/28/2018

ALLEGHENY, ARMSTRONG, BEAVER, BEDFORD, BLAIR, CAMBRIA, CENTRE,
CLARION, CLEARFIELD, FAYETTE, FULTON, GREENE, HUNTINGDON,
INDIANA, JEFFERSON, SOMERSET, WASHINGTON AND WESTMORELAND

	Rates	Fringes

Line Construction:

Cable Splicer.....	\$ 46.29	29.25%+11.25
Groundman.....	\$ 27.77	29.25%+11.25
Lineman.....	\$ 46.29	29.25%+11.25
Truck Driver.....	\$ 30.09	29.25%+11.25
Winch Truck Operator.....	\$ 32.40	29.25%+11.25

 * ELEC0126-007 05/28/2018

FRANKLIN AND MIFFLIN COUNTIES

	Rates	Fringes

Line Construction:

Cable Splicer.....	\$ 45.25	29.25%+11.25
Groundman.....	\$ 27.15	29.25%+11.25
Lineman.....	\$ 45.25	29.25%+11.25
Truck Driver.....	\$ 29.41	29.25%+11.25
Winch Truck Operator.....	\$ 31.68	29.25%+11.25

 ELEC0143-007 06/01/2018

FRANKLIN and MIFFLIN COUNTIES

	Rates	Fringes

ELECTRICIAN.....	\$ 30.60	23.34

 ELEC0712-003 01/01/2018

CRAWFORD, BEAVER, LAWRENCE AND MERCER COUNTIES

	Rates	Fringes

ELECTRICIAN.....	\$ 37.55	22.95

 ELEC0812-008 06/01/2017

CLINTON COUNTY

	Rates	Fringes

ELECTRICIAN.....	\$ 33.59	18.61

 ELEC0812-009 06/01/2017

POTTER COUNTY

	Rates	Fringes

ELECTRICIAN.....	\$ 34.60	18.64

 ELEC0812-011 06/01/2017

CENTRE COUNTY (Burnside, Curtin, Liberty, Howard, Marion, Walker, Miles, Haines Townships)

	Rates	Fringes

ELECTRICIAN.....	\$ 33.59	18.61

 ELEC1319-004 01/01/2018

BUTLER, CAMERON, CLINTON, CRAWFORD, ELK, ERIE, FOREST,

LAWRENCE, MCKEAN, MERCER, VENANGO, WARREN AND POTTER COUNTIES

	Rates	Fringes
Line Construction:		
Equipment Operator.....	\$ 55.43	19.77
Groundmen.....	\$ 34.37	11.24
Linemen.....	\$ 55.43	21.77
Truck Driver.....	\$ 36.03	11.36

ENGI0066-016 01/01/2018

	Rates	Fringes
Power equipment operators: (ALLEGHENY, ARMSTRONG, BEAVER, BLAIR, BUTLER, CAMBRIA, CENTRE, CLARION, CLEARFIELD, CRAWFORD, ERIE, ELK, FAYETTE, GREENE, INDIANA, JEFFERSON, LAWRENCE, MCKEAN, MERCER, SOMERSET, VENANGO, WARREN, WASHINGTON, AND WESTMORELAND COUNTIES)		
GROUP 1.....	\$ 31.29	20.78
GROUP 2.....	\$ 31.03	20.78
GROUP 3.....	\$ 27.38	20.78
GROUP 4.....	\$ 26.92	20.78
GROUP 5.....	\$ 26.67	20.78

Power equipment operators: (BEDFORD, CAMERON, CLINTON, FOREST, FRANKLIN, FULTON, HUNTINGDON, MIFFLIN, AND POTTER COUNTIES)		
GROUP 1.....	\$ 31.00	20.78
GROUP 2.....	\$ 30.72	20.78
GROUP 3.....	\$ 27.08	20.78
GROUP 4.....	\$ 26.59	20.78
GROUP 5.....	\$ 26.38	20.78

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1 - Asphalt Paving Machine (Spreader), Autograde (C.M.I. and similar); Backfiller, Compactor with Blade, Backhoe - 360 and 180 degree Swing; Cableway; Caisson Drill (similar to Hugh Williams), Central Mix Plant; Cooling Plant; Concrete Paving Mixer, Concrete Pump (self-propelled); Cranes; Cranes (boom or mast over 101ft.\$50 per each additional 50 feet inclusive of jib), Cranes (Tower Stationary- Climbing Tower Crane); Derrick; Derrick Boat; Dozer(greater than 25,000 lbs.); Dragline; Dredge; Dredge Hydraulic; Elevating Grader; Franki Pile Machine; Gradall (remote control or otherwise), Grader (power-fine grade); Hllift (4 cy. and over); Hoist 2 Drums or more (in one unit); Hydraulic Boom Truck with pivotal cab (single motor-Pitman or similar), (Boom and Mast over 101 feet will be paid an additional 50 feet inclusive of jib if used;)
Kocal; Mechanic, Locomotive (std. Gauge); Metro-chip Harvester or similar; Milling Machine (Roto Mill or similar); Mix Mobile; Mix Mobile (with Self Loading Attachment), Mucking Machine (tunnel); Pile Driver Machine; Pipe Extrusion Machine; Presplitter Drill (self contained); Refrigeration Plant (soil Stablization) Rough Terrain Crane (25 ton over) (Boom and Mast over 101 feet will be paid an

additional 50 feet inclusive of jib if used); Rough Terrain Crane (under 25 ton), Scrapers; Shovel-Power; Slip form Paver (C.M.I. and similar); Trenching Machine (30,000 lbs. and over), Trenching Machine (under 30,000 lb.), Tunnell Machine (Mark XXI Jarva or similar), Vermeer Saw, Whirley, Mechanic, Compactor with blade

GROUP 2: Asphalt plant operator; auger (tractor mtd.); auger (truck mtd.); belt loader (euclid or similar); boring machine; cable placer or layer; Directional drill over 3,000 lbs thrust; concrete batch plant (electronically synchronized); concrete belt placer (C.M.I. and similar); concrete finishing machine and spreader, concrete mixer (over 1 cy.) concrete pump (stationary); core drill (truck or skid mtd. - similar to penn drill), dozer (25,000 lbs or less); Ditch Witch Saw, force feedloader; fork lift (lull or similar); grader - power; grease unit operator (head); guard rail post driver (truck mounted) guard rail post driver (skid type); hiliift (under 4 cy.); skid steer loader; hydraulic boom truck (non-pivotal cab); job work boat (powered), jumbo operator; locomotive (narrow guage); minor equipment operator (accumulative four units); mucking machine; multi-head saw (groover); overhead crane; roller -power- asphalt; ross carrier; side boom or tractor mounted boom; shuttle buggy (asphalt), stone crusher (screening-washing plants); stone spreader (self propelled) truck mounted drill (davey or similar); welder and repairman; well point pump operator; bidwell concrete finishing machine (or similar).

GROUP 3: Broom Finisher (C.M.I. or similar); Compactors/Rollers (static or vibratory (Self-propelled) on dirt or stone; Curb Builder; Minor Equipment Operator (two or three units); Multi-head Tie Tamper; Pavement Breaker (self-propelled or ridden); Soil Stabilizer Machine; Tire Repairman; Tractor (snaking and hauling); Well Driller and Horizontal: Winch or "A" Frame Truck (when hoisting and lowering).

GROUP 4: Ballast Regulator; Compressor; Concrete Mixer (1 cy. & under with skip); Concrete Saw (Ridden or self-propelled); Conveyor; Elevator (Material hauling only); Fork-lift (Ridden or self-propelled); Form Line Machine; Generator; Grout Pump; Heater (Machinical); Hoist (single Drum); Ladavator, Light Plant; Mulching Machine; Personnel Boat (Powered), Pulverizer, Pumps, Seeding Machine, spray Cure Machine (powered Driven); Subgrader; Tie Puller; Tugger; Welding Machine (Gas or Diesel).

GROUP 5: Deck Hand; Farm Tractor; Fireman on Boiler; Oiler; Power Broom; Side Delivery Shoulder Spreader (attachment);

IRON0003-001 06/01/2017

ALLEGHENY, FAYETTE, WESTMORELAND, CAMBRIA, INDIANA, ARMSTRONG, BUTLER, BEAVER, CLARION, AND WASHINGTON COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 33.54	29.87

IRON0003-007 06/01/2017

BLAIR, CAMERON, CENTRE, CLEARFIELD, CLINTON, ELK, JEFFERSON,
MCKEAN, AND POTTER COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 28.02	28.03

IRON0003-011 06/01/2017

CRAWFORD, ERIE, FOREST, AND WARREN COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 28.91	28.03

IRON0207-002 06/01/2015

LAWRENCE, MERCER, AND VENANGO COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 28.06	22.41

IRON0404-008 07/01/2017FRANKLIN (Remainder), HUNTINGDON (Remainder), AND MIFFLIN
COUNTIES

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 31.33	28.38

IRON0549-002 12/01/2012

GREENE COUNTY

	Rates	Fringes
IRONWORKER.....	\$ 30.45	16.04

IRON0568-004 05/01/2017BEDFORD, FRANKLIN (Southwest 1/3), FULTON, HUNTINGDON (Western
2/3), AND SOMERSET COUNTIES

	Rates	Fringes
IRONWORKER Structural, Ornamental, Reinforcing, Machinery Mover, Rigger & Machinery Erector, Welder, Fence Erector.....	\$ 28.31	19.46

LAB01058-001 01/01/2018

	Rates	Fringes
LABORER (BEDFORD, CAMERON, CENTRE, CLINTON, CRAWFORD, FOREST, FRANKLIN, FULTON, HUNTINGDON, JEFFERSON,		

MIFFLIN, AND POTTER COUNTIES)

GROUP 1.....	\$ 24.85	22.25
GROUP 2.....	\$ 25.01	22.25
GROUP 3.....	\$ 25.50	22.25
GROUP 4.....	\$ 25.95	22.25
GROUP 5.....	\$ 26.36	22.25
GROUP 6.....	\$ 23.20	22.25
GROUP 7.....	\$ 25.85	22.25
GROUP 8.....	\$ 27.35	22.25

Laborers: (ALLEGHENY,
ARMSTRONG, BEAVER, BLAIR,
BUTLER, CAMBRIA, CLARION,
CLEARFIELD, ELK, ERIE,
FAYETTE, GREENE, INDIANA,
LAWRENCE, MCKEAN, MERCER,
SOMERSET, VENANGO, WARREN,
WASHINGTON, AND WESTMORELAND
COUNTIES)

GROUP 1.....	\$ 24.95	22.25
GROUP 2.....	\$ 25.11	22.25
GROUP 3.....	\$ 25.50	22.25
GROUP 4.....	\$ 25.95	22.25
GROUP 5.....	\$ 26.36	22.25
GROUP 6.....	\$ 23.20	22.25
GROUP 7.....	\$ 25.95	22.25
GROUP 8.....	\$ 27.45	22.25

LABORERS CLASSIFICATIONS

GROUP 1: Asphalt curb sealer; Asphalt tamper; Batcherman (weigh) Blaster, Boatman, Brakeman, Change house attendant, Cofferdam, Concrete curing pitman, Puddler, Drill Runner's helper (Includes Drill Mounted on Truck, Track, or similar and Davey Drill Spots, Clean up, helps to maintain), Electric Brush and or Grinder, Fence Construction (Including Fence Machine Operator) Form stripper and Mover, Gabion (Erectors and Placers) Hydro jet blaster nozzleman; Landscape laborer, Manually moved emulsion sprayer, Radio actuated traffic control operator Rip rap work, scaffolds and Runways, Sheet piers and Shoring (includes lagging) structural concrete Top Surfer, Walk Behind Street Sweeper, and Wood Chipper; water boy

GROUP 2: Air tool operator (all types); Asphalt, batch & concrete plant operator (manually operated) Burner, Caisson; men (open air); Carryable pumps; Chain saw operator including attachments, Cribbing, (concrete or steel); Curb machine operator (asphalt or concrete walk behind); Diamond head Core Driller, Drill runner's helper (tunnel) Fork Lift, (walk behind), Form Setter (Road Forms Line man) Highway Slab reinforcement placers (including joint and Basket Setters) Hydraulic pipe pusher; Liner plates (Tile or Vitrified Clay) Mechanical compacting equipment operators, Mechanical joint sealer, Dope pot and Tar Kettle, Mortar mixer (hand or machine) Muckers, Brakemen & all other Labor, (Includes installation of utility lines) Pipe Layers /Fusion /Heating Iron (Regardless of materials) Portable Single Unit Conveyor, Post Hole Auger, (2 or 4 cycle hand operated) Power wheelbarrows and buggies, Rail porter or similar; Sand blaster; Signal Man, Vibrator operator, All RAILROAD TRACK WORK TO INCLUDE THE FOLLOWING: adzing machine, ballast Router, Bolting Machine, Power Jacks, Rail Drills, Railroad Brakeman, Rail Saws, Spike Drivers (Manually or hand held tool) Spike Pullers Tamping Machine, Thermitweld

GROUP 3: Asphalt Luteman/Raker, Blacksmith, Blaster, Brick, stone and block pavers and block cutters (wood, belgian and asphalt); Cement mortar lining car pusher; Cement mortar mixer (pipe relining); Cement mortar pipe reliners; concrete saw operator (walk behind); Curb cutters and setters; Elevated roadway drainage construction; erector of overhead signs, Form setter (road forms-lead man); Grout machine operator; Guniting or dry pack gun (nozzle and machine man); Manhole or catch basin builder (Brick block concrete or any prefabrication) Miners and drillers (including lining, supporting and form workmen, setting of shields, miscellaneous equipment and jumbos); Multi-plate pipe (aligning and securing); Placing wire mesh on guniting projects; Wagon drill operators (air track or similar); Walk behind ditching machine (trencher or similar); crown screed adjuster and welder

GROUP 4: Reinforcing Steel Placer (Bending, aligning, and securing, Cadweld)

GROUP 5: High Burner, (Any burning not done from deck), Welder (Pipeline)

GROUP 6: Uniformed Flagperson, Watchman

GROUP 7: Toxic/Hazardous Waste Removal Laborer Levels C & D

GROUP 8: Toxic/Hazardous Waste Removal Laborer Levels A & B

PAIN0021-019 05/01/2014

CLINTON COUNTY

	Rates	Fringes
Painters:		
Bridge.....	\$ 32.25	15.80
Brush & Roller.....	\$ 25.95	15.80
Spray.....	\$ 27.95	15.80

PAIN0021-024 05/01/2016

FRANKLIN COUNTY

	Rates	Fringes
PAINTER		
Brush.....	\$ 23.47	12.70

PAIN0057-014 06/01/2017

ALLEGHENY, FAYETTE, GREENE, WASHINGTON COUNTIES

	Rates	Fringes
Painters:		
Bridge.....	\$ 33.95	18.43
Brush & Roller.....	\$ 27.50	18.43
Spray.....	\$ 27.50	18.43

PAIN0057-015 06/01/2016

ARMSTRONG, BEAVER, BEDFORD, BLAIR, BUTLER, CAMBRIA, CENTRE,

CLARION, CLEARFIELD, ELK, FULTON, HUNTINGTON, INDIANA,
JEFFERSON, LAWRENCE, MERCER, MIFFLIN, SOMERSET, VENANGO AND
WESTMORELAND COUNTIES

	Rates	Fringes
Painters:		
Bridge.....	\$ 33.68	17.35
Brush and Roller.....	\$ 27.38	17.35
Spray.....	\$ 27.38	17.35

PAIN0057-022 05/01/2017

	Rates	Fringes
Painters: (ERIE, McKEAN, AND WARREN (Including Columbus and Freehold twps) COUNTIES)		
Bridges, Stacks, Towers.....	\$ 24.37	17.22
Brush and Roller.....	\$ 21.87	17.22
Spray and Sandblasting.....	\$ 22.62	17.22

PAIN0057-027 06/01/2016

CAMERON, CRAWFORD, POTTER, WARREN, (Excluding Columbus and
Freehold twps)

	Rates	Fringes
PAINTER		
Brush and Roller.....	\$ 25.99	16.67

PLAS0526-002 01/01/2018

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 31.04	19.90

PLUM0027-001 06/01/2017

ALLEGHENY, ARMSTRONG, GREENE (Except extreme Eastern portion),
WASHINGTON (Except extreme Eastern portion) and WESTMORELAND
(City of Arnold and City of New Kensington Only) COUNTIES

	Rates	Fringes
Plumbers and Pipefitters (Bridge Drain Pipe).....	\$ 39.20	21.27

PLUM0047-005 05/01/2013

BEAVER, BUTLER, MCKEAN, MERCER, VENANGO, CLARION, LAWRENCE,
FOREST, WARREN, CRAWFORD, AND ERIE COUNTIES

	Rates	Fringes
Plumbers and Pipefitters (Bridge Drain Pipe).....	\$ 38.52	20.11

PLUM0354-005 06/01/2012

BEDFORD, BLAIR, CAMBRIA, CAMERON, CLEARFIELD, ELK, FAYETTE,
 GREENE (Extreme Eastern portion), HUNTINGDON, INDIANA,
 JEFFERSON, SOMERSE, WASHINGTON (Extreme Eastern portion), AND
 WESTMORELAND COUNTIES

	Rates	Fringes
Plumbers and Pipefitters (Bridge Drain Pipe).....	\$ 35.54	19.97

 TEAM0040-001 01/01/2018

	Rates	Fringes
TRUCK DRIVER (ALLEGHENY, ARMSTRONG, BEAVER, BLAIR, BUTLER, CAMBRIA, CENTRE, CLARFIELD, CRAWFORD, ERIE, FAYETTE, GREENE, INDIANA, JEFFERSON, LAWRENCE, MCKEAN, MERCER, SOMERSET, VENANGO, WARREN, WASHINGTON, AND WESTMORELAND)		
GROUP 1.....	\$ 28.52	18.40
GROUP 2.....	\$ 28.66	18.48
GROUP 3.....	\$ 29.13	18.78

Truck drivers: (BEDFORD,
 CAMERON, CLAIRON, CLINTON,
 ELK, FOREST, FRANKLIN,
 FULTON, HUNTINGDON, MIFFLIN,
 AND POTTER COUNTIES)

GROUP 1.....	\$ 28.36	18.29
GROUP 2.....	\$ 28.52	18.40
GROUP 3.....	\$ 28.98	18.70

FOOTNOTES: A. Hazardous/toxic waste material/work level A
 & B receive additional \$2.50 per hour above classification
 rate

B. Hazardous/toxic waste materials/Work level C & D receive
 \$1.00 per hour above classification

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - Single Axle (2 axles including steering axle);
 Includes partsman and warehoueman

GROUP 2 - Tandem - Tri-Axle - Semi-Tractor Trailer
 (combination) (3 axles or more including steering axle)

GROUP 3 - Specialty Vehicles; Heavy equipment whose capacity
 exceeds that for which state licenses are issued
 specifically refers to units in excess of eight (8) feet
 width (such as Euclids, Atley Wagon, Payloader,
 Tournawagons, and similar equipment when not self loaded);
 Tar and Asphalt Distributors Trucks, Heavy Duty Trailer,
 such as Low Boy, High Boy

 WELDERS - Receive rate prescribed for craft performing
 operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and

non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator

(See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

CONTRACTOR INTEGRITY PROVISIONS

It is essential that those who seek to contract with the Commonwealth of Pennsylvania and its agencies and authorities, including the URA (collectively, the "Commonwealth") observe high standards of honesty and integrity. They must conduct themselves in a manner that fosters public confidence in the integrity of the Commonwealth procurement process.

In furtherance of this policy, Contractor agrees to the following:

A. Contractor shall maintain the highest standards of honesty and integrity during the performance of this contract and shall take no action in violation of state or federal laws or regulations or any other applicable laws or regulations, or other requirements applicable to Contractor or that govern contracting with the Commonwealth.

B. Contractor shall establish and implement a written business integrity policy, which includes, at a minimum, the requirements of these provisions as they relate to Contractor employee activity with the Commonwealth and Commonwealth employees, and which is distributed and made known to all Contractor employees.

C. Contractor, its affiliates, agents and employees shall not influence, or attempt to influence, any Commonwealth employee to breach the standards of ethical conduct for Commonwealth employees set forth in the Public Official and Employees Ethics Act, 65 Pa.C.S. §§1101 et seq.; the State Adverse Interest Act, 71 P.S. §776.1 et seq.; and the Governor's Code of Conduct, Executive Order 1980-18, 4 Pa. Code §7.151 et seq. or to breach any other state or federal law or regulation.

D. Contractor, its affiliates, agents and employees shall not offer, give or agree or promise to give any gratuity to a Commonwealth official or employee or to any other person at the direction or request of any Commonwealth official or employee.

E. Contractor, its affiliates, agents and employees shall not offer, give, or agree or promise to give any gratuity to a Commonwealth official or employee or to any other person, the acceptance of which would violate the Governor's Code of Conduct, Executive Order 1980-18, 4 Pa. Code §7.151 et seq. or any statute, regulation, statement of policy, management directive or any other published standard of the Commonwealth.

F. Contractor, its affiliates, agents and employees shall not, directly or indirectly, offer, confer, or agree to confer any pecuniary benefit on anyone as consideration for the decision, opinion, recommendation, vote, other exercise of discretion, or violation of a known legal duty by any Commonwealth official or employee.

G. Contractor, its affiliates, agents, employees, or anyone in privity with him or her shall not accept or agree to accept from any person, any gratuity in connection with the performance of work under the contract, except as provided in the contract.

H. Contractor shall not have a financial interest in any other Contractor, subgrantee, or supplier providing services, labor, or material on this project, unless the financial interest is disclosed to the Commonwealth in writing and the Commonwealth consents to Contractor's financial interest prior to Commonwealth execution of the contract. Contractor shall disclose the financial interest to the Commonwealth at the time of bid or proposal submission, or if no bids or proposals are solicited, no later than Contractor's submission of the contract signed by Contractor.

I. Contractor, its affiliates, agents and employees shall not disclose to others any information, documents, reports, data, or records provided to, or prepared by, Contractor under this contract without the prior written approval of the Commonwealth, except as required by the Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104, or other applicable law or as otherwise provided in this contract. Any information, documents, reports, data, or records secured by Contractor from the Commonwealth or a

third party in connection with the performance of this contract shall be kept confidential unless disclosure of such information is:

1. Approved in writing by the Commonwealth prior to its disclosure; or
2. Directed by a court or other tribunal of competent jurisdiction unless the contract requires prior Commonwealth approval; or
3. Required for compliance with federal or state securities laws or the requirements of national securities exchanges; or
4. Necessary for purposes of Contractor's internal assessment and review; or
5. Deemed necessary by Contractor in any action to enforce the provisions of this contract or to defend or prosecute claims by or against parties other than the Commonwealth; or
6. Permitted by the valid authorization of a third party to whom the information, documents, reports, data, or records pertain; or
7. Otherwise required by law.

J. Contractor certifies that neither it nor any of its officers, directors, associates, partners, limited partners or individual owners has not been officially notified of, charged with, or convicted of any of the following and agrees to immediately notify the Commonwealth agency contracting officer in writing if and when it or any officer, director, associate, partner, limited partner or individual owner has been officially notified of, charged with, convicted of, or officially notified of a governmental determination of any of the following:

1. Commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property.
2. Commission of fraud or a criminal offense or other improper conduct or knowledge of, approval of or acquiescence in such activities by Contractor or any affiliate, officer, director, associate, partner, limited partner, individual owner, or employee or other individual or entity associated with:
 - (a) obtaining;
 - (b) attempting to obtain; or
 - (c) performing a public contract or subcontract.

Contractor's acceptance of the benefits derived from the conduct shall be deemed evidence of such knowledge, approval or acquiescence.

3. Violation of federal or state antitrust statutes.
4. Violation of any federal or state law regulating campaign contributions.
5. Violation of any federal or state environmental law.
6. Violation of any federal or state law regulating hours of labor, minimum wage standards or prevailing wage standards; discrimination in wages; or child labor violations.
7. Violation of the Act of June 2, 1915 (P.L.736, No. 338), known as the Workers' Compensation Act, 77 P.S. 1 et seq.
8. Violation of any federal or state law prohibiting discrimination in employment.
9. Debarment by any agency or department of the federal government or by any other state.

10. Any other crime involving moral turpitude or business honesty or integrity. Contractor acknowledges that the Commonwealth may, in its sole discretion, terminate the contract for cause upon such notification or when the Commonwealth otherwise learns that Contractor has been officially notified, charged, or convicted.

K. If this contract was awarded to Contractor on a non-bid basis, Contractor must, (as required by Section 1641 of the Pennsylvania Election Code) file a report of political contributions with the Secretary of the Commonwealth on or before February 15 of the next calendar year. The report must include an itemized list of all political contributions known to Contractor by virtue of the knowledge possessed by every officer, director, associate, partner, limited partner, or individual owner that has been made by:

1. Any officer, director, associate, partner, limited partner, individual owner or members of the immediate family when the contributions exceed an aggregate of one thousand dollars (\$1,000) by any individual during the preceding year; or

2. Any employee or members of his immediate family whose political contribution exceeded one thousand dollars (\$1,000) during the preceding year.

To obtain a copy of the reporting form, Contractor shall contact the Bureau of Commissions, Elections and Legislation, Division of Campaign Finance and Lobbying Disclosure, Room 210, North Office Building, Harrisburg, PA 17120.

L. Contractor shall comply with requirements of the Lobbying Disclosure Act, 65 Pa.C.S. § 13A01 et seq., and the regulations promulgated pursuant to that law. Contractor employee activities prior to or outside of formal Commonwealth procurement communication protocol are considered lobbying and subjects the Contractor employees to the registration and reporting requirements of the law. Actions by outside lobbyists on Contractor's behalf, no matter the procurement state, are not exempt and must be reported.

M. When Contractor has reason to believe that any breach of ethical standards as set forth in law, the Governor's Code of Conduct, or in these provisions has occurred or may occur, including but not limited to contact by a Commonwealth officer or employee which, if acted upon, would violate such ethical standards, Contractor shall immediately notify the Commonwealth contracting officer or Commonwealth Inspector General in writing.

N. Contractor, by submission of its bid or proposal and/or execution of this contract and by the submission of any bills, invoices or requests for payment pursuant to the contract, certifies and represents that it has not violated any of these Contractor integrity provisions in connection with the submission of the bid or proposal, during any contract negotiations or during the term of the contract.

O. Contractor shall cooperate with the Office of Inspector General in its investigation of any alleged Commonwealth employee breach of ethical standards and any alleged Contractor non-compliance with these provisions. Contractor agrees to make identified Contractor employees available for interviews at reasonable times and places. Contractor, upon the inquiry or request of the Office of Inspector General, shall provide, or if appropriate, make promptly available for inspection or copying, any information of any type or form deemed relevant by the Inspector General to Contractor's integrity and compliance with these provisions. Such information may include, but shall not be limited to, Contractor's business or financial records, documents or files of any type or form that refers to or concern this contract.

P. For violation of any of these Contractor Integrity Provisions, the Commonwealth may terminate this and any other contract with Contractor, claim liquidated damages in an amount equal to the value of anything received in breach of these provisions, claim damages for all additional costs and expenses incurred in obtaining another Contractor to complete performance under this contract and debar and suspend Contractor from doing business with the Commonwealth. These rights and remedies are cumulative, and the use or non-use of any one shall not preclude the use of all or any other. These rights

and remedies are in addition to those the Commonwealth may have under law statute, regulation or otherwise.

Q. For purposes of these Contractor Integrity Provisions, the following terms shall have the meanings found in this Paragraph 17.

1. "Confidential information" means information that a) is not already in the public domain; b) is not available to the public upon request; c) is not or does not become generally known to Contractor from a third party without an obligation to maintain its confidentiality; d) has not become generally known to the public through an act or omission of Contractor; or e) has not been independently developed by Contractor without the use of confidential information of the Commonwealth.

2. "Consent" means written permission signed by a duly authorized officer or employee of the Commonwealth, provided that where the material facts have been disclosed, in writing, by pre-qualification, bid, proposal, or contractual terms, the Commonwealth shall be deemed to have consented by virtue of execution of this contract.

3. "Contractor" means the individual or entity that has entered into this contract with the Commonwealth, including those directors, officers, partners, managers, and owners having more than a five percent interest in Contractor.

4. "Financial interest" means:

(a) Ownership of more than a five percent interest in any business; or

(b) Holding a position as an officer, director, trustee, partner, employee, or holding any position of management.

5. "Gratuity" means tendering, giving or providing anything of more than nominal monetary value including, but not limited to, cash, travel, entertainment, gifts, meals, lodging, loans, subscriptions, advances, deposits of money, services, employment, or contracts of any kind. The exceptions set forth in the Governor's Code of Conduct, Executive Order 1980-18, the 4 Pa. Code §7.153 (b), shall apply.

6. "Immediate family" means a spouse and any unemancipated child.

7. "Non-bid basis" means a contract awarded or executed by the Commonwealth with Contractor without seeking bids or proposals from any other potential bidder or offeror.

8. "Political contribution" means any payment, gift, subscription, assessment, contract, payment for services, dues, loan, forbearance, advance or deposit of money or any valuable thing, to a candidate for public office or to a political committee, including but not limited to a political action committee, made for the purpose of influencing any election in the Commonwealth of Pennsylvania or for paying debts incurred by or for a candidate or committee before or after any election.

Urban Redevelopment Authority of Pittsburgh

**200 Ross Street
Pittsburgh, Pennsylvania 15219**

STATEMENT OF SUBCONTRACTOR'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Subcontractor may submit any additional information he desires.

1. Name of Subcontractor: _____ Phone No: _____
2. PennDOT Prequalification No. (If applicable) _____
3. Permanent main office address: _____
4. When organized: _____
5. Check type of organization:
Individual _____ Partnership _____ Corporation _____
6. If a corporation, where incorporated? _____
7. How many years have you been engaged in the contracting business under your present firm or trade name? _____
8. Contracts on hand: (Schedule these, showing amount of each contract, the owner, the owner's phone number and the approximate anticipated dates of completion.) _____
9. Describe the general character of work performed by your company: _____
10. Have you ever failed to complete any work awarded to you?
If so, where and why? _____
11. Have you ever defaulted on a contract?
If so, where and why? _____

12. List the more important contracts recently completed by your company stating the owner, the owner's phone number, the approximate cost for each, and the month and year completed.
13. List your major equipment available for this subcontract.
14. Cite experience in work similar in kind and scope to this subcontract.
15. List background and experience of the principal members of your organization, including the officers.
16. Credit Available: \$ _____
17. Give bank reference: _____

18. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Urban Redevelopment Authority of Pittsburgh?
19. Do you have any Affirmative Action Program that meets the requirements of Section 210 (Equal Employment Opportunity) of the Contract General Conditions?
20. Do you have a written Affirmative Action Plan, outlining your Affirmative Action Program that will be made available to the Urban Redevelopment Authority of Pittsburgh upon request?
21. If you do not presently have such a Program and Plan, will you agree to establish a program and provide a plan, if requested by the Urban Redevelopment Authority of Pittsburgh?
22. Does your Affirmative Action Program actively support the training of minority group persons in the trade classifications which will be used in the execution of the subcontract?
23. Have you ever been denied an award of a contract have you ever had funds withheld from your firm for failure to comply with the Equal Employment Provisions required by Executive Order No. 11246?
24. For all parties in Interest identified in No. 23, provide for each the names of any contracting firms for which they ever had a beneficial interest and further state whether, during the period of ownership interest was held, the contracting firm ever defaulted on a contract (and if so, where and why), whether the contracting firm failed to complete any work awarded to it (and if so, where and why) and whether the contracting firm ever filed for bankruptcy.

Subcontractor

Title

_____ Being duly sworn deposes and says that he is _____
of _____ and that the answers to the foregoing questions and all statements
therein contained are true and correct.

Notary Public

My commission expires _____, 20____.

URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH

200 Ross Street
Pittsburgh, PA 15219

APPROVAL OF SUBCONTRACTOR

PROJECT NAME _____

CONTRACT NO. _____ FOR _____ WORK

PRINCIPAL CONTRACTOR _____

Subcontractor _____

Address _____

Subcontractor PennDOT Prequalification No. _____

Item(s) of Work _____

Date of Subcontract _____

Estimated Subcontract Starting Time _____

Submitted by Principal Contractor:

By _____ Date _____
Signature of Principal Contractor

APPROVED BY:

Urban Redevelopment Authority of Pittsburgh

Date

Date

NOTE)This form must be submitted in three (3) copies together with one (1) copy of the Subcontract
)or accepted Proposal, one (1) copy of the Subcontractor's Qualifications Form and one (1) copy
)of Certificate of Insurance indicating coverage as required under General Conditions, Part I,
)and also one (1) copy of the Non-Collusion Affidavit of Subcontractor Form and Waiver of
)Mechanics' Liens

NON-COLLUSION AFFIDAVIT OF SUBCONTRACTOR

STATE OF _____)
)
)SS
COUNTY OF _____)

_____ being first duly sworn,
deposes and says that:

- (1) He is _____ of _____
hereinafter referred to as the "Subcontractor".
- (2) He is fully informed respecting the preparation and contents of the Subcontractor's Proposal
submitted by the Subcontractor to _____,
the Contractor for certain work in connection with contract _____
pertaining to _____ work.
- (3) Such Subcontractor's Proposal is genuine and is not a collusive or sham proposal.
- (4) Neither the Subcontractor nor any of its officers, partners, owners, agents, representatives,
employees, or parties in interest, including this affiant, has in any way colluded, conspired,
connived, or agreed, directly or indirectly, with any other Bidder, firm, or person to submit a
collusive or sham Proposal in connection with such Contract or to refrain from submitting a
Proposal in connection with such Contract, or has in any manner, directly or indirectly, sought by
unlawful agreement or connivance with any other Bidder, firm, or person to fix the price or prices
in said Subcontractor's Proposal, or to fix any overhead, profit or cost element of the price or
prices in said Subcontractor's Proposal, or to secure through collusion, conspiracy, connivance, or
unlawful agreement any advantage against the Urban Redevelopment Authority of Pittsburgh or any
person interested in the proposed contract.
- (5) The price or prices quoted in the Subcontractor's Proposal are fair and proper and are not tainted
by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any of
its agents, representatives, owners, employees, or parties in interest, including this affiant.

Subcontractor

By _____

Title _____

Subscribed and sworn to before me

this _____ day of _____, 20____

My commission expires _____, 20____

WAIVER OF MECHANICS' LIENS

(For a Subcontractor in connection with a bonded project)

This WAIVER OF MECHANICS' LIENS (this "Waiver"), dated as _____, 20____, is entered into by and between URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH, a redevelopment authority organized and existing under the Urban Redevelopment Law, 35 P.S. §1701 et seq., having offices at 200 Ross Street, Pittsburgh, PA 15219 ("URA") and _____ (the "Subcontractor").

WITNESSETH THAT:

WHEREAS, URA and _____ (the "Contractor") have entered into a written contract dated _____, 20____ known as _____, (the "Contract"), providing for the construction of certain public improvements (the "Work") upon property located in the City of Pittsburgh, Allegheny County, Pennsylvania described in EXHIBIT "A" attached hereto and made part hereof (the "Property") owned by the URA, (the "Owner"); and

WHEREAS, the total amount of the Contract price is \$ _____ (exclusive of future change orders), and the time of payment is set forth on Exhibit "B" attached hereto and made part hereof; and;

WHEREAS, the Contractor and the Subcontractor have entered into a written contract of even date herewith (the "Subcontract"), relating to certain labor and/or materials to be provided in connection with the Work; and

WHEREAS, the Contractor has posted a Labor and Materialmen's Payment Bond (the "Bond"), attached hereto as EXHIBIT "C", guaranteeing the payment of the labor and/or materials to be supplied by the Subcontractor; and

WHEREAS, due to the fact that the Contractor has posted the Bond, the Contract and this Waiver provide that no mechanics' lien or claims will be entered and filed against the Property or any part thereof by the Subcontractor or anyone claiming by, through or under the Subcontractor for any Work, labor and materials supplied in connection with the performance of the Contract or the Subcontract; and

WHEREAS, the Subcontractor desire to grant this Waiver pursuant to and in compliance with the provisions of Article IV, § 402, of the Act of the General Assembly of Pennsylvania of August 24, 1963, P.L. 1175, No. 497, as amended, known as the Mechanics' Lien Law of 1963, 49 P.S. § 1101 *et seq.* (the "Mechanics' Lien Law"), in settlement of all claims of the Subcontractor.

NOW, THEREFORE, the Subcontractor, intending to be legally bound, hereby covenants and agrees as follows:

1. Unless the context hereof clearly indicates otherwise, all capitalized terms used herein are used as such terms defined in the Mechanics' Lien Law.

2. To the fullest extent permitted by applicable law, no mechanics' or materialman's lien or claim or other lien or claim of any kind whatsoever, pursuant to Section 301 of the Mechanics' Lien Law or otherwise, shall ever be filed or maintained against the Property, or any Improvement thereon, by the Subcontractor for any Work done or services performed or labor or materials furnished under the Subcontract for the demolition, erection, construction, alteration or repair of any Improvements, or for any other debts due by the Owners or the Contractor to the Subcontractor or Sub-subcontractor or any other claimant acting by, through or under the Subcontractor arising out of the performance of this Agreement.

3. The Subcontractor shall look solely to the Contractor for payment for all claims or debts due for any Work done or services performed or labor or materials furnished in connection with any Improvements on the Property, so that no claim of any kind whatsoever shall be made or filed against the Owners or the Property for or on account of any Work done or labor or materials furnished under the Subcontract.

4. This Waiver shall be an independent covenant running with the land and shall operate and be effective with respect to all Work done or services performed or labor or materials furnished under any supplemental contract or agreement between the Contractor and the Subcontractor or between the Subcontractor and any Sub-subcontractor for extra work to be done or extra services to be performed or extra labor or materials to be furnished in connection with any Work or Improvements on the Property.

5. In addition to any obligation of the Subcontractor to indemnify the Owners contained in this Waiver or the Subcontract, Subcontractor shall indemnify, defend and hold harmless Owners from any claim, liability, damage, suit, cost and expense (including without limitation reasonable attorneys' fees and court costs) arising, directly or indirectly, from (i) Subcontractor's breach of any covenant or agreement of Subcontractor contained in this Waiver and (ii) any mechanics' lien, suit, demand, claim for sums owed or lien threatened or filed by Subcontractor against Owners or the Property or the Improvements on, or to be built on, the Property or any other property or interest encompassed by the Contract and/or the Subcontract. This indemnification obligation includes, without limitation, the obligation to zealously pursue the feat of any lien claim as filed or threatened and the removal of any lien asserted against the Property or the Improvements, where such threatened or filed lien claim and/or lien is in contravention of this Waiver. This undertaking will be made entirely at Subcontractor's sole cost and expense, and the Owners' only obligation shall be to reasonably cooperate and provide any information required for fulfillment of this obligation.

6. Subcontractor acknowledges and agrees that it has actual notice that the Bond has been posted by the Contractor and that no mechanics' lien claim or other lien may be filed against the Property for the Work or the Improvements on, or to be built on, the Property or any other property or interest encompassed by the Contract. Subcontractor covenants and agrees to provide actual notice to all parties (the "Sub-subcontractors") with whom Subcontractor contracts (each, a "Sub-subcontract"), express or implied, for Work to be done on the Property and that no mechanics' lien claim or other lien may be filed against the Property by Subcontractor or any Sub-subcontractor for the Work or the Improvements on, or to be built on, the Property or any other property or interest encompassed by the Contract, the Subcontract or any Sub-subcontract.

7. Subcontractor hereby certifies that it has not delivered any materials or performed any work on the Property in connection with the Contract or Subcontract on or prior to the date of this Waiver and that Subcontractor will not deliver any materials or perform any Work on the Property until this Waiver has been filed with the Prothonotary of Allegheny County and, at the option of the Owners, the Allegheny County Recorder of Deeds Office in the Commonwealth of Pennsylvania.

8. The Subcontractor hereby authorizes the Owners and/or the Contractor to file this Waiver with the Prothonotary of Allegheny County and, at the option of the Owners, the Allegheny County Recorder of Deeds Office in the Commonwealth of Pennsylvania.

9. This Waiver shall be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania and shall be binding upon and shall inure to the benefit of the Owners and the Subcontractor, and their respective successors and assigns.

IN WITNESS WHEREOF, the Subcontractor has duly executed this Waiver as of the day and year first above written.

SUBCONTRACTOR:

By: _____

Print Name: _____

Title: _____

EXHIBIT "A"

PROPERTY DESCRIPTION

EXHIBIT "B"

PAYMENTS TO CONTRACTOR

EXHIBIT "C"

LABOR AND MATERIALMEN'S PAYMENT BOND

Steel Products Procurement Act. In the performance of this Agreement, Contractor and its subcontractors, materialmen, and suppliers shall use only steel products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two or more of such operations, from steel made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer, or other steel-making process. Steel products include not only cast iron products, but also machinery and equipment listed in United States Department of Commerce Standard Industrial Classifications 25 (furniture and fixtures), 35 (machinery, except electrical), and 37 (transportation equipment), and made of, fabricated from, or containing, steel components. If a product contains both foreign and United States steel, it shall be determined to be a United States steel product only if at least 75 percent of the cost of the articles, materials, and supplies have been mined, produced, or manufactured, as the case may be, in the United States. Transportation equipment shall be determined to be a United States steel product only if it complies with Section 165 of P.L. 97-424 (96 Stat. 2136).

If unidentified steel products are supplied under this Agreement, before any payment will be made, Contractor must provide documentation including, but not limited to, invoices, bills of lading, and mill certification that the steel was melted and manufactured in the United States. If a steel product is identifiable from its face, Contractor must submit certification which satisfies the URA that Contractor has fully complied with this provision. URA shall not provide for or make any payments to any person who has not complied with the Pennsylvania Steel Products Procurement Act, 73 P.S. §§ 1881, *et seq.* (the "SPPA"). Any such payments made to any person by URA that should not have been made due to the SPPA shall be recoverable directly from the contractor, subcontractor, manufacturer, or supplier who did not comply with the SPPA. Contractor shall include the provisions of the SPPA in every subcontract and supply contract so that the provisions of the SPPA shall be binding upon each subcontractor and supplier.

WAIVER OF MECHANICS' LIENS

(For a Sub-subcontractor in connection with a bonded project)

This WAIVER OF MECHANICS' LIENS (this "Waiver"), dated as _____, 20____, is entered into by and between URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH, a redevelopment authority organized and existing under the Urban Redevelopment Law, 35 P.S. §1701 *et seq.*, having offices at 200 Ross Street, Pittsburgh, PA 15219 ("URA") and _____ (the "Sub-subcontractor").

WITNESSETH THAT:

WHEREAS, URA and _____ (the "Contractor") have entered into a written contract dated _____, 20____ known as _____, (the "Contract"), providing for the construction of certain public improvements (the "Work") upon property located in the City of Pittsburgh, Allegheny County, Pennsylvania described in EXHIBIT "A" attached hereto and made part hereof (the "Property") owned by the URA, (the "Owner"); and

WHEREAS, the total amount of the Contract price is \$_____ (exclusive of future change orders), and the time of payment is set forth on Exhibit "B" attached hereto and made part hereof; and;

WHEREAS, the Contractor and _____ (the "Subcontractor") have entered into a written contract (the "Subcontract"), relating to certain labor and/or materials to be provided in connection with the Work; and

WHEREAS, the Subcontractor and Sub-subcontractor have entered into a written contract of even date herewith (the "Sub-subcontract"), relating to certain labor and/or materials to be provided in connection with the Work; and

WHEREAS, the Contractor has posted a Labor and Materialmen's Payment Bond (the "Bond"), attached hereto as EXHIBIT "C", guaranteeing the payment of the labor and/or materials to be supplied by the Subcontractor; and

WHEREAS, due to the fact that the Contractor has posted the Bond, the Contract and this Waiver provide that no mechanics' lien or claims will be entered and filed against the Property or any part thereof by the Sub-subcontractor or anyone claiming by, through or under the Sub-subcontractor for any Work, labor and materials supplied in connection with the performance of the Contract, the Subcontract or the Sub-subcontract; and

WHEREAS, the Sub-subcontractor desire to grant this Waiver pursuant to and in compliance with the provisions of Article IV, § 402, of the Act of the General Assembly of Pennsylvania of August 24, 1963, P.L. 1175, No. 497, as amended, known as the Mechanics' Lien Law of 1963, 49 P.S. § 1101 *et seq.* (the "Mechanics' Lien Law"), in settlement of all claims of the Sub-subcontractor.

NOW, THEREFORE, the Subcontractor, intending to be legally bound, hereby covenants and agrees as follows:

1. Unless the context hereof clearly indicates otherwise, all capitalized terms used herein are used as such terms defined in the Mechanics' Lien Law.

2. To the fullest extent permitted by applicable law, no mechanics' or materialman's lien or claim or other lien or claim of any kind whatsoever, pursuant to Section 301 of the Mechanics' Lien Law or otherwise, shall ever be filed or maintained against the Property, or any Improvement thereon, by the Sub-subcontractor for any Work done or services performed or labor or materials furnished under the Sub-subcontract for the demolition, erection, construction, alteration or repair of any Improvements, or for any other debts due by the Owners, Contractor or Subcontractor to the Sub-subcontractor or any other claimant acting by, through or under the Sub-subcontractor arising out of the performance of this Agreement.

3. The Sub-subcontractor shall look solely to the Subcontractor or Contractor for payment for all claims or debts due for any Work done or services performed or labor or materials furnished in connection with any Improvements on the Property, so that no claim of any kind whatsoever shall be made or filed against the Owners or the Property for or on account of any Work done or labor or materials furnished under the Sub-subcontract.

4. This Waiver shall be an independent covenant running with the land and shall operate and be effective with respect to all Work done or services performed or labor or materials furnished under any supplemental contract or agreement between the Subcontractor and the Sub-subcontractor for extra work to be done or extra services to be performed or extra labor or materials to be furnished in connection with any Work or Improvements on the Property.

5. In addition to any obligation of the Sub-subcontractor to indemnify the Owners contained in this Waiver or the Sub-subcontract, Sub-subcontractor shall indemnify, defend and hold harmless Owners from any claim, liability, damage, suit, cost and expense (including without limitation reasonable attorneys' fees and court costs) arising, directly or indirectly, from (i) Sub-subcontractor's breach of any covenant or agreement of Sub-subcontractor contained in this Waiver and (ii) any mechanics' lien, suit, demand, claim for sums owed or lien threatened or filed by Sub-subcontractor against Owners or the Property or the Improvements on, or to be built on, the Property or any other property or interest encompassed by the Contract, the Subcontract and/or the Sub-subcontract. This indemnification obligation includes, without limitation, the obligation to zealously pursue the feat of any lien claim as filed or threatened and the removal of any lien asserted against the Property or the Improvements, where such threatened or filed lien claim and/or lien is in contravention of this Waiver. This undertaking will be made entirely at Sub-subcontractor's sole cost and expense, and the Owners' only obligation shall be to reasonably cooperate and provide any information required for fulfillment of this obligation.

6. Sub-subcontractor acknowledges and agrees that it has actual notice that the Bond has been posted by the Contractor and that no mechanics' lien claim or other lien may be filed against the Property for the Work or the Improvements on, or to be built on, the Property or any other property or interest encompassed by the Contract. Sub-subcontractor covenants and agrees to provide actual notice to all parties with whom Sub-subcontractor contracts, express or implied, for Work to be done on the Property and that no mechanics' lien claim or other lien may be filed against the Property for the Work or the Improvements on, or to be built on, the Property or any other property or interest encompassed by the Contract, the Subcontract or any Sub-subcontract.

7. Sub-subcontractor hereby certifies that it has not delivered any materials or performed any work on the Property in connection with the Contract or Subcontract on or prior to the date of this Waiver.

8. The Sub-subcontractor hereby authorizes the Owners and/or the Contractor to file this Waiver with the Prothonotary of Allegheny County and, at the option of the Owners, the Allegheny County Recorder of Deeds Office in the Commonwealth of Pennsylvania.

9. This Waiver shall be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania and shall be binding upon and shall inure to the benefit of the Owners and the Sub-subcontractor, and their respective successors and assigns.

IN WITNESS WHEREOF, the Sub-subcontractor has duly executed this Waiver as of the day and year first above written.

SUB-SUBCONTRACTOR: _____

By: _____

Print Name: _____

Title: _____

EXHIBIT "A"

PROPERTY DESCRIPTION

EXHIBIT "B"

PAYMENTS TO CONTRACTOR

EXHIBIT "C"

LABOR AND MATERIALMEN'S PAYMENT BOND

**CONDITIONAL FINAL WAIVER OF LIENS AND CLAIMS
AND AFFIDAVIT OF PAYMENT**

The undersigned is the _____ (title) of _____, which is the _____ (designate whether contractor, subcontractor, sub-subcontractor, supplier, consultant or otherwise) for the _____ (designate type of work, suppliers or services rendered) (the "Work") under the contract between Urban Redevelopment Authority of Pittsburgh ("URA") and _____ (name of prime contractor) for a construction project called _____, (the "Project") on property located in the _____ Ward of the City of Pittsburgh, Allegheny County, Pennsylvania (the "Property") owned by the URA, (the "Owner").

For and in consideration of the sum of \$_____ and other good and valuable consideration, to be paid by _____ (name of contractor, or subcontractor) to the undersigned, which sum represents the total amount due and payable for all work performed and materials and services furnished in connection with the Property and the Project through the date hereof, and when the check clears the bank upon which it is drawn, then the undersigned unconditionally waives and releases any and all mechanics' lien claims, rights of lien, demands, damages, causes of action and other claims of whatever nature or description against the Owners, the Property, the Project, the Project lessees or any person or entity relating in any manner whatsoever to the Property and the Project.

The undersigned acknowledges and represents that the current payment represents full and final payment for all work, labor, materials, equipment, tools and services supplied to or in furtherance of the Project, include extra work and impact claims through the date hereof, and that no additional sum is or will hereafter be claimed due by the undersigned for such work, services or materials against or from any person or entity, the Owners, the Property, the Project or any lessees.

The undersigned states that all persons who supplied labor, material, equipment, services or tools to the undersigned in connection with the Project have been paid in full or will be paid in full with the proceeds of the current payment.

The undersigned further agrees to indemnify, defend and hold harmless Owners from and against any and all suits, claims, damages, losses, costs, settlements, arbitration awards and expenses, including attorneys' fees suffered, incurred or arising from mechanics' or materialmen's liens and any other similar liens asserted against the Project, the Property, existing improvements on the Property, or any part thereof arising out of the Work for any losses or expenses should any such claim, lien or right to a lien be asserted (by the undersigned or by a laborer, materialman or subcontractor of the undersigned), including, without implied limitation, attorneys' fees incurred in the defense thereof.

The undersigned further acknowledges that the receipt of the aforesaid sums shall be in full accord and satisfaction for the aforementioned claims with the full knowledge that Owners, their successors and assigns, are relying thereon; and furthermore, that upon receipt of the aforesaid sums, the undersigned acknowledges Owners' responsibilities under the contract have been fulfilled.

The undersigned further represents and warrants that he/she is duly authorized and empowered to sign and execute this waiver on behalf of the undersigned.

Name of Subcontractor or Sub-subcontractor

Date

By: _____
Print Name: _____
Title: _____

State of _____)
County of _____) ss:

On _____, 20____, before me, the undersigned Notary Public in and for the said County and State, personally appeared _____ and acknowledged execution of the foregoing affidavit as his/her voluntary act and deed and further stated that the facts recited are true of his/her personal knowledge.

Notary Public

**SPECIAL CONDITIONS
PART I**

**401. SPECIAL CONDITIONS FOR LIBERTY GREEN/THE RIVER ROOTS PARK -
EAST LIBERTY SITE PREPARATION CONTRACT NO 4**

401.01 PROJECT AREA

- A. The project is located on the north side of Larimer Avenue in the City of Pittsburgh's Eleventh Ward.
- B. The Liberty Green site is bounded by Larimer Avenue, Station Street Kalida Drive, and Princeton Place. The Roots Project is located north of the Liberty Green site, across Kalida Drive from the Liberty Green, and south of East Liberty Boulevard.

401.02 TIME FOR COMPLETION

The work which the Contractor is required to perform under this Contract shall be commenced at the time stipulated by the URA in the written "Notice to Proceed" (estimated to be issued September 24, 2018) to the Contractor and shall be fully completed as follows:

- TASK 1 – Liberty Green Project shall be completed by September 1, 2019
- TASK 2- The River Roots Project shall be completed by November 30, 2019

At the completion of each task described here, a final inspection will be conducted to assure that all work is complete. The contractor is to schedule these inspections with sufficient lead time to allow the Engineer to confirm the attendance of all required parties.

401.03 LIQUIDATED DAMAGES

As actual damages for any delay in completion of the Work which the Contractor is required to perform under this Contract are impossible to determine, the Contractor and his sureties shall be liable for and shall pay to the Owner the sum of \$1,000 as fixed, agreed, and liquidated damages for each calendar day of delay beyond the specific times stipulated for completion or as modified in accordance with the section entitled Changes in Work under General Conditions until such work is satisfactory completed and accepted. The schedule of liquidated damages which are in effect for the contractor is as follows: Contractor agrees to pay as liquidated damages, the sum of \$1,000.00 per day for each consecutive calendar day thereafter for failure to fully complete the work tasks of the project within the times specified in Section 401.02 – Time for Completion or as modified in accordance with the section entitled "Changes in the Work."

401.04 RESPONSIBILITIES OF CONTRACTOR

Except as otherwise specifically stated in the Contract Documents and Technical Specifications, the Contractor shall provide and pay for all material, labor, tools, equipment, water, light, heat, power, transportation, superintendence, temporary construction of every nature whatsoever necessary for the performance of the Contract and deliver all improvements embraced in this Contract for the construction of the improvements complete in every respect within the specified time.

401.05 COMMUNICATIONS

- A. All notices, demands, requests, instructions, approvals, and claims must be in writing.
- B. Any notice to or demand upon the Contractor will be sufficiently given if delivered at the office of the Contractor stated on the signature page of the Agreement (or at such other office as the Contractor may, from time to time, designate in writing to the URA), or if deposited in the United States mail in a sealed, postage-prepaid envelope, in each case addressed to such office. All papers required to be delivered to the URA will, unless otherwise specified in writing to the Contractor, be delivered to the URA at 200 Ross Street, Pittsburgh, Pennsylvania, 15219, and any notice to or demand upon the URA will be sufficiently given if so delivered, or if deposited in the United States mail in a sealed, postage-prepaid envelope, or to such other representative of the URA or to such other address as the URA may subsequently specify in writing to the Contractor for such purpose.
- C. Any such notice will be deemed to have been given as of the time of actual delivery or, in the case of mailing, when the same should have been received in due course of post or, in the case of electronic correspondence, at the time of actual receipt, as the case may be.
- D. Engineers called out in the Special Conditions refers to the Urban Redevelopment Authority's (URA) designated field representative.
- E. Owner called out in these Special Conditions refers to the Urban Redevelopment Authority of Pittsburgh.

401.06 CONTRACT DOCUMENTS AND DRAWINGS

The URA will furnish the Contractor, without charge, two (2) copies of the Contract Documents, including Technical Specifications and Drawings. Additional copies requested by the Contractor will be furnished at cost.

401.07 USE OF CITY WATER

In case the Contractor uses water from the Pittsburgh Water and Sewer Authority for any and all work herein specified or shown upon the Contract Drawings, all such water used will be paid for by the Contractor at the established current meter rates that apply and in accordance with the rules and regulations of the agency or authority governing the use of the same. If necessary, this item will also include the purchase of a city water meter, installation cost, and protection and maintenance of equipment.

401.08 EQUIPMENT

The Contractor shall submit, with his Bid, a schedule of the equipment he proposes to use in the execution of the Contract. The Contractor must convince the Engineer, before the Contract is awarded, that he will use sufficient equipment of the size and type appropriate to complete the work within the time specified.

401.09 NOTICE TO PROCEED

The Contractor shall begin work on the date specified in the official, written Notice to Proceed and shall perform the various controlling operations, parts, and items of work in accordance with the required construction progress schedule in Section 107 under GENERAL CONDITIONS, and as outlined hereinafter. The anticipated Notice to Proceed date is October, 2018.

401.10 CONSTRUCTION PROGRESS SCHEDULE

- A. Promptly after the award of the Contract, the Contractor shall confer with the various utility companies to confirm any work that is to be done by these companies within the work limits included in this Contract. The anticipated starting dates and time for construction will be determined, if possible. At the same time, the Contractor shall also confer, for the purpose of determining the factors affecting his progress schedule, with all other interested parties, i.e., Department of Engineering and Construction, Department of Public Works, Department of Public Safety, the Pittsburgh Water and Sewer Authority and the Pennsylvania Department of Environmental Protection.
- B. Within ten (10) days after the date of the award or five (5) days after the signing of the Contract Documents, whichever is later, the Contractor shall submit to the Engineer for approval electronic copies of a practicable progress schedule. The progress schedule will show the proposed sequence of work by major items of work, i.e., grading, utility installation, wall construction, paving, landscaping, etc. The schedule will show the order in which the Contractor proposes to carry on the work, the dates on which he will start the various items, and the contemplated dates for completing these items. The schedule will be in the form of a bar chart of suitable scale to clearly show the dates and items of work. Each group of bars will represent one activity area and the major items of work for that activity.
- C. The schedule will be revised and resubmitted within five (5) days after receipt of comments from the Engineer. Subsequent revisions, as required, will be resubmitted within a similar five (5) day period until the schedule is approved.
- D. Pennsylvania Construction Code Act

Construction must comply with the Act of November 10, 1999 (P.L. 491, No. 45), known as the Pennsylvania Construction Code Act (35 P.S. Sections 7210.101 et seq.), as implemented by Department of Labor and Industry regulations, 34 Pa. Code Chapters 401-405.
- E. The Contractor is hereby notified that no extra consideration will be provided for extended overhead, general requirements or other carrying costs associated with weather delays over the period of construction. The Contractor shall be cognizant that delays are anticipated due to long light poles and anchor bolts delivery times.

401.11 WORK BY OTHERS

The artistic enhancements described in Technical Specification 322501 will be provided to the Contractor at no cost, unless otherwise specified in Section 322501. These items are to be installed by the Contractor using methods and at locations described in the specifications and on the drawings.

401.12 PROJECT SIGNS

- A. The Contractor shall provide, install and maintain one (1) project sign as shown in Attachment A. It shall be mounted on $\frac{3}{4}$ " thick plywood, in color and be 8 feet wide and 4 feet high.
- B. A standard graphic template and exact wording will be provided to the Contractor by URA at time of award.
- C. A draft sign layout (pdf file) shall be provided to the URA for approval before the final sign is produced.
- D. All signs and maintenance of signs will be incidental to the unit prices bid for the project.

401.13 RESPONSIBILITY FOR TESTS AND INSPECTIONS

- A. Tests and inspections and the frequency thereof shall be performed in accordance with Pennsylvania Department of Transportation PTM No. 1 and as directed by the Construction Inspector,
- B. The decisions by the URA/PWSA, as to whether workmanship should be accepted or rejected, will be binding upon the Contractor.
- C. The Contractor shall obtain the approval in advance from the URA for any commercial inspection and testing laboratory that the Contractor wishes to employ on the project. A commercial inspection and testing laboratory will furnish one (1) original and two (2) copies of its inspection and testing reports to the URA.
- D. Upon request by the URA, and/or PWSA, the Contractor shall furnish samples of sufficient size to permit inspection and testing to the satisfaction of the URA, or PWSA.
- E. All inspections will be performed by the Construction Inspector.
- F. The Contractor shall include all costs for testing by an independent laboratory in the bid price for the various bid items.
- G. Tests on all PWSA facilities must be witnessed by a PWSA representative. The Contractor must provide 72-hour advance notice to PWSA prior to testing.
- H. Not Used
- I. The Contractor shall provide the original of each certification for each item requiring certification to the URA and/or its field representative, and two (2) copies of each certification for each item of the Construction Inspector. All certifications must be approved to the installation of the material.
- J. Acceptance and Rejection:
 - 1. Acceptance of defective workmanship does not waive any other remedies the URA, and/or PWSA, may have because of the failure of such material or workmanship to comply with the Contract Documents.
 - 2. Upon completion of inspection and testing, the URA will notify the Contractor that the workmanship is either rejected or provisionally accepted.

401.14 UTILITIES

The Contractor's attention is directed to the following list of utility companies that may have underground and/or surface facilities in the area.

Verizon
Duquesne Light Company
Columbia Gas Company
Pittsburgh Water and Sewer Authority
Comcast

The Contractor shall cooperate with the public utility companies and local authorities in the disconnection, placement, relocation, adjustment, or reconstruction of their structures and facilities during construction.

Prior to any demolition activities, it shall be the responsibility of the Contractor to ensure that all service lines within the limits of demolition are not active.

Utility companies will inform the Engineer of all proposed work which may interfere with or modify the Contractor's operations.

The correctness of the utility information is not guaranteed. Utilities are shown on the plans in accordance with the best information available and are for the convenience of the Contractor only.

Prior to any excavation work in the vicinity of underground utilities, the Contractor must contact the Pennsylvania "One Call System" (at One Call 1-800-242-1776) to confirm the status of the utilities and to determine whether any additional action is required to protect the utilities.

401.15 SALVAGE OPERATIONS

- A. Upon release of the property for construction purposes, the Contractor shall not delay work at the site to conduct salvage operations but should proceed promptly to complete Contract work.
- B. THE CLEANING AND DISMANTLING OF SALVAGED MATERIAL WILL NOT BE PERMITTED AT THE PROJECT SITE.

401.16 JOB OFFICE AND EQUIPMENT STORAGE

- A. The Contractor shall maintain an office on the site, as necessary for the work at no additional cost to the URA. Drinking water and rest room facilities shall be provided by the Contractor.
- B. A separate office or working space with a locking door, desk, and chair shall be provided by the Contractor for use by the Owner's Representative. Provide two (2) 120V receptacles to the office space.
- C. Storage of equipment on the site shall be subject to the approval of the URA and shall only be allowed in areas designated by the URA. Should potential development or other work conflict with the storage / office area in use by the Contractor, the Contractor must relocate storage and offices when requested to do so by the URA, at no additional cost to the project.

401.17 BURNING RESTRICTIONS

The Contractor is hereby notified that burning on the site will not be permitted.

401.18 DISPOSITION OF MATERIAL

The Contractor will be required to furnish the URA with a plan for the disposition of unsuitable material that is hauled off site, including signed permission from the owner of the disposal site upon which the material is to be deposited as well as applicable local codes.

401.19 SURFACE WATER MANAGEMENT

The Contractor shall be responsible for surface water management in the project area so as not to cause erosion, water pollution, or property damage due to his work. The Contractor shall take all precautions necessary to avoid having water runoff or entrapment cause a problem in or around his work area. The cost of surface water management shall be incidental to the project.

401.20 ADDITIONAL INSURED

In addition to those parties named in the General Conditions, Part 1, the Contractor will also protect from claims arising out of his operations and name as additional insureds the City of Pittsburgh; Pittsburgh Water and Sewer Authority. Five (5) original certificates of insurance will be delivered to the Authority's project engineer prior to commencing construction.

401.21 CITY OF PITTSBURGH FINANCE DEPARTMENT APPROVAL

Prior to the awarding of this Contract to the lowest responsible bidder, the City of Pittsburgh Finance Department will conduct a review to determine if the Contractor being considered is current with all taxes due to the City of Pittsburgh. If there is an outstanding balance due to the City of Pittsburgh, this balance must be satisfied to award the Contract.

401.22 CLEANING OF EXISTING STREETS

All surrounding public and private streets must be kept clean at all times. The cleaning of all debris generated by this project will be the responsibility of the Contractor. There will be no additional payment for this work.

401.23 INSURANCE AMOUNTS

The Contractor and his subcontractors shall purchase and maintain insurance as stated in the General Conditions, Part 1. The amounts required for the coverage stated in the General Conditions, Part 1, are as follows:

<u>INSURANCE</u>	<u>AMOUNT</u>
Worker's Compensation Insurance	As required by law;
Employer's Liability Insurance	Five Million Dollars (\$5,000,000);
Comprehensive General Liability	Two Million Dollars (\$2,000,000)/occurrence;
Insurance and Contractual Liability Insurance	Five Million Dollars (\$5,000,000) in the aggregate;
Contractor's Completed Operations Insurance	Two Million Dollars (\$2,000,000) in the aggregate;
Comprehensive Automobile Liability Insurance	One Million Dollars (\$1,000,000) for bodily injury and property damage; and
Excess Liability Insurance	Five Million Dollars (\$5,000,000)/ occurrence and Ten Million Dollars (\$10,000,000) in the aggregate. Aggregate is to apply specifically to this project.

401.24 NOT USED

401.25 EROSION AND SEDIMENT POLLUTION CONTROL

Earthmoving shall not commence until appropriate erosion control measures as described on the drawings are implemented. Contractor shall become a co-permittee for the purposes of the NPDES permit.

401.26 HEALTH & SAFETY PLAN

Prior to commencing work, the Contractor shall provide to URA a copy of the Contractor's Health and Safety Plan (HASP) that includes an addendum that is specific to this project. Cost for preparation of the HASP shall be incidental to the project.

401.27 PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN

- A. Develop a Preparedness, Prevention, and Contingency (PPC) Plan for the jobsite within 14 calendar days of the award of the Contract and prior to mobilization. This PPC Plan is necessary to fulfill the requirements of the erosion and sediment pollution control permit that has been issued for this project by the Allegheny County Conservation District.
- B. The plan shall include information on the following: a) a general description of construction activities; b) emergency response program; c) material and waste inventory; d) spill and leak prevention and response program, inspection program, housekeeping program, security program; and e) external factors.
- C. The completed PPC Plan is to be available at the job site for review upon request by either the URA, PaDEP, or the Allegheny County Conservation District. All requirements of the completed PPC Plan are to be strictly followed throughout the duration of the project.
- D. Costs for preparation and implementation of the PPC Plan are considered incidental to the project.

401.28 ENGINEERING SERVICES

Prior to the start of the construction, the Contractor will establish baseline station and bench marks in accordance with the Contract Drawings. The Contractor shall be responsible for the protection and preservation of this survey control information. If any survey points or bench marks are destroyed, the URA will order the Contractor to replace the bench marks.

401.29 CLEANING OF CASTINGS

The Contractor shall be responsible for cleaning all water boxes and manhole castings of all types, after construction is complete. No additional payment will be made for this work. Costs for this shall be included in the unit prices bid for the various items constructed under this Contract.

401.30 SITE SECURITY

The Contractor shall be responsible for the security of all material and equipment, including fuel tank storage and job trailers at the work site and storage yard area. Security costs for the project shall be included in the unit prices bid for the various items constructed under this contract.

401.31 CITY OF PITTSBURGH SPECIFICATIONS

The Contractor is responsible for being familiar with and subject to the current construction specifications of the City of Pittsburgh and its Departments and the Pittsburgh Water and Sewer Authority, and the Allegheny County Sanitary Authority with respect to the various items of work in the Contract.

401.32 GUARANTEED ITEMS OF WORK

The Contractor shall guarantee the following items of work for the listed periods in accordance with the GENERAL CONDITIONS, Part I.

<u>Guaranteed Items of Work</u>	<u>Guarantee Period</u>
Lighting and Electrical Work	Three (3) Years
Bituminous Asphalt and Concrete Pavement	Three (3) Years
Landscaping	Two (2) Years
Concrete Curb	Three (3) Years
Utility and Storm Sewer Line Work	Three (3) Years
Waterline Work	Three (3) Years

401.33 SUPERINTENDENCE BY CONTRACTOR

- A. Except where the Contractor is an individual and gives his personal superintendence to the work, the Contractor shall provide a competent superintendent, satisfactory to URA and the Engineer, on the work at all times during working hours with full authority to act for him. The Contractor shall also provide adequate staff for the proper coordination and expediting of his work.
- B. The Contractor shall lay out all of his own work, and he shall be responsible for all work executed by him under the Contract. He shall verify all locations and elevations before proceeding with the work and will be held responsible for any error resulting from the failure to do so.

401.34 ACCESS AND COORDINATION

- A. The Contractor's attention is directed to the fact that during the course of this construction, access to and through the project area might be required by other parties authorized by the URA. The Contractor is required to coordinate with these parties so as not to restrict their access through the construction zone. The locations and nature of this access will be established through coordination with and approval of the URA. The Contractor is also notified that the work area is adjacent to private residences and that the Contractor must at all times protect the public. Any work or transportation / storage of materials or equipment in or through public areas must be coordinated with the URA and the City of Pittsburgh.
- B. The Contractor is notified that there are active construction projects adjacent to or near the project area.

401.35 DAMAGE TO ADJACENT PROPERTY

- A. The Contractor is alerted that he is responsible for the repair of damage to any adjacent property resulting from his construction operations.
- B. The Contractor will be restricted to area as provided by URA as a staging area, and is not permitted to use any other adjacent development property as a staging area without prior permission.

401.36 SAFETY (O.S.H.A.)

All regulations of the Occupational Safety and Health Act of 1970 are in effect during the life of this Contract. The URA will not be liable for any citations received by the Contractor from O.S.H.A. It is the sole responsibility of the Contractor to comply with O.S.H.A. Standards.

401.37 ENVIRONMENTAL

- A. Contractor shall be aware that both sites are classified as PA Department of Environmental Protection (PADEP) Act 2 (Land Reuse) sites. The Environmental Covenants are included in Attachments B and C of this Special Conditions section. The Contractor shall abide by the stipulations of the environmental covenant upon completion of the work.
- B. The property is currently covered by an 18-inch soil cap above a witness barrier (orange safety fence). Upon completion of construction activities, the parks shall be covered by concrete (sidewalks, etc.), the playground safety mats, landscaping, or a witness barrier and 18 inches of cap soil.
- C. Environmental soils and remediation reports are provided on the Publicpurchase.com webpage for this RFP for downloading and review.
- D. Contractor shall not mix or combine the cover soil with general excavation of soil materials beneath the cover soil. The deeper materials will either be backfilled to create grading in the parks or be disposed off site at the URA property at Butler and Suydam Streets in the 10th Ward, City of Pittsburgh.

401.38 TRENCH BACKFILLING

All trenches on this project shall be backfilled in accordance with the Contract Drawings and applicable standards with approved granular material meeting the City of Pittsburgh, the PWSA, and/or AASHTO Specifications for 2A, 57, or 67 stone. Granular material is to be placed from the top of pipe to the subgrade elevation. The Engineer shall have the sole approval of materials.

401.39 PROJECT PERMITS

The Contractor shall be responsible for obtaining permits from the City for traffic control, street lane closures, and Contractor licenses.

401.40 PROJECT CLOSEOUT

Prior to project closeout and final payment, the Contractor shall submit the URA form "Certificate and Release" and AIA Document G707 "Consent of Surety to Final Payment."

401.41 SPECIAL NOTICES TO ALL CONTRACTORS

Costs for all items in Special Conditions 1 are considered incidental and should be included in the Contractor's bid for the project.

401.42 UNITED STATES PRODUCED STEEL AND ALUMINUM IMPORT RESTRICTIONS REQUIREMENTS

- A. This Contract is subject to the provisions of the Pennsylvania "Steel Products Procurement Act, Act No. 1978-3" (73 P.S. 1881 et. seq. as amended). Accordingly, only "steel products" as defined in Section 6 of the Steel Products Act shall be used or supplied in the performance of this Contract or subcontracts.
- B. The Contractor shall provide certifications to the Owner, with each shipment of steel products delivered to the project site, that such steel products comply with this Act. Certifications shall be on PA DGS Form ST-1, ST-2, ST-3, or ST-4 as appropriate, copies attached (see Attachment D).
- C. In accordance with the Trade Practices Act (71 P.S. 773.101), the Contractor shall not use or permit to be used any aluminum or steel products listed in the act manufactured in Argentina, Brazil, Spain, or South Korea.

401.43 REFERENCE TO PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

- A. Wherein these Contract Documents or on the Contract Drawings, where reference is made to the Pennsylvania Department of Transportation (PennDOT) Form 408, it shall mean the 2011 Edition of Standard Specification Publication 408, published by the Commonwealth of Pennsylvania Department of Transportation and any supplements thereto.
- B. Wherein these Contract Documents or on the Contract Drawings, reference is made to PennDOT Standard Drawings, it shall mean the June 2010 edition of PennDOT Publication No. 72, Standards for Roadway Construction, Series RC-1 to 100 as published by the Commonwealth of Pennsylvania Department of Transportation and any supplements or revisions made thereto.

401.44 SANITARY FACILITIES

- A. The Contractor shall furnish, install, and maintain ample sanitary facilities for the workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the sanitary codes of the state and local government. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

401.45 AGENCY REQUIRED FORMS

The following Agency Required Forms are attached: Steel Origin Certifications (ST-1, ST-2, ST-3, and ST-4)

**ATTACHMENT A
PROJECT SIGN LAYOUT**

Liberty Green

A PROJECT OF:
**Urban Redevelopment Authority
of Pittsburgh**

William Peduto, Mayor **Robert Rubinstein, Executive Director**

FINANCIAL ASSISTANCE PROVIDED BY:

The Commonwealth of Pennsylvania, Honorable Tom Wolf, Governor
Mayor Bill Peduto, City of Pittsburgh
Urban Redevelopment Authority of Pittsburgh

CONSTRUCTION SERVICES PROVIDED BY:

BOARD OF DIRECTORS:

Kevin Acklin, Chair
The Honorable Ed Gainey, Vice Chair
Dr. Cheryl Hall-Russell
The Honorable R. Daniel Lavelle
Sam Williamson



ura.org

ATTACHMENT B
RIVER ROOTS ENVIRONMENTAL COVENANT



60 2017 00035538

Allegheny County
Jerry Tyskiewicz
Department of Real Estate
Pittsburgh, PA 15219

Instrument Number: 2017-35538

BK-DE VL-17013 PG-330

Recorded On: November 14, 2017 As-Deed Agreement

Parties: PITTSBURGH CITY HOUS AUTH

To PITTSBURGH CITY HOUS AUTH

of Pages: 22

Comment: ENVIRONMENTAL COVENANT

***** THIS IS NOT A BILL *****

Deed Agreement 162.00

0

0

Total: 162.00

Realty Transfer Stamp

Department of Real Estate Stamp

Affidavit Attached-No

NOT A DEED OF TRANSFER

EXEMPT

Value

Certified On/By-> 11-14-2017 / Belinda Gibbs

NOT A DEED OF TRANSFER

I hereby certify that the within and foregoing was recorded in the Department of Real Estate in Allegheny County, PA

****DO NOT REMOVE-THIS PAGE IS PART OF THE RECORDED DOCUMENT****

File Information:

Record and Return To:

Document Number: 2017-35538

Receipt Number: 3336388

Recorded Date/Time: November 14, 2017 09:28:41A

Book-Vol/Pg: BK-DE VL-17013 PG-330

User / Station: T Greil - Cash Super 05

JUNG WOOK KIM

HOUS AUTH OF PITTSBURGH

100 ROSS T 2ND FL

PITTSBURGH PA 15219


Jerry Tyskiewicz, Director
Rich Fitzgerald, County Executive

Environmental Covenant

When recorded, return to:
Jung-Wook Kim
Senior Development Manager
Housing Authority of the City of Pittsburgh
100 Ross Street, 2nd Floor
Pittsburgh, PA 15219

The County Parcel Identification No. of the Property: 83-S-201 (Block D); 83-S-202 (Block D); 83-S-192 (Kalida Drive Extension)
GRANTOR: Housing Authority of the City of Pittsburgh
PROPERTY ADDRESS: Intersection of East Liberty Boulevard & Larimer Avenue, Pittsburgh, Pennsylvania.

ENVIRONMENTAL COVENANT

This Environmental Covenant is executed pursuant to the Pennsylvania Uniform Environmental Covenants Act, Act No. 68 of 2007, 27 Pa. C.S. §§ 6501 – 6517 (UECA). This Environmental Covenant subjects the Property identified in Paragraph 1 to the activity and/or use limitations in this document. As indicated later in this document, this Environmental Covenant has been approved by the Pennsylvania Department of Environmental Protection (Department).

1. **Property affected.** The property affected (Property) by this Environmental Covenant is located in the 11th Ward of Pittsburgh, Allegheny County, Pennsylvania, 15206.

The latitude and longitude of the center of the Property affected by this Environmental Covenant is: 40.4636417⁰ N; -79.9183889⁰ W.

The Property has been known by the following names: Larimer/East Liberty Phase I – Block D.

The Primary Facility ID# is: 662895

The PADEP Land Recycling Program (LRP) # is: 5-2-1-18884.

A complete description of the Property is attached to this Environmental Covenant as Exhibit A. A Site Location Map of the Property is attached to this Environmental Covenant as Exhibit B. Exhibit C depicts the property boundaries for the Block D parcel. Exhibit D presents the delineated SVOC impacted area. Historical sampling locations are presented on Exhibit E. Soil cap and cover locations are depicted on Exhibit F.

2. **Property Owner / GRANTOR / GRANTEE.** Housing Authority of the City of Pittsburgh is the owner of the Property and the GRANTOR/GRANTEE of this Environmental Covenant.

3. **Mailing Address.** The mailing address of the owner is: 100 Ross Street, 2nd Floor, Pittsburgh, PA 15219

4. **Description of Contamination & Remedy.** Block D was formerly part of the adjoining (north and west) "Liberty Park – Fairfield" redevelopment project; however, Block D is now part of the Larimer/East Liberty Phase I redevelopment project. Environmental impacts to Block D were previously characterized as part of the Liberty Park redevelopment.

The project documents that detail justification for the Act 2 determinations and conclusions include the following:

- April 26, 2017 "Site Specific Standard for Soil Final Report Approval, Larimer/East Liberty Phase I Development-Block D, eFACTS PF #662895, eFACTS Activity #36087, LRP # 5-2-21-18884, Intersection of East Liberty Boulevard & Larimer Avenue, City of Pittsburgh, Allegheny County" 4 pages, prepared by the Pennsylvania Department of Environmental Protection
- January 2017 "Final Soils Report, Larimer/East Liberty Phase I Development, Block D, City of Pittsburgh, Allegheny County, Pennsylvania" 17 pages without Appendices, prepared by KU Resources, Inc.
- October 2013 "Phase I Environmental Site Assessment, Larimer Avenue Phase I Development, Blocks D, E, and F, Pittsburgh, Pennsylvania" 46 pages without Appendices, prepared by KU Resources, Inc.
- October 24, 2012 "Environmental Cleanup & Brownfield Development Program Approval-Final Report-Soils, Liberty Park Site – Phase II Development, Borough of East Liberty, Pittsburgh, Pennsylvania" 2 pages, prepared by the Pennsylvania Department of Environmental Protection
- April 22, 2008 "Land Recycling Program Approval – Final Soils Report, Facility I.D. No. 5-2-1-1884, Liberty Park Development Site, Block Defined by Broad Street, Larimer Avenue, Collins Avenue and East Liberty Boulevard, City of Pittsburgh, Allegheny County" 2 pages, prepared by the Pennsylvania Department of Environmental Protection
- April 7, 2006 "Approval – Groundwater Remedial Investigation and Final Report, Facility I.D. 5-2-1-18884, Liberty Park Development Site, Block Defined by Broad Street, Larimer Avenue, Collins Avenue and East Liberty Boulevard, City of Pittsburgh, Allegheny County" 2 pages, prepared by the Pennsylvania Department of Environmental Protection
- February 2006 "Remedial Investigation Report/Final Report of Groundwater, Liberty Park Site" prepared by Penn Environmental & Remediation, Inc.
- November 14, 2005 "Consent Order and Agreement," 11 pages, between Commonwealth of Pennsylvania, the Urban Redevelopment Authority of Pittsburgh, and Liberty Park L.P.
- September 22, 2005 "ECP-Land Recycling Program, I.D. No. 5-2-1-18884, Cleanup Plan Approval for Soils Only, Liberty Park Development Site, Block Defined by Broad St, Larimer Ave, Collins Ave and East Liberty Blvd., City of Pittsburgh, Allegheny County, 1 page, prepared by the Pennsylvania Department of Environmental Protection
- July 2005 "Soil Cleanup Plan, Liberty Park Site" prepared by Penn Environmental & Remediation, Inc.

A brief summary of the Penn E&R site characterization results with respect to Block D is presented below.

- Groundwater: Three monitoring wells were advanced on the northern, eastern, and southern portions of Block D. PCE and lead were identified above Act 2 residential Statewide Health Standards in the shallow overburden water-bearing zone on the eastern portion of Block D.
- Soils: Results of the Penn E&R site characterization identified on Block D a limited area of SVOCs ("SVOC Area 3") and two areas of metals ("Metal Areas 6 and 7") above Act 2 residential statewide standards. No VOCs were identified in soil above residential statewide standards.

Block D was included in the February 2006 Remedial Investigation Report (RIR) and the July 2005 Soil Cleanup Plan. The RIR presented the site characterization data, their evaluation, and provided a conceptual site model. The Soil Cleanup Plan identified the remediation necessary to mitigate unacceptable human health or ecological risks associated with the constituents identified on Site. Remedial activities commenced in May 2015 were subject to oversight and compliance activities by KU Resources, Inc., and were completed in September 2016. The entirety of the site, to include the Penn E&R identified metals-impacted areas 6 and 7, as well as the SVOC Area 3, were addressed by installation of a clean soil cap that, in most areas, overlies a witness barrier, or hardscape such as concrete or asphalt. Prior to the placement of an 18-inch soil cap, an orange security fence "witness barrier" was installed in all greenspace areas. A minor portion of the Site along newly installed Kalida Street received 30 inches of soil cap, eliminating the need for a witness barrier. The soil cap material was obtained from known clean on-Site sources, as well as imported topsoil. As part of the Site's environmental cleanup and redevelopment, the site has been zoned for and redeveloped with residential housing.

For the Property, the RIR, Soil Cleanup Plan, and the January 2017 Final Soils Report fulfill the administrative requirements for demonstration of the Site-Specific Standard for soil and groundwater under Pennsylvania's Act 2. The Department approved the Final Soils Report on April 26, 2017, as it demonstrated attainment of a Site-Specific Standard for soil, based on residential use assumptions. In order to meet and/or continue to attain the Site-Specific Standard for soil and groundwater, activity and use limitations shall be placed on the Property.

5. Activity & Use Limitations. The Property is subject to the following activity and use limitations, which the then current owner of the Property, and its tenants, agents, employees and other persons under its control, shall abide by:

- (a) Withdrawal of groundwater at and under the Property is prohibited for any consumptive or agricultural uses.
- (b) Cap shall be required and maintained. (Cap currently consists of paving, building slabs, soil buffers over impacted soil.) Areas with an 18-inch clean soil cap with

a witness barrier, and areas with 30 inches of clean soil without a witness barrier shall be monitored and maintained in their current configuration.

(c) Areas with hardscape shall be maintained in their current form.

(d) Changes to these administrative and engineering controls can only be performed if pre-approved by the Department.

(e) Future site residents/occupants will be prohibited from conducting excavations, plantings, gardening, and other earth disturbing activities throughout the entire Block D area.

6. **Notice of Limitations in Future Conveyances.** Each instrument hereafter conveying any interest in the Property subject to this Environmental Covenant shall contain a notice of the activity and use limitations set forth in this Environmental Covenant and shall provide the recorded location of this Environmental Covenant.

7. **Compliance Reporting.** After written request by the Department, and by the end of every January following the Department's approval of this Environmental Covenant, the then current owner of the Property shall submit to the Department written documentation stating whether or not the activity and use limitations in this Environmental Covenant are being abided by. In addition, within 30 days after any of the following events, the then current owner of the Property shall submit to the Department written documentation: noncompliance with the activity and use limitations in this Environmental Covenant; transfer of the Property; changes in use of the Property; or filing of applications for building permits for the Property and any proposals for any site work, if the building or proposed site work will affect the contamination on the Property subject to this Environmental Covenant.

8. **Access by the Department.** In addition to any rights already possessed by the Department, this Environmental Covenant grants to the Department a right of reasonable access of the Property in connection with implementation or enforcement of this Environmental Covenant.

9. **Recording & Proof & Notification.** Within 30 days after the date of the Department's approval of this Environmental Covenant, the Grantor shall file this Environmental Covenant with the Allegheny County Real Estate Department, and send a file-stamped copy of this Environmental Covenant to the Department within 60 days of recording. Within that time period, the Grantor also shall send a file-stamped copy to each of the following: City of Pittsburgh and Allegheny County.

10. **Termination or Modification.**

(a) This Environmental Covenant may only be terminated or modified in accordance with 27 Pa. C.S. §§ 6509 or 6510, or in accordance with this paragraph.

(b) This Environmental Covenant may be amended or terminated as to any portion of the Property that is acquired for use as state highway right-of-way by the

Commonwealth provided that: (1) the Department waives the requirements for an environmental covenant and for conversion pursuant to 27 Pa. C.S. §6517 to the same extent that this Environmental Covenant is amended or terminated; (2) the Department determines that termination or modification of this Environmental Covenant will not adversely affect human health or the environment; and (3) the Department provides 30-days advance written notice to the current property owner, each holder, and, as practicable, each person that originally signed the Environmental Covenant or successors in interest to such persons.

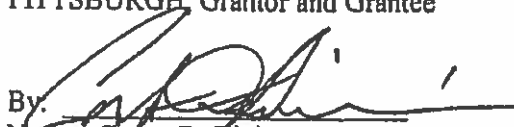
11. Department's address. Communications with the Department regarding this Environmental Covenant shall be sent to: Program Manager, Environmental Cleanup & Brownfields, Department of Environmental Protection, Southwest Regional Office, 400 Waterfront Drive, Pittsburgh, PA 15222-4745

12. Severability. The paragraphs of this Environmental Covenant shall be severable and, should any part hereof be declared invalid or unenforceable, the remainder shall continue in full force and effect between the parties.

ACKNOWLEDGMENTS by Owner(s) and any Holder(s), in the following form:

HOUSING AUTHORITY OF THE CITY OF
PITTSBURGH, Grantor and Grantee

Date: 9/25/17

By: 
Name: Caster D. Binion
Title: Executive Director
The Housing Authority of the City of Pittsburgh

APPROVED, by Commonwealth of Pennsylvania,
Department of Environmental Protection

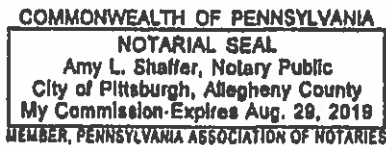
Date: 10/30/17

By: 
Name: Kevin Halloran
Title: Program Manager
Environmental Cleanup and Brownfields

COMMONWEALTH OF PENNSYLVANIA)
)
COUNTY OF ALLEGHENY) SS:

On this 26th day of September, 2017, before me, the undersigned officer, personally appeared Caster D. Binon, who acknowledged himself to be the Executive Director of The Housing Authority of the City of Pittsburgh (Owner, Grantor/Holder, Grantee), whose name is subscribed to this Environmental Covenant, and acknowledged that he executed same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.



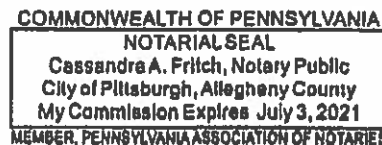
Amey L. Shaffer.
Notary Public

COMMONWEALTH OF PENNSYLVANIA)
COUNTY OF ALLEGHENY) SS:

On this 30th day of October, 2017, before me, the undersigned officer, personally appeared Kevin Halloran, who acknowledged himself to be the Program Manager, Environmental Cleanup & Brownfields of the Commonwealth of Pennsylvania, Department of Environmental Protection, Southwest Regional Office, whose name is subscribed to this Environmental Covenant, and acknowledged that he executed same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

Cassandra A. Fitch
Notary Public



EXHIBITS

Exhibit A
Property Description

EXHIBIT A
LARIMER PHASE I DEVELOPMENT / BLOCK D
PROPERTY DESCRIPTION FOR ENVIRONMENTAL COVENANT

Legal Descriptions for Block/Lot No. 83-S-201 (Block D)

All that certain parcel of land, being Parcel 3-D in the Larimer/East Liberty Phase 1 Plan of Lots as recorded in the Allegheny County Department of Real Estate in Plan Book Volume 282, Page 51, situate in the 11th Ward, City of Pittsburgh, Allegheny County, Pennsylvania, more particularly bound and described as follows:

Beginning at a point on the southwesterly right of way line of East Liberty Boulevard, 100.00 feet wide, at the line dividing Parcel 3-D and Parcel 3-D2 in the Larimer/East Liberty Phase 1 Plan of Lots as recorded in the Allegheny County Department of Real Estate in Plan Book Volume 282, Page 51; thence from said point of beginning by the southwesterly right of way line of East Liberty Boulevard the following three (3) courses and distances:

in a southeasterly direction by a curve bearing to the right having a radius of 904.93 feet through an arc distance of 69.79 feet, also having a chord bearing of S 40° 00' 44.6" E and a chord distance of 69.78 feet, to a point of tangency;

S 37° 48' 10.4" E a distance of 283.89 feet to a point of curvature;

in a southwesterly direction by a curve bearing to the right having a radius of 15.00 feet through an arc distance of 22.99 feet to a point of tangency on the northwesterly right of way line of Larimer Avenue, 45.00 feet wide;

thence by the northwesterly right of way line of Larimer Avenue S 50° 00' 51.6" W a distance of 240.36 feet to a point of curvature on the line dividing Parcel 3-D and Road B-Revised in said Larimer/East Liberty Phase 1 Plan of Lots; thence by the line dividing Parcel 3-D and Road B-Revised in said Larimer/East Liberty Phase 1 Plan of Lots the following three (3) courses and distances:

in a northwesterly direction by a curve bearing to the right having a radius of 10.00 feet through an arc distance of 16.09 feet to a point of tangency;

N 37° 47' 04.5" W a distance of 311.34 feet to a point of curvature;

in a northwesterly direction by a curve bearing to the left having a radius of 200.00 feet through an arc distance of 57.84 feet to a point on the line dividing Parcel 3-D and Parcel 3-D2 in said Larimer/East Liberty Phase 1 Plan of Lots;

thence by the line dividing Parcel 3-D and Parcel 3-D2 in said Larimer/East Liberty Phase 1 Plan of Lots the following three (3) courses and distances:

in a northeasterly direction by a curve bearing to the left having a radius of 351.39 feet through an arc distance of 54.84 feet, also having a chord bearing of N 31° 48' 46.5" E and a chord distance of 54.78 feet, to a point of reverse curvature;

in a northeasterly direction by a curve bearing to the right having a radius of 184.00 feet through an arc distance of 180.44 feet to a point of reverse curvature;

in a northeasterly direction by a curve bearing to the left having a radius of 80.00 feet through an arc distance of 48.13 feet to a point on the southwesterly right of way line of said East Liberty Boulevard, at the point of beginning.

Containing an area of 104,710 square feet or 2.404 acres.

Legal Descriptions for Block/Lot No. 83-S-202 (Block D)

All that certain parcel of land, being Parcel 3-D2 in the Larimer/East Liberty Phase 1 Plan of Lots as recorded in the Allegheny County Department of Real Estate in Plan Book Volume 282, Page 51, situate in the 11th Ward, City of Pittsburgh, Allegheny County, Pennsylvania, more particularly bound and described as follows:

Beginning at a point on the southwesterly right of way line of East Liberty Boulevard, 100.00 feet wide, at the line dividing Parcel 3-D2 and Parcel 3-D in the Larimer/East Liberty Phase 1 Plan of Lots as recorded in the Allegheny County Department of Real Estate in Plan Book Volume 282, Page 51; thence from said point of beginning by the Parcel 3-D2 and Parcel 3-D in said Larimer/East Liberty Phase 1 Plan of Lots the following three (3) courses and distances:

in a southwesterly direction by a curve bearing to the right having a radius of 80.00 feet through an arc distance of 48.13 feet, also having a chord bearing of S 65° 52' 12.7" W and a chord distance of 47.40 feet, to a point of reverse curvature;

in a southwesterly direction by a curve bearing to the left having a radius of 184.00 feet through an arc distance of 180.44 feet to a point of reverse curvature;

in a southwesterly direction by a curve bearing to the right having a radius of 351.39 feet through an arc distance of 54.84 feet to a point on the line dividing Parcel 3-D2 and Road B-Revised in said Larimer/East Liberty Phase 1 Plan of Lots;

thence by the line dividing Parcel 3-D2 and Road B-Revised in said Larimer/East Liberty Phase 1 Plan of Lots in a northwesterly direction by a curve bearing to the left having a radius of 200.00 feet through an arc distance of 36.26 feet to a point of tangency; thence continuing by same and by the northeasterly right of way line of Kalida Drive N 64° 44' 38.4" W a distance of 29.20 feet to a point on the line dividing Parcel 3-D2 in said Larimer/East Liberty Phase 1 Plan of Lots and Parcel 3A in the Liberty Park Phase 2 Plan of Lots as recorded in the Allegheny County Department of Real Estate in Plan Book Volume 271, Page 54; thence by the line dividing Parcel 3-D2 in said Larimer/East Liberty Phase 1 Plan of Lots and Parcel 3A in said Larimer/East Liberty Phase 1 Plan of Lots the following four (4) courses and distances:

N 25° 15' 21.6" E a distance of 62.49 feet;

in a northerly direction by a curve bearing to the left having a radius of 147.50 feet through an arc distance of 161.19 feet, also having a chord bearing N 21° 16' 48.3" E and a chord distance of 153.28 feet, to a point of tangency;

N 10° 02' 47.4" W a distance of 90.41 feet;

N 25° 15' 15.8" E a distance of 12.36 feet to a point on the southwesterly right of way line of said East Liberty Boulevard;

thence by the southwesterly right of way line of said East Liberty Boulevard in a southeasterly direction by a curve bearing to the right having a radius of 904.93 feet through an arc distance of 260.17 feet, also having a chord bearing of S 50° 27' 29.4" E and a chord distance of 259.27 feet, to a point on line dividing Parcel 3-D2 and Parcel 3-D in said Larimer/East Liberty Phase 1 Plan of Lots, at the point of beginning.

Containing an area of 32,320 square feet or 0.742 acres.

Legal Descriptions for Block/Lot No. 83-S-192 (Kalida Drive Extension)

All that certain parcel of land, being a portions of Parcel 3-D and Road B – Revised in the Larimer/East Liberty Phase 1 Plan of Lots as recorded in the Allegheny County Department of Real Estate in Plan Book Volume 282, Page 51, situate in the 11th Ward, City of Pittsburgh, Allegheny County, Pennsylvania, more particularly bound and described as follows:

Beginning at a point common to Road B – Revised, Parcel 3-D1 and Parcel 3-D1-A in the Larimer/East Liberty Phase 1 Plan of Lots as recorded in the Allegheny County Department of Real Estate in Plan Book Volume 282, Page 51; thence from said point of beginning by the line dividing Road B – Revised and Parcel 3-D1-A in said Larimer/East Liberty Phase 1 Plan of Lots N 37° 47' 04.5" W a distance of 28.94 feet to a point of curvature; thence continuing by same in an easterly direction by a curve bearing to the left having a radius of 40.00 feet through an arc distance of 33.29 feet to a point; thence by a line through Road B – Revised in said Larimer/East Liberty Phase 1 Plan of Lots the following three (3) courses and distances:

N 31° 32' 01.6" E a distance of 2.59 feet;

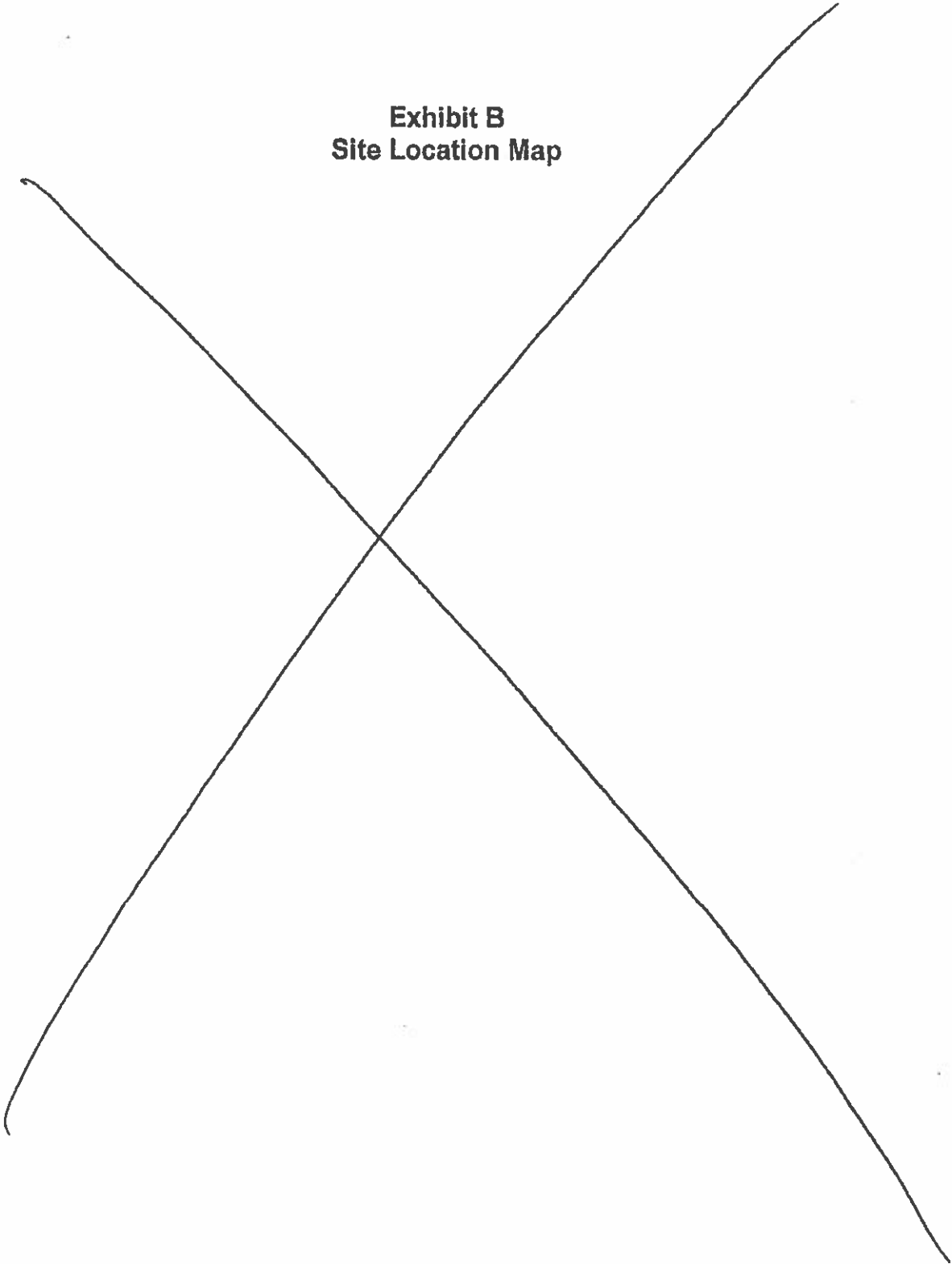
N 63° 33' 38.4" W a distance of 20.90 feet;

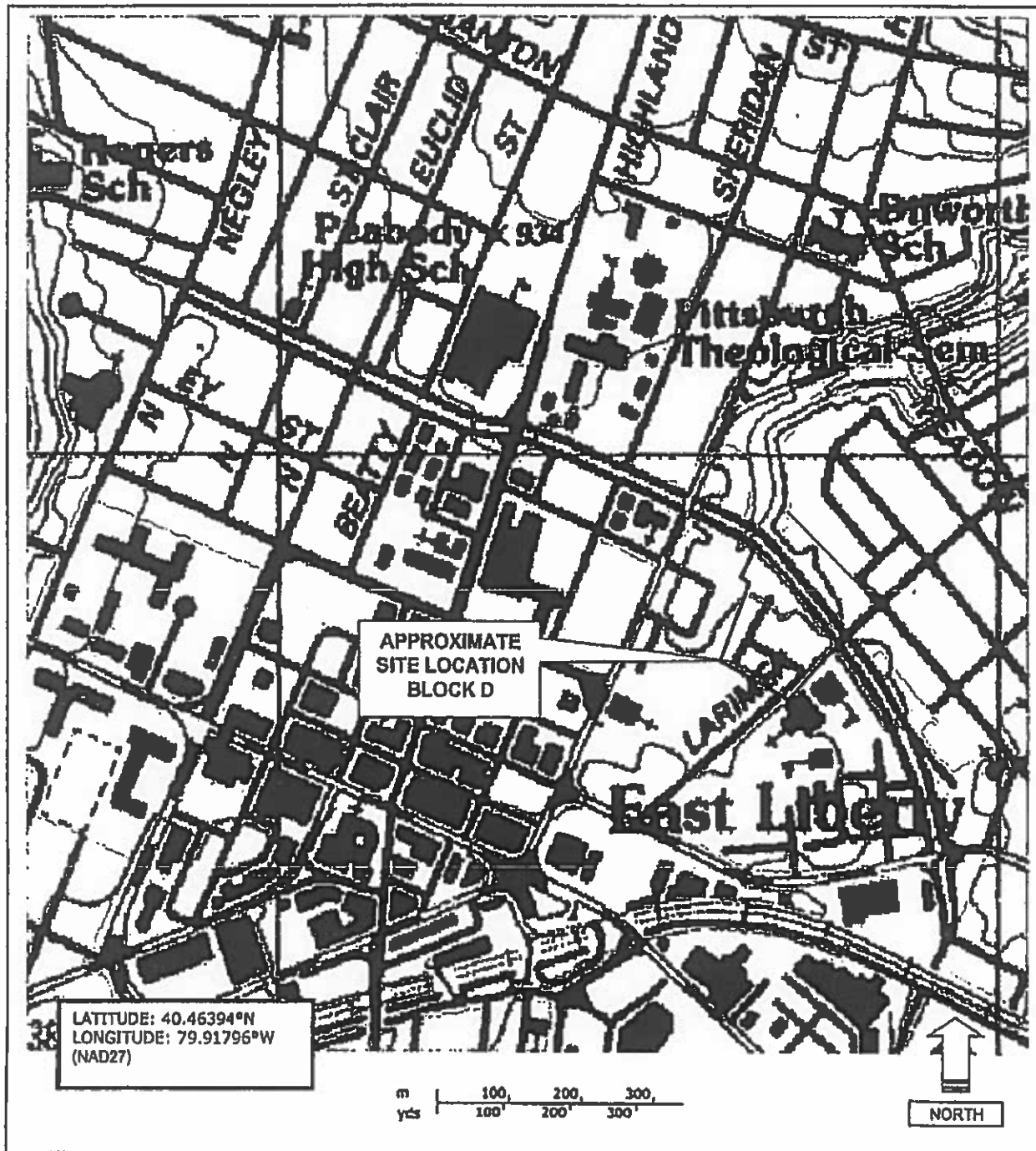
N 31° 32' 01.6" E a distance of 60.75 feet to a point;

thence continuing through Road B – Revised and also through Parcel 3-D in said Larimer/East Liberty Phase 1 Plan of Lots N 28° 55' 01.6" E a distance of 90.15 feet to a point in Parcel 3-D in said Larimer/East Liberty Phase 1 Plan of Lots; thence by a line through Parcel 3-D in said Larimer/East Liberty Phase 1 Plan of Lots S 63° 33' 38.4" E a distance of 84.64 feet to a point; thence continuing through Parcel 3-D and also through Road B – Revised in said Larimer/East Liberty Phase 1 Plan of Lots S 31° 32' 01.6" W a distance of 167.50 feet to a point common to Road B – Revised, Parcel 3-D1 and Parcel 3-D1-A in said Larimer/East Liberty Phase 1 Plan of Lots, at the point of beginning.

Containing an area of 12,607 square feet or 0.289 acre.

Exhibit B
Site Location Map

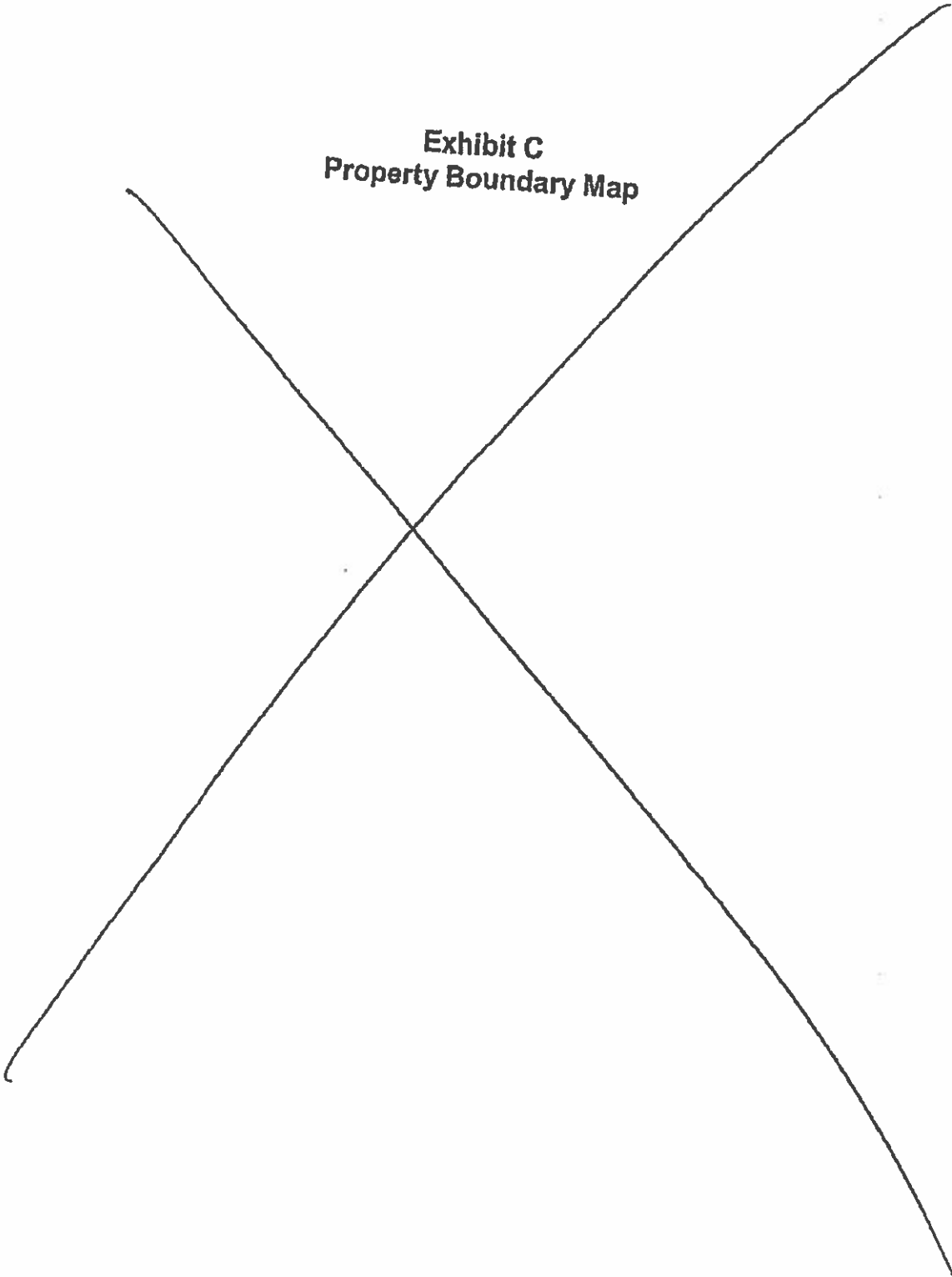




MAP REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC MAPS
-PITTSBURGH EAST, PA 1993

 KU Resources, Inc.	TOPOGRAPHIC LOCATION MAP BLOCK D LARIMER/EAST LIBERTY PHASE ONE DEVELOPMENT EAST LIBERTY, PENNSYLVANIA			DRAWN BY:	KJK	10/2016
	Prepared for: HOUSING AUTHORITY OF THE CITY OF PITTSBURGH			CHECKED BY:	FWB	10/2016
				APPROVED BY:	FWB	10/2016
				DRAWING NO.	MCB.16191FRDEFI	
	EXHIBIT B					

Exhibit C
Property Boundary Map



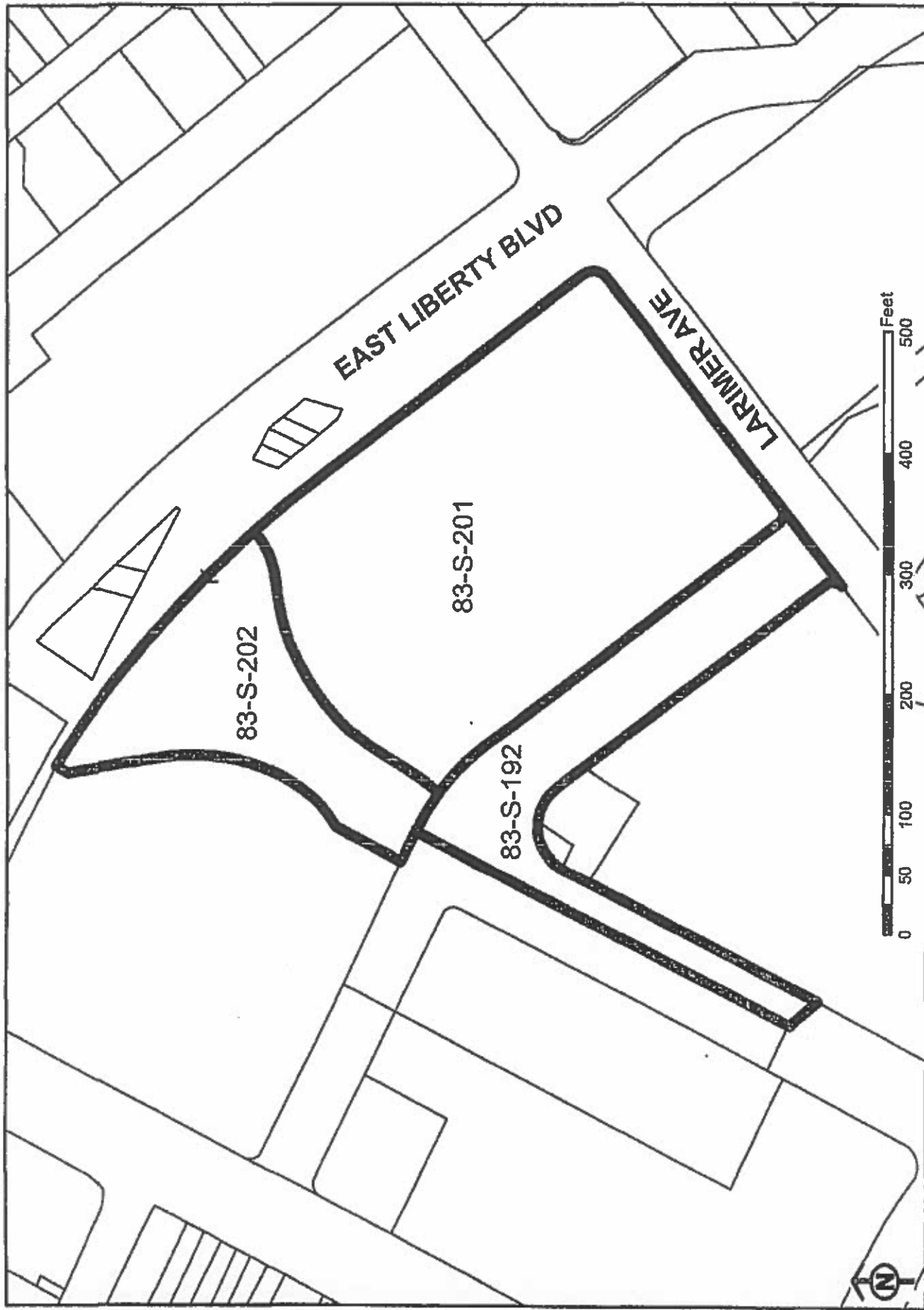


Exhibit D
SVOC Impacted Area

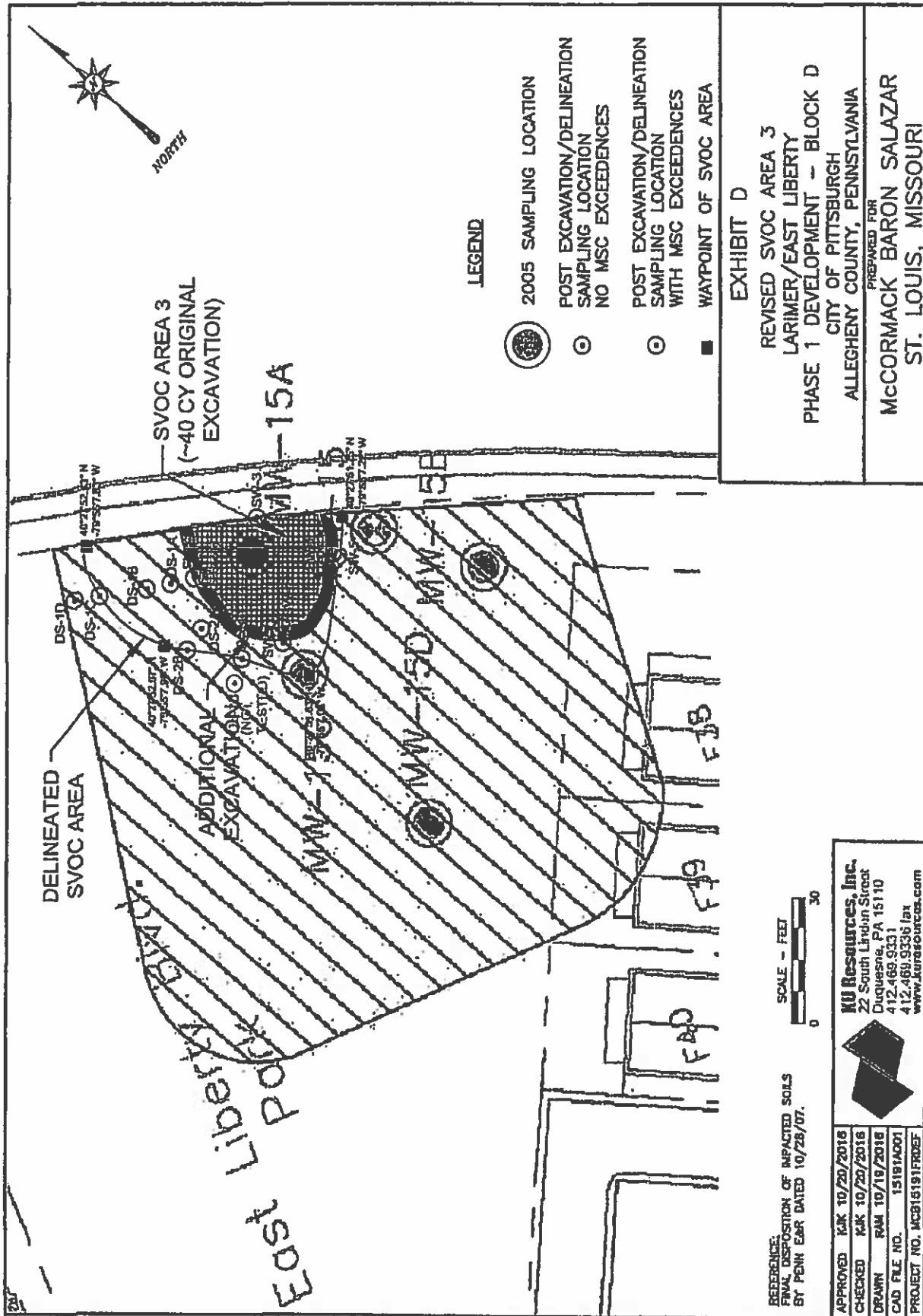


Exhibit E
Historical Sampling Locations

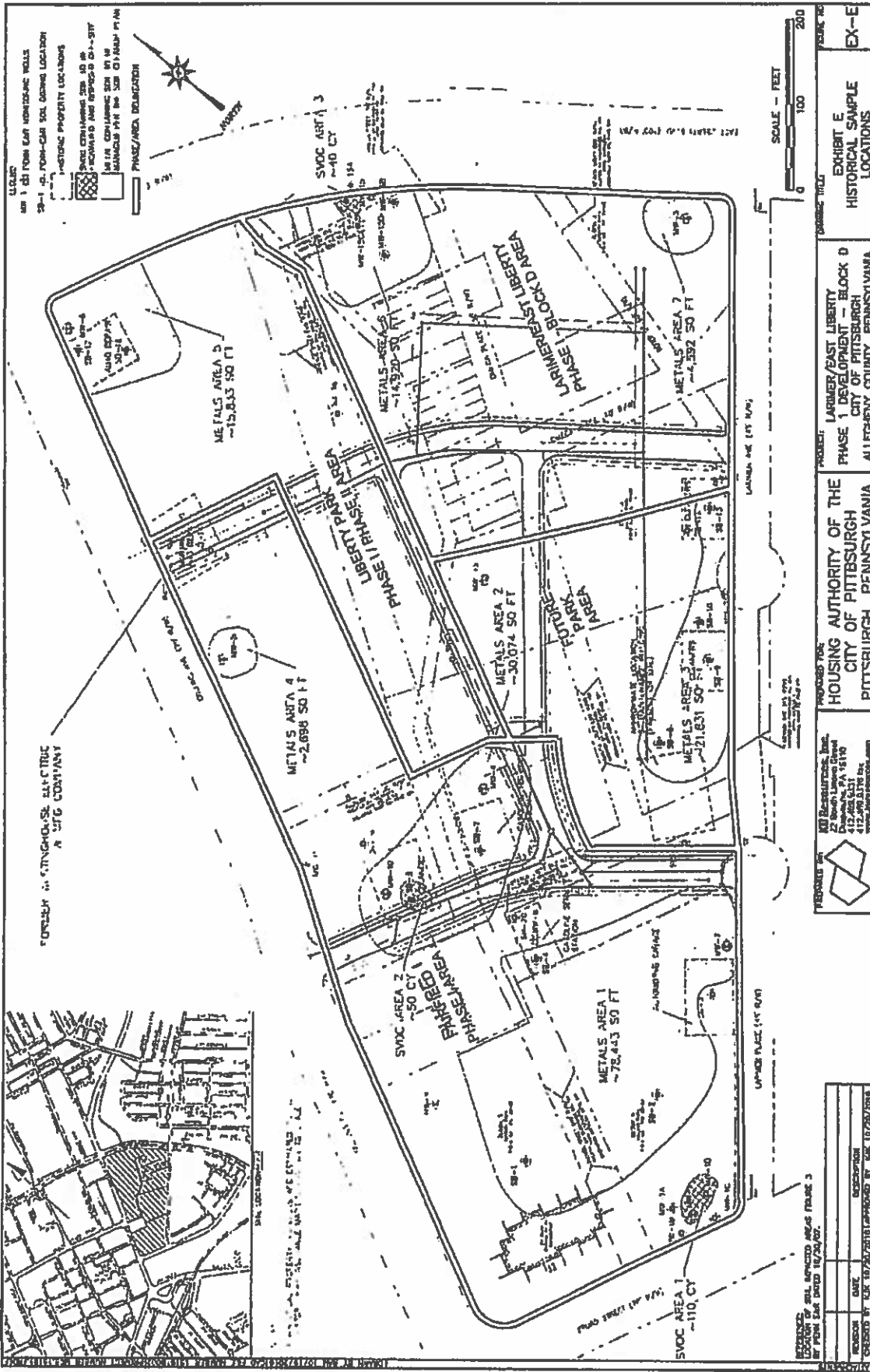
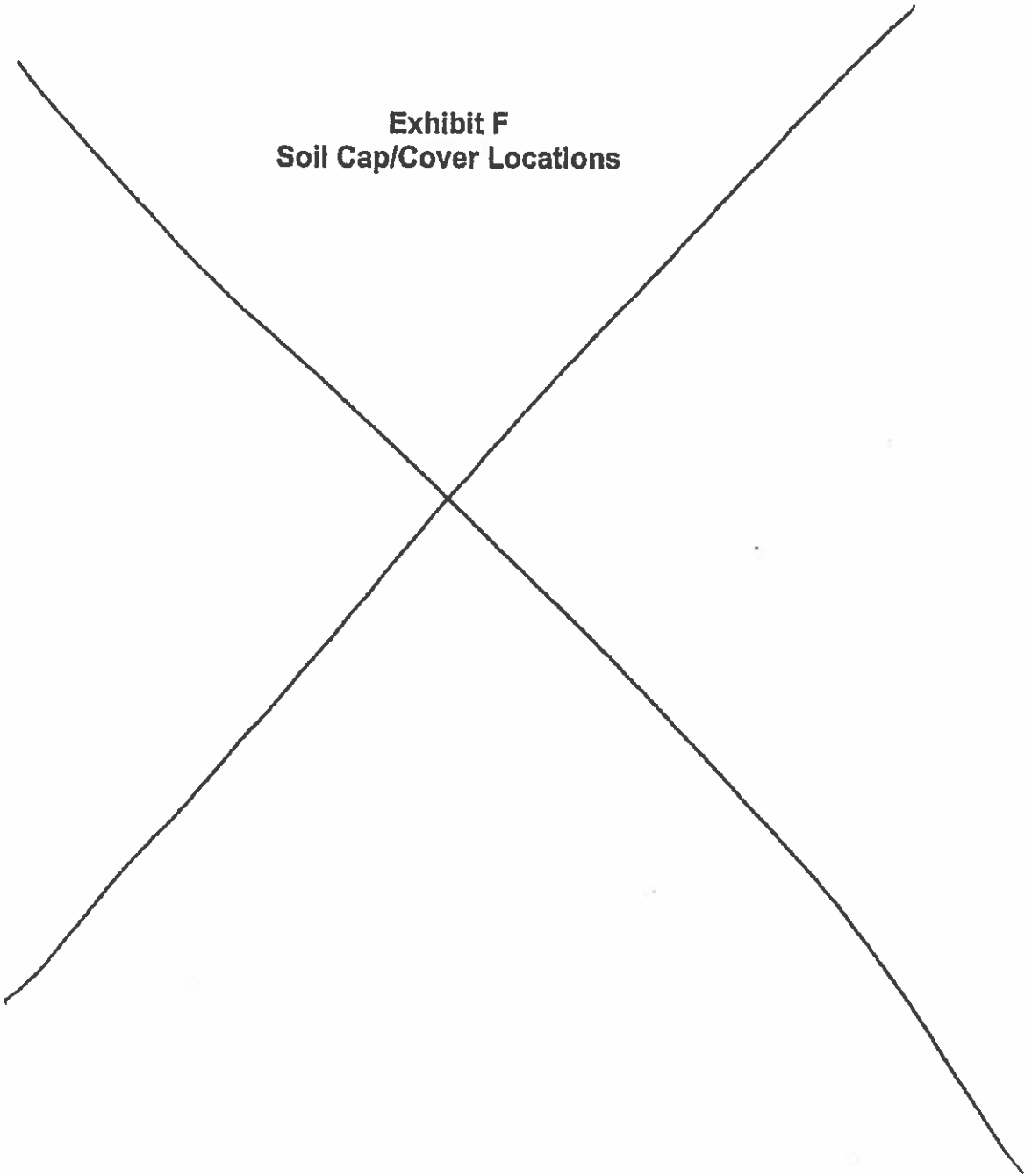
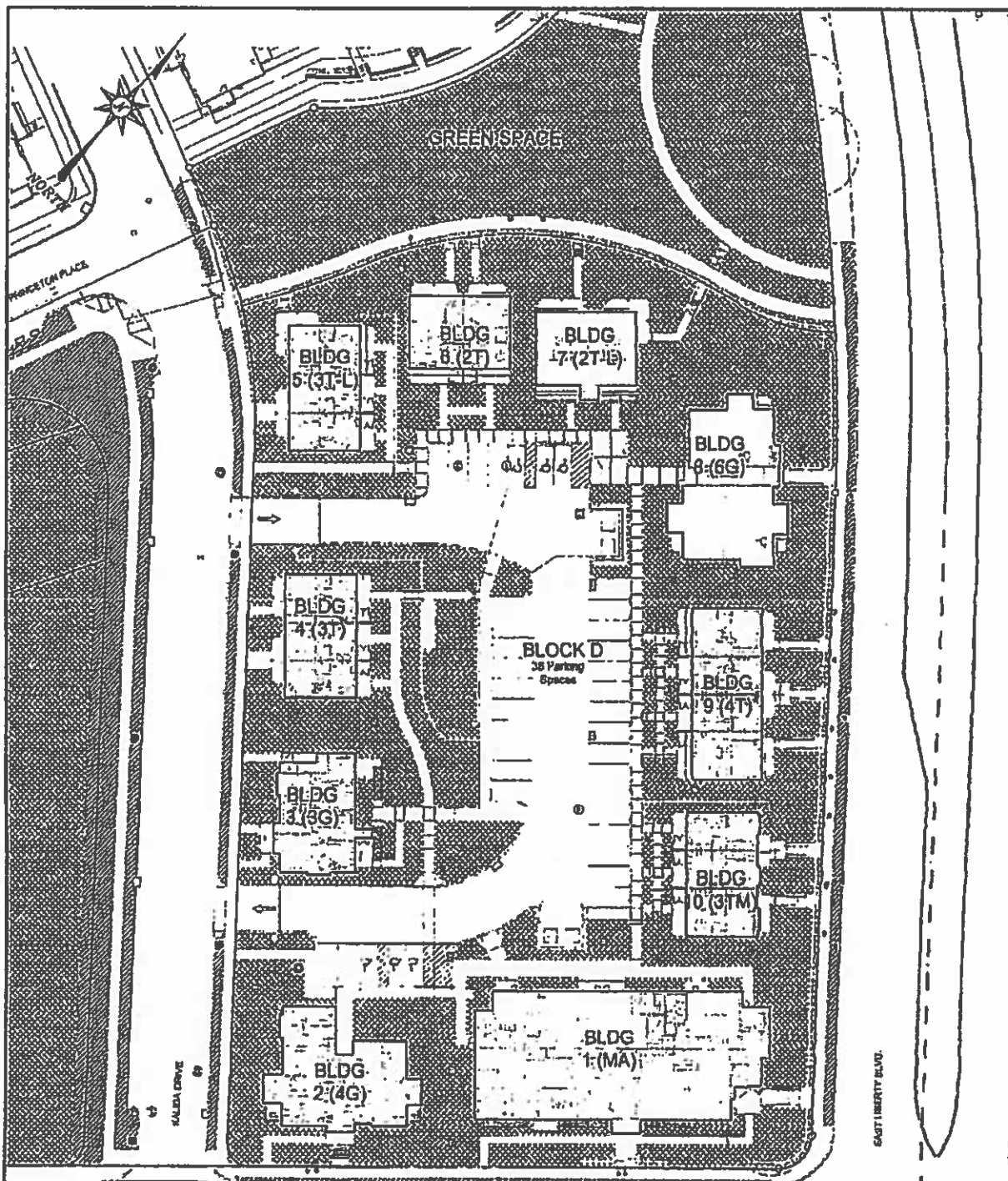


Exhibit F
Soil Cap/Cover Locations





REFERENCE:
WITNESS BARRIER PLAN EAST
DRAWING NO. L4.1 BY
LOQUATRA BONCI ASSOCIATES OF
PITTSBURGH, PENNSYLVANIA,
DATED JUNE 17, 2018

SCALE - FEET



REVISION	DATE	DESCRIPTION
APPROVED	FWB 09/27/2017	
CHECKED	FWB 09/27/2017	
DRAWN	KJK 09/27/2017	
CAD FILE NO.	16191A012	
PROJECT NO.	MGB15181FRDEF	

KU Resources, Inc.
 22 South Linden Street
 Duquesne, PA 16110
 412.489.9331
 412.469.9338 fax
www.kuresources.com

EXHIBIT F
SOIL CAP LOCATIONS
LARIMER/EAST LIBERTY
PHASE 1 DEVELOPMENT - BLOCK D
CITY OF PITTSBURGH
ALLEGHENY COUNTY, PENNSYLVANIA
 PREPARED FOR
HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
PITTSBURGH, PENNSYLVANIA

ATTACHEMENT C
LIBERTY GREEN ENVIRONMENTAL COVENANT



Allegheny County
Jerry Tyskiewicz
Department of Real Estate
Pittsburgh, PA 15219

Instrument Number: 2017-37217

BK-DE VL-17030 PG-114

Recorded On: November 29, 2017 As-Deed Agreement

Parties: PITTSBURGH URB REDEVELOP AUTH

To PENNSYLVANIA COMWTH BY DEP ENVRMTL PROTECTION

of Pages: 14

Comment: ENVIRONMENTAL COVENANT

***** THIS IS NOT A BILL *****

Deed Agreement 162.00
0
0
Total: 162.00

Realty Transfer Stamp

Department of Real Estate Stamp

Affidavit Attached-No
NOT A DEED OF TRANSFER
EXEMPT
Value 0.00

Certified On/By-> 11-29-2017 / S B
NOT A DEED OF TRANSFER

I hereby certify that the within and foregoing was recorded in the Department of Real Estate in Allegheny County, PA

****DO NOT REMOVE-THIS PAGE IS PART OF THE RECORDED DOCUMENT****

File Information:

Record and Return To:

Document Number: 2017-37217
Receipt Number: 3343352
Recorded Date/Time: November 29, 2017 12:28:29P
Book-Vol/Pg: BK-DE VL-17030 PG-114
User / Station: J Clark - Cash Super 07

URBAN REDEVELOPMENT AUTH OF PGH
ATTN PAUL ALESSIO
200 ROSS ST 11TH FL
PITTSBURGH PA 15219



Jerry Tyskiewicz, Director
Rich Fitzgerald, County Executive

13

Environmental Covenant

When recorded, return to:
Urban Redevelopment Authority of Pittsburgh
200 Ross Street, 11th Floor
Pittsburgh, PA 15219
Attention: Paul Alessio

The County Parcel Identification Nos. of the Property is: **83-S-190** and **83-S-196**

GRANTOR: Urban Redevelopment Authority of Pittsburgh

PROPERTY ADDRESS: Corner of Station Street and Larimer Avenue, Pittsburgh, PA, 15206

ENVIRONMENTAL COVENANT

This Environmental Covenant is executed pursuant to the Pennsylvania Uniform Environmental Covenants Act, Act No. 68 of 2007, 27 Pa. C.S. §§ 6501 – 6517 (UECA). This Environmental Covenant subjects the Property identified in Paragraph 1 to the activity and/or use limitations in this document. As indicated later in this document, this Environmental Covenant has been approved by the Pennsylvania Department of Environmental Protection (Department).

1. **Property affected.** The property affected (Property) by this Environmental Covenant is located in Pittsburgh, Allegheny County, PA.

The latitude and longitude of the center of the Property affected by this Environmental Covenant is: ^{44°}40°27'47" N; ^{10°}-79°55'43" W.

The Property has been known by the following name(s): Liberty Green; CNIG Park Site; formerly part of Liberty Park-Fairfield Act 2 site.

The DEP Primary Facility ID# is: 662898

The Land Recycling Program (LRP) ID# is: 5-2-1-18884

A complete description of the Property is attached to this Environmental Covenant as Exhibit A. A map of the Property is attached to this Environmental Covenant as Exhibit B.

2. **Property Owner / GRANTOR / GRANTEE.** Urban Redevelopment Authority of Pittsburgh is/are the owner(s) of the Property and the GRANTOR and GRANTEE of this Environmental Covenant.

3. The mailing address of the owner is: Urban Redevelopment Authority of Pittsburgh, 200 Ross Street, Pittsburgh, PA 15219.

4. **Description of Contamination & Remedy.** Formerly part of the "Liberty Park-Fairfield" Act 2 redevelopment project, impacts to the 4.426 acre site were previously characterized in a 2005 Remedial Investigation Report (RIR). The RIR identified an area of soil with metals (antimony, arsenic, boron, lead, thallium and silver) above the Act 2 residential standards. The RIR also identified tetrachloroethylene (PCE) and lead in the groundwater at concentrations above the Act 2 residential Statewide Health Standard in the shallow overburden water bearing zone (approximately 10 Ft. below ground surface). Fate-and-transport analysis indicated that, should the shallow water-bearing zone extend off-site, PCE will not migrate beyond 400 Ft. of the Property boundaries exceeding the residential, used aquifer Statewide Health Standard. The RIR concluded that because the shallow overburden groundwater bearing zone exists approximately 10 Ft. below the ground surface, concentrations of PCE and lead do not present a direct contact concern to future residents or trespassers. Risk assessment calculations associated with site worker direct contact indicated that concentrations of PCE and lead present in the shallow overburden water bearing zone do not present a significant risk. The Department approved the RIR on August 25, 2005.

A July 2005 Cleanup Plan was approved by the Department on September 20, 2005 and implemented for the Property during yrs. 2015-2016.

A February 2006 RIR and Final Report for groundwater for the whole Liberty Park Development project, including the Property was submitted and subsequently approved by the Department on April 7, 2006.

A 2017 "Final Soils Report CNIG Park Site" (Final Report) was submitted to the Department in order to document Act 2 Site Specific Standard (SSS) utilizing pathway elimination. As documented in the Final Report, the current intended use of the Property is a recreational park. Achievement of the Act 2 Standard for soils is accomplished through engineering and institutional controls, including repositioning impacted soil to lower in the final soil profile, limited and discrete excavation, and placement of an appropriate buffer or cap including pavement or clean soil. The Department approved the Final Report on August 23, 2017 as it demonstrated a Site Specific Standard based on residential use assumptions. Since the Final Report utilized activity and use limitations and post remedial care plan (PRCP) obligations to meet and or attain the SSS, activity and use limitations and reporting requirements shall be required to meet and/or continue to attain the SSS. PRCP obligations are documented in the Final Report portions of the PRCP are also listed below (Paragraph 5 and 7).

The administrative file (LRP# 5-2-1-18884), detailing the characterization and remedial activities undertaken with respect to the Property, is maintained by the Department in the Department's Southwest Regional Office, 400 Waterfront Drive, Pittsburgh, Pennsylvania 15222, and is available for inspection at that location in accordance with the Department's or its successor agency's document retention and public access policies.

5. **Activity & Use Limitations.** The Property is subject to the following activity and use limitations, which the then current owner of the Property, and its tenants, agents, employees and other persons under its control, shall abide by:

(a) Use of the groundwater at and under the property for drinking, commercial, or agricultural purposes shall be prohibited;

(b) A protective cap/cover shall be required and maintained (as seen on Exhibit B) on the Property. The cap/ cover currently consists of 18-inch soil cap and a witness barrier or 30-inch cap without witness barrier;

(c) Prior to excavation a Soils Management Plan and Health and Safety Plan shall be required. All excavations encountering groundwater shall be dewatered and properly disposed of per applicable State and Federal regulations prior to being entered by construction personnel.

6. **Notice of Limitations in Future Conveyances.** Each instrument hereafter conveying any interest in the Property subject to this Environmental Covenant shall contain a notice of the activity and use limitations set forth in this Environmental Covenant and shall provide the recorded location of this Environmental Covenant.

7. **Compliance Reporting.** After written request by the Department and by the end of every third January following the Department's approval of this Environmental Covenant, the then current property owner shall submit, to the Department, written documentation stating whether or not the activity and use limitations in the Environmental Covenant are being abided by. In addition, within 1 month after any of the following events, the then current owner of the Property shall submit to the Department, written documentation: noncompliance with any activity and use limitations in this Environmental Covenant; transfer of the Property; changes in use of the Property; or filing of applications for building permits for the Property and any proposals for any site work, if the building or proposed site work will affect the contamination on the property subject to this Environmental Covenant.

8. **Access by the Department.** In addition to any rights already possessed by the Department, this Environmental Covenant grants to the Department a right of reasonable access of the Property in connection with implementation or enforcement of this Environmental Covenant.

9. **Recording & Proof & Notification.** Within 30 days after the date of the Department's approval of this Environmental Covenant, the URA or their designee shall file this Covenant with the Recorder of Deeds for each County in which the Property is located, and send a file-stamped copy of this Environmental Covenant to the Department within 60 days of recording. Within that time period, the URA also shall send a file-stamped copy to each the City of Pittsburgh and Allegheny County.

10. **Termination or Modification.**

(a) This Environmental Covenant may only be terminated or modified in accordance with 27 Pa. C.S. §§ 6509 or 6510, or in accordance with this paragraph.

(b) This Environmental Covenant may be amended or terminated as to any portion of the Property that is acquired for use as state highway right-of-way by the Commonwealth provided that: (1) the Department waives the requirements for an environmental covenant and for conversion pursuant to 27 Pa. C.S. §6517 to the same extent that this Environmental Covenant is amended or terminated; (2) the Department determines that termination or modification of this Environmental Covenant will not adversely affect human health or the environment; and (3) the Department provides 30-days advance written notice to the current property owner, each holder, and, as practicable, each person that originally signed the Environmental Covenant or successors in interest to such persons.

(c) This Environmental Covenant shall terminate upon attainment, in accordance with 35 P.S. §§ 6026. 101 – 6026.908, with an unrestricted use remediation standard for the above-described contamination at the Property. The Department must approve, in writing, of such termination.

(d) In accordance with 27 Pa. C.S. § 6510(a)(3)(i), Grantor hereby waives the right to consent to any amendment or termination of the Environmental Covenant by consent; it being intended that any amendment to or termination of this Environmental Covenant by consent in accordance with this Paragraph requires only the following signatures on the instrument amending or terminating this Environmental Covenant: (i) the Holder at the time of such amendment or termination; (ii) the then current owner of the Property and (iii) the Department.

11. **Department's address.** Communications with the Department regarding this Environmental Covenant shall be sent to: Program Manager, Environmental Cleanup & Brownfields, Pennsylvania Department of Environmental Protection, Southwest Regional Office, 400 Waterfront Drive, Pittsburgh, PA 15222.

12. **Severability.** The paragraphs of this Environmental Covenant shall be severable and should any part hereof be declared invalid or unenforceable, the remainder shall continue in full force and effect between the parties.

ACKNOWLEDGMENTS by Owner(s) and any Holder(s), in the following form:

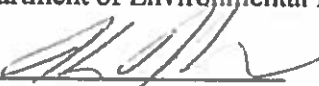
Urban Redevelopment Authority of Pittsburgh,
Grantor and Grantee

Date: 11-3-17

By: 
Name: ROBERT RUCENSTEIN
Title: EXECUTIVE DIRECTOR

APPROVED, by Commonwealth of Pennsylvania,
Department of Environmental Protection

Date: 11/20/17

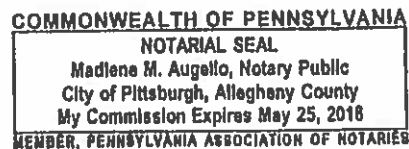
By: 
Name: Kevin Halloran
Title: Program Manager
Environmental Cleanup & Brownfields

COMMONWEALTH OF PENNSYLVANIA)
)
COUNTY OF Allegheny)

On this 3rd day of November, 2017, before me, the undersigned officer, personally appeared Robert Rubinstein, who acknowledged himself/herself to be the Executive Director of Urban Redevelopment Authority of Pittsburgh the Grantor and Grantee subscribed to this Environmental Covenant, and acknowledged that s/he executed same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

Madlene M. Augello
Notary Public



COMMONWEALTH OF PENNSYLVANIA)
)
COUNTY OF ALLEGHNEY) SS:

On this 30th day of November, 2017, before me, the undersigned officer, personally appeared Kevin Halloran, who acknowledged himself to be the Program Manager, Environmental Cleanup & Brownfields of the Commonwealth of Pennsylvania, Department of Environmental Protection, Southwest Regional Office, whose name is subscribed to this Environmental Covenant, and acknowledged that s/he executed same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

Cassandra A. Fritch
Notary Public

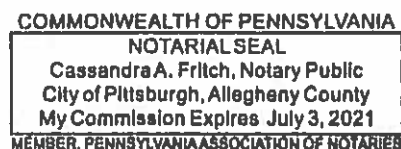


Exhibit A
Property Description

The project site was created during reconstruction of this neighborhood by developers McCormick Baron Salazar (MBS) over the period 2014-present pursuant to a Choice Homes Grant. The park will be located on approximately 4 acres bounded by Station Street, Kalida Street and Larimer Avenue one block north of Broad Street in the City's Larimer neighborhood.



Headquarters
600 First Road, Suite 303
Pittsburgh, PA 15203
Phone: 412.371.4460
Fax: 412.371.4462

Map Block & Lot: 83-S-190

All that piece or parcel of land situate in the 11th Ward of the City of Pittsburgh, Allegheny County, Pennsylvania, being more particularly described as follows:

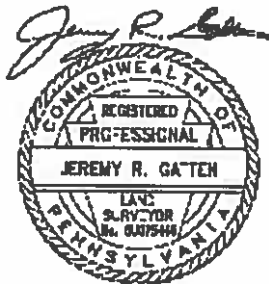
Beginning at a point on the easterly right-of-way line of Princeton Place, said right-of-way being 65 feet in width; said point also being a northwesterly corner of a tract owned by the Housing Authority of the City of Pittsburgh.

Thence, leaving the said Housing Authority of the City of Pittsburgh tract, along and contiguous with the said easterly right-of-way line of Princeton Place, transitioning to the westerly right-of-way line of Kalida Drive along the arc of a curve to the right having a chord bearing North 62°44'53" East for a chord distance of 43.83 feet to a point, a corner of the said Housing Authority of the City of Pittsburgh tract;

Thence, leaving the said westerly line of Kalida Drive, along and contiguous with a westerly line of the said Housing Authority of the City of Pittsburgh tract South 32°58'41" West a distance of 36.11 feet to a point;

Thence along and contiguous with a line of the said Housing Authority of the City of Pittsburgh tract North 62°06'59" West a distance of 21.85 feet to the Point of Beginning;

Containing 0.013 acres or 587 square feet, more or less.



Survey CM Environmental Geotechnical
Certified MDC

Map Block & Lot: 83-S-196

All that piece or parcel of land situate in the 11th Ward of the City of Pittsburgh, Allegheny County, Pennsylvania, being more particularly described as follows:

Beginning at a drill hole found in concrete on the northerly right-of-way line of Larimer Avenue, on the west side of Kalida Drive;

Thence running along and contiguous with the said northerly right-of-way line of Larimer Avenue the following two (2) courses and distances:

1. South 51°27'31" West a distance of 61.12 feet to a 3/4" iron pin found;
2. South 50°42'15" West a distance of 66.70 feet to a hub & tack found near a 5" x 5" square steel bollard;

Thence, leaving the said northerly right-of-way line of Larimer Avenue, along and contiguous with a northwesterly line of a tract owned by the City of Pittsburgh and along the existing Larimer Avenue South 50°42'15" West a distance of 275.26 feet to a 3/4" iron pin found, being a point on the radius of a cul-de-sac, the right-of-way line of Larimer Avenue;

Thence, leaving the said City of Pittsburgh tract, along and contiguous with the said cul-de-sac right-of-way line of Larimer Avenue, along the arc of a curve to the left having a chord bearing North 84°00'15" West for a chord distance of 13.65 feet to a drill hole found in concrete. Said curve having a radius of 40.00 feet and an arc length of 13.72 feet. Said point also being an intersection of the cul-de-sac right-of-way line of Larimer Avenue and the easterly right-of-way line of Station Street;

Thence, leaving the cul-de-sac right-of-way line of Larimer Avenue, along and contiguous with the said easterly right-of-way line of Station Street North 39°10'06" West a distance of 148.09 feet to a point;

Thence along the arc of a curve to the right having a chord bearing North 6°14'02" West for a chord distance of 10.87 feet to a point on the easterly right-of-way line of Princeton Place. Said curve having a radius of 10.00 feet and an arc length of 11.50 feet. Said curve being a connecting arc between the easterly right-of-way lines of Station Street and Princeton Place;

Thence along and contiguous with said easterly right-of-way line of Princeton Place the following two (2) courses and distances:

1. North 26°42'01" East a distance of 122.83 feet to a point;
2. North 26°42'01" East a distance of 264.14 feet to a point, a corner of a tract owned by the Housing Authority of the City of Pittsburgh;

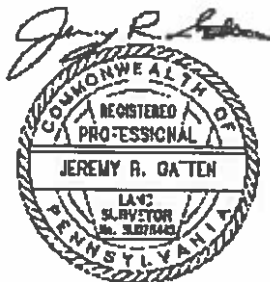
Thence along and contiguous with the southerly line of the said Housing Authority of the City of Pittsburgh tract the following two courses and distances:

1. South $56^{\circ}46'59''$ East a distance of 78.37 feet to a point;
2. North $32^{\circ}58'41''$ East a distance of 55.43 feet to a point on the westerly right-of-way line of Kalida Drive. Said right-of-way being 65 feet in width;

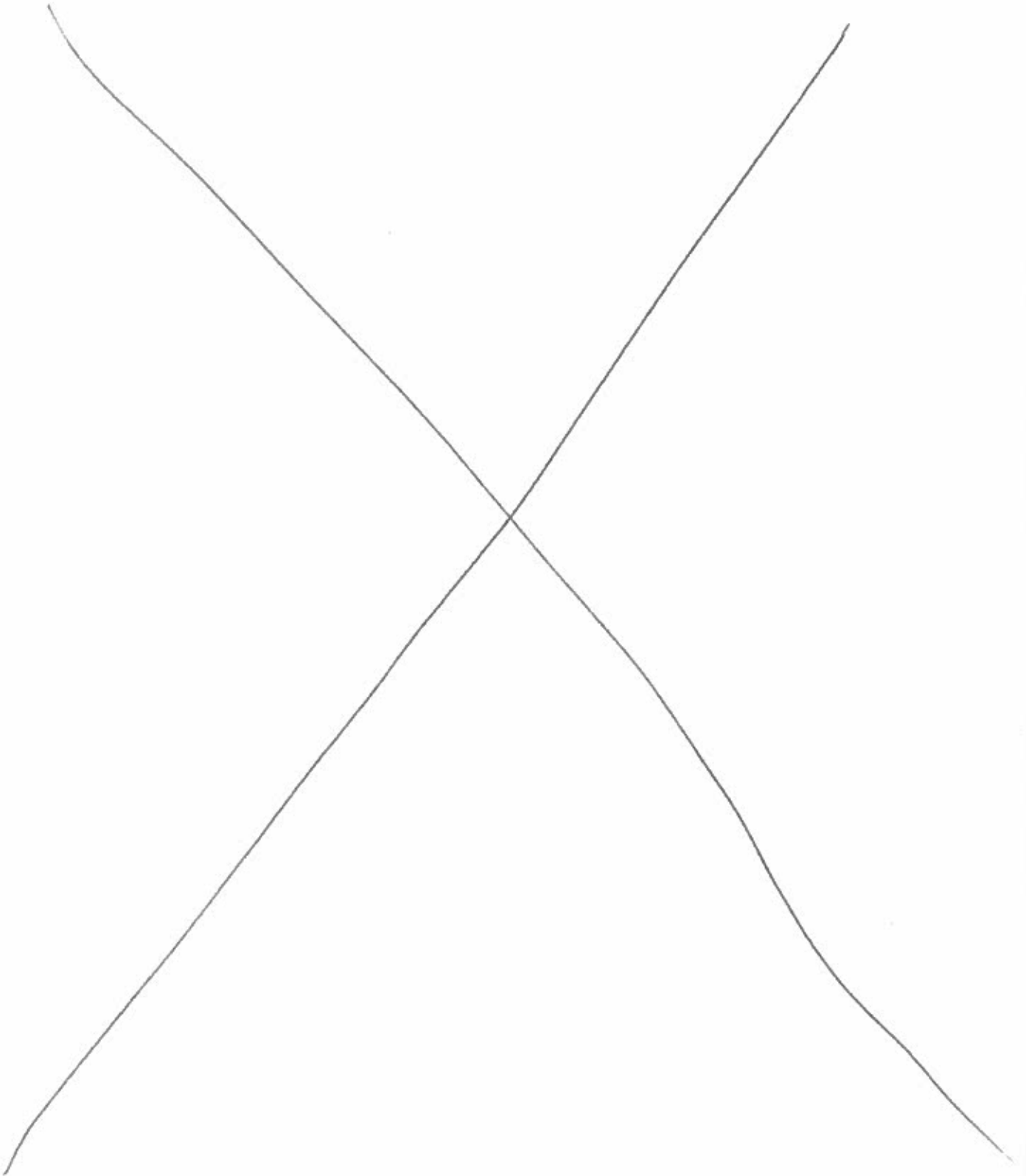
Thence, leaving the said Housing Authority of City of Pittsburgh tract, along and contiguous with the said westerly right-of-way line of Kalida Drive South $36^{\circ}20'20''$ East a distance of 258.10 feet to a point;

Thence along the arc of a curve to the right having a chord bearing South $7^{\circ}33'33''$ West for a chord distance of 13.87 feet to the Point of Beginning. Said curve having a radius of 10.00 feet and an arc length of 15.32 feet. Said curve being a connecting arc between the westerly right-of-way line of Kalida Drive and the northerly right-of-way line of Larimer Avenue;

Containing 2.441 acres or 106,331 square feet, more or less.



Appendix B
Property Maps



☐ Parole ☒ Muncipalities

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[illegible]

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 Parcels
  Municipalities

Panel A: Comparison of the two groups in the number of days until the first sexual intercourse, by whether they had a previous sexual experience.

**ATTACHMENT D
STEEL CERTIFICATION FORMS**

FORM ST-1 Steel Origin Certification: Contractors

This form must be executed by the Contractor and delivered to the proper Department of General Services representative before any item containing steel may be incorporated into any Commonwealth of Pennsylvania public works project. Execute and present this form for each type of steel product to be incorporated as provided above.

A. TO BE COMPLETED BY ALL CONTRACTORS:

1. Name of Contractor's firm: _____ 2. Date submitted: _____
3. Firm's Address: _____ 4. Phone number: () _____
5. Project No. DGS _____ 6. Project title: _____
7. Steel Product: _____
8. Name and address of supplier: _____

B. TYPE OF STEEL PRODUCT (check and complete applicable category)

1. Identifiable Steel Product: 100% of the steel in a product is identifiably marked as manufactured in the United States.
 - a. Other documentation required: NONE
 - b. Manner in which steel product is identifiable: _____
2. Non-identifiable Structural Steel: Less than 100% of the steel contained in the product is identifiable as provided above. Structural steel is defined as steel products used as a basic structural element of a project (i.e. steel beams, columns, decking, stairways, reinforcing bars, structural lintels, pipes, etc.).
 - a. Other documentation required: Bills of lading, invoices and mill certificates that certify that the steel contained in the product was melted or manufactured in the United States.
3. Non-identifiable Non-Structural Steel: All other steel products including door and window frames, machines, equipment, etc.
 - a. Other documentation required: Executed Form ST-2 Steel Origin Certification: Fabricators.

- C. **CERTIFICATION:** I, the undersigned officer of the above named firm, do certify that, to the best of my knowledge, the steel product listed above complies with the provisions of the Steel Products Procurement Act (73 P.S. §1881 et seq., as amended). I understand that by signing this document I certify that the facts contained herein are true. I further understand that this document is subject to the provisions of the Unsworn Falsification to Authorities Act (18 P.S. §4904) and the Steel Products Procurement Act, which provide penalties including, but not limited to, debarment from bidding on any Commonwealth of Pennsylvania public works project for a period of five years.

Witness:

Secretary or Treasurer

President or Vice President (SEAL)

(Corporate Seal)

FORM ST-2 Steel Origin Certification: Fabricator

This form must be executed by the Fabricator of any item containing steel that is not structural steel that is to be incorporated in any public works project. Structural steel is defined as steel products used as a basic structural element of a project (i.e. steel beams, columns, decking, stairways, reinforcing bars, structural lintels, pipes, etc.). Purchasers of structural steel products (contractors/subcontractors) must provide bills of lading, invoices and mill certification that the steel was manufactured in the United States instead of this form. The Fabricator shall be herein defined as the firm that assembles the component parts of the item(s) to be purchased. The Department of General Services (the Department) will accept the certification of firms that are earlier in the chain of purchase (i.e. manufacturers of components, steel suppliers) in lieu of the Fabricator. This form must be submitted to the appropriate Department representative before the product may be incorporated as provided above.

A. TO BE COMPLETED BY THE PURCHASER:

1. Name of purchasing firm: _____ 2. Date submit to Fabricator: _____
3. Address of purchasing firm: _____ 4. Phone number: () _____
5. Project No. DGS _____ 6. Project title: _____
7. Steel Product(s): _____

B. TO BE COMPLETED BY THE FABRICATOR:

8. Name of Firm: _____ 9. Date received: _____
10. Address of Firm: _____ 11. Phone number: () _____
12. Federal Employer ID No.: _____

CERTIFICATION: I, the undersigned officer of the above named firm, do certify that our firm assembled/manufactured the components to the steel products listed in Section 7, and that all steel components therein are comprised of steel that is manufactured in the United States. I understand that by signing this document I certify that I have received assurances from the suppliers/manufacturers of the components that said components do not contain foreign manufactured steel. I further understand that this document is subject to the provisions of the Unsworn Falsification to Authorities Act (18 P.S. §4904). I also understand that I am subject to the provisions of the Steel Products Procurement Act (73 P.S. §1881 et seq.) which provides penalties including, but not limited to, debarment from supplying any products for Commonwealth of Pennsylvania public works project for a period of five years for violations therein.

WITNESS:

Secretary or Treasurer_____
President or Vice President (SEAL)

(Corporate Seal)

FORM ST-3 75% U.S. Manufacture Certification: Fabricator

This form must be executed by a Fabricator of any item containing BOTH FOREIGN AND U.S. MANUFACTURED STEEL. The Steel Products Procurement Act (73 P.S. §1881 et seq.) allows the use of steel products with both types of steel if seventy-five percent (75%) of the cost of the materials (including steel, rubber, wood, plastic, etc.) in the product are manufactured or produced, as the case may be, in the United States.

The Fabricator shall be herein defined as the firm that assembles the component parts of the item(s) to be purchased. The Department of General Services (the Department) will accept the certification of firms that are earlier in the chain of purchase (i.e. manufacturers of components, steel suppliers) in lieu of the Fabricator. This form must be submitted to the appropriate Department representative before the product may be incorporated as provided above.

A. TO BE COMPLETED BY THE CONTRACTOR (PURCHASER):

1. Name of Contractor: _____ 2. Date submitted to Fabricator: _____
3. Address of Contractor: _____ 4. Phone number: () _____
5. Project No. DGS _____ 6. Project title: _____
7. Steel Product(s): _____

B. TO BE COMPLETED BY THE FABRICATOR:

8. Name of Firm: _____ 9. Date received: _____
10. Address of Firm: _____ 11. Phone number: () _____
12. Federal Employer ID No.: _____
13. Total cost of materials in the item listed in Section 7 that were manufactured/produced in the United States: _____
14. Total cost of ALL of the materials in the item listed in Section 7: _____
15. Section 13 divided by Section 14 = _____ (greater than .75)

CERTIFICATION: I, the undersigned officer of the above named firm, do certify that our firm assembled/manufactured the components to the steel products listed in Section 7, that the steel in said product is both foreign and domestically manufactured and that all the facts contained in this document are true. I understand that this document is subject to the provisions of the Unsworn Falsification to Authorities Act (18 P.S. §4904), and the Steel Products Procurement Act (73 P.S. §1881 et seq.) which provides penalties including, but not limited to, debarment from supplying any products for Commonwealth of Pennsylvania public works project for a period of five years for violations therein.

WITNESS:

Secretary or Treasurer

(Corporate Seal)

President or Vice President (SEAL)

FORM ST-4 Not Domestically Manufactured: Contractors

This form must be executed by the Contractor when a particular steel product required in a Commonwealth of Pennsylvania public works project is not produced in sufficient quantities in the United States. As provided under the Steel Products Procurement Act (73 P.S. §1881 et seq.) written permission to incorporate said steel product by the Department of General Services shall constitute the Department's agreement that said product is not available with sufficient U.S. manufactured steel and so the product is exempt from the Act.

1. Name of Contractor's Firm: _____ 2. Date submitted: _____
3. Firm's Address: _____ 4. Phone number: () _____
5. Project No. DGS _____ 6. Project title: _____
7. Steel Product: _____
8. Suppliers/Manufacturers contacted by the Contractor that claimed that the steel product listed in Section 7 is not produced/manufactured with U.S. Manufactured Steel in sufficient quantities to complete the above referenced project (need at least four).
 - a. Firm Name: _____ Address: _____
Phone Number: () _____ Person Contacted: _____
 - b. Firm Name: _____ Address: _____
Phone Number: () _____ Person Contacted: _____
 - c. Firm Name: _____ Address: _____
Phone Number: () _____ Person Contacted: _____
 - d. Firm Name: _____ Address: _____
Phone Number: () _____ Person Contacted: _____
(include a separate sheet if necessary)

CERTIFICATION: I, the undersigned officer of the above named firm, do certify that I have contacted the firms listed in Section 8, and that said firms assured me that the product listed in Section 7 is not produced/manufactured with U.S. Manufactured Steel in sufficient quantities to complete the above referenced project.

I understand that this document is subject to the provisions of the Unsworn Falsification to Authorities Act (18 P.S. §4904) and the Steel Products Procurement Act, which provide penalties including, but not limited to, debarment from bidding on any Commonwealth of Pennsylvania public works project for a period of five years.

WITENESS:

Secretary or Treasurer

President or Vice President (SEAL)

(Corporate Seal)

END OF SPECIAL CONDITIONS 1

SPECIAL CONDITIONS

PART II

402. SPECIAL CONDITIONS PART II pertains to the following:

SECTION 1

The Urban Redevelopment Authority of Pittsburgh's Minority and Women's Participation Policy - establishes a goal of eighteen percent (18%) of the contract amount to be expended for minority participation and seven percent (7%) of the contract amount to be expended for women's participation.

SECTION 2

Section 3 of the Housing and Urban Development Act of 1968 – Establishes provisions and procedures pertaining to employment opportunities for lower income residents of the project area and for business concerns which are located in, or owned in substantial part by persons residing in the project area.

SPECIAL CONDITIONS**PART II****SECTION I****URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH****MINORITY AND WOMEN'S PARTICIPATION POLICY****402.1**

The Urban Redevelopment Authority of Pittsburgh is committed to providing equal employment opportunities to minorities and women and equal opportunities for business growth and development to minority and women entrepreneurs. To that end, the Urban Redevelopment Authority of Pittsburgh requires that all contractors and subcontractors performing work for the URA shall demonstrate a good faith effort to obtain the participation of minority and women business enterprises in the work to be performed for the URA and to employ minorities and women during performance of the work. It is the URA's objective to obtain minority and women's participation in its contracts with the goal being eighteen percent (18%) of the contract amount be expended for minority participation and seven percent (7%) of the contract amount be expended for women's participation. The URA promotes the full utilization of subcontracting activities to ensure a successful Minority and Women's Participation Plan. Minority and women's participation may be provided by a combination of the following:

- a. Subcontracts for work on the project. The amount of minority and women's participation for this element shall be the total amount of subcontracts with minority business enterprises or women's business enterprises for work on the project.
- b. Supply contracts for the project. The amount of minority and women's participation for this element varies depending on the type of supply contract held.
 - 1) If the materials or supplies are obtained from a minority or women's business enterprise (M/WBE) manufacturer, the entire cost of the material/supplies purchased from the manufacturer for use on the project is considered toward the M/WBE goal.
 - 2) If the materials or supplies are purchased from a M/WBE regular dealer, sixty percent (60%) of the total cost of the materials/supplies purchased from the dealer for use on the project is considered toward the M/WBE goal.
 - 3) If the materials or supplies are purchased from M/WBE packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite the transaction (all considered brokers under the definition of this Policy), ten percent (10%) of the total cost of the materials/supplies purchased from the broker for use on the project is considered toward the M/WBE goal.

402.2 Minority and Women's Employment on the project is encouraged. The contractor and all subcontractors shall make a good faith effort to employ minority and female workers at the project site for the duration of the work. Total compensation paid to minorities and women employed at the project site will be reported on forms provided by the URA. **The minority and women's employment will be considered toward the M/WBE goal for the project.**

402.3 **Minority Business Enterprises** (hereinafter MBE) means a sole proprietorship, partnership or corporation-owned, operated and controlled by minority group members who have at least fifty-one percent (51%) ownership. The minority group members must have operational and managerial control, interest in capital and earnings commensurate with the percentage of ownership. Furthermore, to qualify as an MBE, the business must be certified as an MBE by the City of Pittsburgh, Allegheny County, the Commonwealth of Pennsylvania or the Pennsylvania Department of Transportation.

Women's Business Enterprise (hereinafter WBE) means a sole proprietorship, partnership or corporation-owned, operated and controlled by women who have at least fifty-one percent (51%) ownership. Women must have operational and managerial control, interest in capital and earnings commensurate with the percentage of ownership. Furthermore, to qualify as an WBE, the business must be certified as an WBE by the City of Pittsburgh, Allegheny County, the Commonwealth of Pennsylvania or the Pennsylvania Department of Transportation.

Minority and minority group members means African Americans, Hispanics, Asians, and American Indians.

402.4 **Manufacturer** means a firm that operates or maintains a factory or establishment that produces on the premises, the materials, supplies, articles or equipment required under the contract and are of the general character described by the contract documents.

Regular Dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment are of the general character described by the contract documents and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. A regular dealer, must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.

A regular dealer may sell such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided above if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis.

Broker means packagers, manufacturers' representatives or other persons who arrange or expedite transactions related to the supply or purchase of materials described in the contract documents. A firm is considered a broker if it does not mean either of the definitions of manufacturer or regular dealer described above.

- 402.5** The bidder must submit with his bid, the attached "Certificate of Minority and Women's Participation" form which includes Exhibit A, Affirmative Action Provisions, and Exhibit B MBE/WBE Solicitation Statement, properly filled out and signed in ink by the bidder. the Urban Redevelopment Authority of Pittsburgh shall consider failure to submit, as part of the bid, a signed certification as grounds for rejection of the bid.
- 402.6** The bidder must demonstrate to the Urban Redevelopment Authority of Pittsburgh that he has made a diligent good faith effort to meet the URA's goals for minority and women's participation in the contract work.
- 402.7** The bidders attention is directed to the following:
- a. Prior to award of the contract, the apparent successful bidder shall submit a written plan to the URA outlining his participation plan and the participation plan of his subcontractors. Upon review by the URA, the contractor shall meet with the URA to discuss the implementation of the plan.
 - b. Upon approval of the bidder's Minority and Women's Participation Plan by the URA, award of the contract shall be made and implementation of the approved plan shall be a contract obligation.
 - c. During the course of construction, the contractor shall submit monthly reports on forms provided by the URA detailing minority and women's utilization in the contract and the dollar amounts expended for minority and women's participation. The contractor's compliance with the approved Minority and Women's Participation Plan shall be monitored by the URA. If at any time during the course of the contract, the contractor determines that he will be unable to comply with the approved Plan, the contractor must reevaluate the project and consider alternate ways to meet the goals as established in the approved Plan. A revised Plan must then be resubmitted to the URA for approval. If all good faith efforts have been considered and the goals can not be achieved, then the contractor may apply to the URA for a waiver. The URA may grant a waiver when the contractor demonstrates that he has made a diligent good faith effort to fulfill his obligations under the approved Plan, but due to circumstances beyond his control, it is impossible to comply.
 - d. The URA shall consider failure of the contractor to fulfill his obligations with respect to minority and women's participation during the term of the contract as grounds for termination of the contract.

URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH
CERTIFICATE OF MINORITY AND WOMEN'S PARTICIPATION

The undersigned bidder certifies that it understands and agrees to actively solicit the participation of minorities and women in all work to be performed under this contract, and to make a diligent good faith effort to achieve the minority and women's participation goals of the URA.

The bidder further certifies that the attached exhibits A, B, and C details its efforts and plans regarding the solicitation and utilization of minorities and women in the work to be performed under this contract.

The bidder further certifies that it understands that prior to award of this contract, the bidder must submit a written Minority and Women's Participation Plan for review and approval by the URA.

Failure of the bidder to comply with these conditions or failure to sign and submit this Certificate and its Exhibits with the bid shall disqualify the bid.

Name of Bidder _____

By (Signed) _____

Title _____

Date _____

NOTE: THIS BID WILL NOT BE ACCEPTED UNLESS THIS FORM IS COMPLETED BY BIDDER

EXHIBIT A

AFFIRMATIVE ACTION PROVISIONS

PROJECT: _____

1. Name of Firm _____

2. Address _____

3. Telephone Number _____
(Street #) (City) (State) (Zip Code)

4. Person responsible for contract provisions _____

Title: _____

5. What is the total number of permanent construction employees? _____

6. Do you have any state or federal contracts? ☐ Yes ☐ No

With what agencies? _____

7. Proposed employment range - This project

Job Titles	Total Number of Employees	Number of Minority Employees	Number of Female Employees

(Use extra sheet if necessary)

8. With what labor unions does your firm have contracts?

Name of Union	Local No.	Jobs Covered

9. Does your firm have a policy to the effect that all hiring and promotions shall be without regard to race, color, religious creed, ancestry, national origin, age, handicap or sex? ☐ Yes ☐ No

a. Is this policy in writing? ☐ Yes ☐ No
(Obtain a copy and attach to this schedule)

b. In what ways has this policy been communicated to personnel engaged in hiring and promoting employees? _____

c. In what ways has this policy been communicated to your sources of recruitment? _____

10. Do you have apprentices? ☐ Yes ☐ No

Name of Trade	Total Apprentices

a. Which of these apprenticeship programs are registered with the Pennsylvania Apprenticeship and Training Council? _____

b. What are your sources of referral of applicants for apprenticeships? _____

11. Who makes the final selection of apprentices?

☐ Company

☐ Union

☐ Joint Committee

12. For what jobs have you found a shortage of qualified applicants? _____

13. What jobs are unfilled at present? _____

14. What job openings do you expect in the near future? _____

15. We propose the following actions to undertake to ensure that there will be minority group representation in all trades and in all phases of our operation.

a. We propose to employ as apprentices or journeymen on this project the following number of minority persons in the following crafts:

Journeymen	Apprentices	Craft

16. We propose to upgrade the following number of minority group persons to the following crafts:

Number	Craft (From)	Craft (To)

17. We propose to participate in the following training programs designed to increase minority group employment in the crafts which we employ

18. We propose to utilize the following additional recruitment sources designed to increase minority group employment within our concern

19. We propose to take the following other actions to ensure fair employment practices within our concern

Prepared by:

Title:

Telephone Number:

MBE/WBE SOLICITATION STATEMENT

Failure to complete this form and submit it with bid shall be sufficient cause for rejection of this bid.

BIDDER'S FIRM:
ADDRESS:
TELEPHONE:
CONTACT PERSON:
BID FOR:

List Certified MBE/WBE's that you have solicited in reference to this contract.

[illegible]

Prepared by:

Title:

Telephone Number:

BIDDER'S PREVIOUS HISTORY

BIDDER'S FIRM:
ADDRESS:
TELEPHONE:
CONTACT PERSON:
BID FOR:

List below all contracts during the past three years and the MBE and WBE participation obtained.

Contract Title	Contract Date	Amount	% Participation MBE	% Participation WBE	Comments

Prepared by: _____

Title: _____

Telephone Number: _____

MBE/WBE SOLICITATION STATEMENT

Additional Information

The bidder wishes to present the following as additional and supplemental information to its MBE/WBE Solicitation Statement:

Prepared by: _____

Title: _____

Telephone Number: _____

MBE/WBE COMMITMENT WAIVER REQUEST

Waiver of the participation requirements is requested for the following reasons:

Blank lined paper for writing.

Telephone:

**PROVISIONS AND PROCEDURES
PERTAINING TO
COMPLIANCE WITH
SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968,
AS AMENDED**

1. Assurance of Compliance

- A. The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701U (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.
- C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each, and the name and location of the person(s) taking applications for each of the positions, and the anticipated date the work shall begin.
- D. The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice of knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.
- E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

- F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

2. Definitions

- A. Section 3 Covered Contract means a contract or subcontract in excess of \$100,000, including professional service contracts, awarded by a contractor for work generated by the expenditure of Section 3 covered assistance, or for work arising in connection with a Section 3 covered project. Section 3 covered contracts do not include contracts for the purchase of materials and equipment unless the contract includes the installation of the material or equipment.
- B. Section 3 Resident means an individual who resides in the project area or the City of Pittsburgh and who is: (1) a low-income person which is defined as families (including single persons) whose incomes do not exceed 80 per centum of the median income for the area or (2) a very low-income person which is defined as families (including single persons) whose incomes do not exceed 50 per centum of the median family income for the area. A person seeking the training and employment preference provided by Section 3 bears the responsibility of providing evidence, if requested, that they are eligible for the preference.
- C. Section 3 Business means a business concern that is (1) 51% or more owned by Section 3 residents; or (2) whose permanent, full-time employees include persons, at least 30 percent of whom are currently Section 3 residents, or within three years of the date of first employment with the business concern were Section 3 residents; or (3) provides evidence of a commitment to subcontract in excess of 25 percent of the dollar award of all subcontracts to be awarded to business concerns that meet the qualifications set forth in (1) or (2) of this definition of Section 3 business concern. A business concern seeking the preference provided by Section 3 bears the responsibility of producing documentation to support the Section 3 business concern status.

3. Section 3 Area Residents As Trainees And Employees

- A. Each contractor and subcontractor with a contract in excess of \$100,000 shall fulfill their obligation to provide training and employment opportunities for Section 3 area residents by:
- (1) Identifying the number of positions in the various job categories needed to perform the work under this Section 3 covered project;
 - (2) Determining the number of positions which are currently filled and which positions are not filled by regular, permanent employees;
 - (3) Establishing a target within each job category for the number of positions to be filled by Section 3 area residents.
 - (4) Estimated Work Force -- See Appendix #1.

4. Utilization of Section 3 Businesses

- A. Each contractor and subcontractor with a contract in excess of \$100,000 for work on a Section 3 covered project shall give preference to Section 3 business concerns that meet one of three definitions outlined in Part 2 C. of these Provisions and Procedures by:
- (1) Identifying the approximate number and dollar value of contracts to be awarded to eligible businesses within each category over the duration of this contract.
 - (2) Ensuring that Section 3 business concerns are notified of pending contractual opportunities either personally or through locally utilized media.
 - (3) Section 3 Business Utilization - See Appendix #2.

SECTION 3 CERTIFICATION

_____ will abide by and include in all subcontracts the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended.

Company Name

Signature

Date

APPENDIX NO. 1

ESTIMATED WORK FORCE BREAKDOWN

Job Category	Total Estimated Positions Needed for Project	No. Positions Occupied by Permanent Employees	Number of Positions Not Occupied	Number of Positions to be Filled with Section 3 Residents

*For definition of Section 3 Resident refer to Section 2.B. of the Provisions and Procedures.

Company

Person Completing Form

Title

Date

SECTION 3 BUSINESS UTILIZATION

Federal Identification No.: _____

[illegible]

Total Dollar Amount Awarded to Section 3 Businesses \$

Section 3 Covered Contract & Section 3 Business Concern Refer to Sections 2.A. and 2.C. of the Provisions and Procedures

TECHNICAL SPECIFICATIONS

EXHIBIT II
TECHINICAL SPECIFICATIONS
FOR

LIBERTY GREEN
PITTSBURGH, PA

100% CONSTRUCTION DOCUMENTS

JUNE, 2018

OWNER

THE URBAN REDEVELOPMENT AUTHORITY OF PITTSBURGH

200 ROSS STREET
12TH FLOOR
PITTSBURGH, PA 15219
412-255-6695

CONSULTANT

LANDSCAPE ARCHITECT

WRT

1700 MARKET STREET, SUITE 2800
PHILADELPHIA, PA 19103
215-732-5215

SUBCONSULTANTS

CIVIL | MEP | STRUCTURAL ENGINEER

GAI CONSULTANTS

385 EAST WATERFRONT DRIVE
HOMESTEAD, PA 15120
412-476-2000

SURVEYOR

SCI-TEK

655 RODI ROAD, SUITE 303
PITTSBURGH, PA 15120
412-371-4460

ELECTRICAL ENGINEER

SANTANGELO & LINDSAY

732 THIRD AVENUE, SUITE 102
NEW BRIGHTON, PA 15066
724-847-0407

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Section 117000 Play Equipment and Structures

Section 117001 Water Play Equipment

Division 22 Plumbing

Section 221113 Facility Water Distribution Piping

Section 221313 Facility Sanitary Sewers

Division 26 Electrical

Section 265600 Exterior Lighting and Power

(continued)

Division 31 Earthwork

Section 310516 Aggregates for Earthwork
Section 311000 Site Clearing
Section 312000 Earth Moving
Section 312317 Trenching
Section 312319 Dewatering
Section 312500 Erosion and Sediment Controls
Section 312514 Geotextiles
Section 312515 Linear Low Density Polyethylene (LLDPE) Liner
Section 313700 Riprap
Section 316000 Structural Soils

Division 32 Exterior Improvements

Section 321313 Concrete Paving
Section 321314 Exposed Aggregate Concrete Paving
Section 321315 Colored Concrete Paving
Section 321373 Concrete Paving Joint Sealants
Section 321374 Water Feature Concrete Paving Joint Sealants
Section 322500 Site Furnishings
Section 328400 Planting Irrigation
Section 328401 Irrigation Mechanical System
Section 329200 Turf and Grasses
Section 329300 Planting
Section 329600 Tree Transplanting

Division 33 Utilities

Section 331114 Drinking Fountain
Section 331115 Ground Hydrants
Section 333000 Sanitary Sewerage Utilities
Section 334100 Storm Utility Drainage Piping
Section 334419 Utility Storm Water Treatment
Section 334420 Steel Reinforced Polyethylene (SRPE) Cistern Tank
Section 334421 Aluminized Type II Corrugated Metal Pipe (CMP) Underground
Tank Standard Specification

Supplemental Materials

Maintenance Narrative
Site Furnishings Cut Sheets
Play Equipment Cut Sheets

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents.
 - 2. Type of the Contract.
 - 3. Work phases.
 - 4. Work under other contracts.
 - 5. Products ordered in advance.
 - 6. Owner-furnished products.
 - 7. Use of premises.
 - 8. Owner's occupancy requirements.
 - 9. Work restrictions.
 - 10. Specification formats and conventions.
- B. Related Sections include the following:
 - 1. Division 01 Section "Multiple Contract Summary" for division of responsibilities for the Work.
 - 2. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: **Liberty Green, Zone A**
 - 1. Project Location: The project is bounded by Larimer Ave., Station St., Princeton Pl., and Kalida Dr. in PITTSBURGH PA.
- B. Owner: Urban Redevelopment Authority of Pittsburgh
 - 1. Owner's Representative: Emily Mitchell, Sr. Project Development Specialist
- C. Landscape Architect: WRT, 1700 Market St., Ste. 2800, Philadelphia, PA 19103
- D. The Work consists of the following:

1. The Work includes site demolition and preparation, underground installation of utilities and stormwater infrastructure, installation of new paving, extensive planting, play surfacing, precast concrete seat walls, wooden decks, various site furnishings, lighting, curb ramps, boulders, and regrading.

1.4 TYPE OF CONTRACT

- A. Project will be constructed under a single prime contract.

1.5 WORK PHASES

- A. The Work shall be conducted in one phase to substantial completion.

1.6 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Preceding Work: A separate contract is underway for the Larimer Avenue realignment and curb installation. These operations are scheduled to be substantially complete before work under this Contract begins.
- C. Choice Homes: McCormick Baron Salazar, the developer of the new housing surrounding the park will be reconstructing Larimer Avenue in 2018.

1.7 USE OF PREMISES

- A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Limits: Confine constructions operations to Liberty Green Limit of Work line as defined in construction documents.
- C. Laydown Areas: The Owner will provide nearby property for material storage and / or offices. All improvements, security, and facilities required by the Contract shall be provided by the Contractor.

1.8 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed during normal business working hours, Monday through Friday, except otherwise indicated.

- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.

1.9 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
 - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

END OF SECTION 011000

SECTION 012900 – MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The term Contract Documents refers to both the Contract Drawings and Technical Specifications.
- B. It is the intent of the Contract Documents to show the Work required to be installed under the Contract as well as to describe the materials and equipment to be incorporated into the Work. The Work consists of the complete construction and placing in operation all work as noted on the Contract Drawings and all appurtenances in accordance with the Contract Documents.
- C. The Work has been divided into various items for the purpose of measuring the amount of Work performed and determining the amount of compensation for performing this amount of work and any and all incidental work as set forth in Bid Tabulation Summary in this Proposal. Quantities shown in the Bid Tabulation Summary are estimated quantities only.
- D. It is to be understood that the items, both individually and totally, includes all the Work to be performed under this Contract and that any Work required by the Contract Documents, or in order to place in operation all Work as noted on the Contract Drawings and all appurtenances that are not specifically identified in the Unit Price Schedule or in this section of the Technical Specifications is considered as an incidental or subsidiary obligation of the Contractor and shall be performed at no additional cost to the owner.
- E. The extend of disturbed areas is within the Contractor's control. Where payment for restoration items is based on lineal foot measurement no consideration will be given to width of disturbed area. Where payment is to be based on square footage or yardage, width will be as established by the Construction Manager prior to the Work.
- F. The Owner may add or delete any item or any part of any item and may add or delete quantities of any of the bid items comprising this Contract as conditions dictate. Should the total quantities exceed or be less than the estimated quantities shown in the Proposal, the Contract amount shall be adjusted, up or down accordingly, by multiplying the quantity added or deleted by the unit price contained in the Proposal and adding or subtracting the product to or from the Contract price, as the case may be.
- G. Based on available geotechnical boring information and the relatively shallow depths of excavation proposed, it is anticipated that most of the excavation will be in unconsolidated materials: soils, fill, and heavily weathered rock. However, based on limited boring information, it is anticipated that excavation may include consolidated materials (rock), which will need to be removed by means other than conventional soil excavation equipment. Therefore, three categories of excavation are included:
 - 1) General Excavation of unconsolidated earthen materials using conventional excavation equipment (i.e., backhoe or front-end excavator)

- 2) Rock Excavation of consolidated earth materials (rock) in open pit excavations, which will require excavation with equipment other than conventional excavation equipment (i.e., hoe-ram or other equipment). An open excavation is defined as an excavation wide enough for the exaction and removal equipment to fully or partially enter the excavation to remove material.
- 3) Rock Excavation of consolidated earth materials (rock) in trench excavations, which will require excavation with specialty equipment (i.e., hoe-ram or other equipment) other than conventional excavation equipment (i.e., backhoe or front-end loader). A trench excavation is defined as an excavation that is not wide enough for the exaction and removal equipment to fully or partially enter the excavation to remove material.

- H. Quantities of rock excavation have been estimated in these Bid Items based on limited subsurface data. These quantities represent a reasonable amount of unconsolidated material that is expected to be encountered. These quantities may or may not represent the actual quantities encountered. All rock encountered will be removed at the unit rates provided by the Bidder.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 PAYMENT

1.4 PROPOSAL ITEMS

- A. General: The Unit Prices bid in the Proposal, applied to the actual units of work performed (measured as described in section 1.5), shall constitute complete payment for the Work of the Contract, which Work is as specified in the Contract Documents and indicated on the Contract Drawings.

1.5 ITEM DESCRIPTIONS

A. PAYMENT CONDITIONS

1. Payment will be made for "Work Complete" that has been measured as described in Section 1.5 B "Measurement" (below). Work Complete is defined to be complete installation, testing and, where included in the Bid Unit Price, surface restoration. Payment amounts will be determined by multiplying the Bid Unit Price by the measurement quantity and deducting appropriate retainage.

B. ITEM DESCRIPTIONS AND TERMS OF MEASUREMENT AND PAYMENT – BASE BID

Item numbers correspond to Item Number on Bid Tabulation Summary. For convenience, the items are separated by work at the two distinct sites: Liberty Green and River

Roots. Items 1 through 7, 142, and 143 include both sites; Items 8 to 94 are located at Liberty Green; and Items 95 to 141 are located at River Roots.

1. Mobilization / Demobilization / General Conditions – This work shall consist of the contractor's mobilization of equipment and materials to the site, general site facilities such as temporary office and sanitary facilities, disposal containers, storage/stockpile areas, site security, site security fences and facilities, phone, water, and electrical facilities, compliance with local and state laws and regulations, obtaining required permits, posting and maintaining signage, and insurance, bonds, and any other initial items required for the start of work. This item also included demobilization within 15 days of the completion of the project. This item is measured as lump sum. The payment will be will be in three parts: The first payment will be 50 percent at 10 percent completion of the total contract price; the second payment will be 25 percent at 60 percent completion; and the third payment will be 25 percent after demobilization and satisfactory clean-up of the site.
2. Erosion and Sedimentation Control – This item includes the furnishing, installation, maintenance, inspection and reporting, temporary and permanent surface stabilization, and removal of temporary erosion and sedimentation control facilities in accordance with the approved plan permit and Contract Documents. The work includes the Plan for the Liberty Green/River Roots project and the construction of stockpiles for excess removed materials at the designated URA disposal site. Stockpiles at the disposal site will need to be furnished with appropriate approved sedimentation control barriers, graded and shaped evenly, and stabilized with temporary or permanent seeding in accordance with the Plan and state requirements. This item includes all temporary seasonal site stabilization such as temporary seeding, stockpile tarp covers and sandbagging for end of construction season temporary closure. This item is Lump Sum and will be paid as follows: Thirty percent after initial installation of erosion and sedimentation facilities, and equal payments each month over the anticipated construction schedule.
3. Demolition and Disposal; item removal and storage – This item included the demolition and disposal of existing site items and facilities that will not be retained or incorporated into the work; and items that will be removed, stored, and re-installed; or removed, protected and transferred over to the City of Pittsburgh. The extents and limits of these items are shown on the Construction Drawings. The following sub-items are included:
 - i. Remove existing traffic and parking signs and supporting foundations; store and protect for reinstallation
 - ii. Remove existing light poles and foundations; store and protect for reinstallation
 - iii. Remove and dispose corrugated flexible drain pipe
 - iv. Remove and dispose existing concrete sidewalks as indicated
 - v. Remove and dispose existing asphalt sidewalks as indicated
 - vi. Remove and stockpile existing rip-rap for re-installation (material will used for proposed riprap aprons and non-visible gabion fill)
 - vii. Remove and dispose of existing PVC drain
 - viii. Salvage existing trees/deliver to City of Pittsburgh
 - ix. Sewer Laterals - Abandonment in place
 - x. Remove existing bollard
 - xi. Protect and maintain temporary lighting

- xii. Remove existing sidewalk and miscellaneous minor structures to the limits shown on the River Roots Construction Drawings

Measurement shall be Lump Sum for all items. Incremental payments shall be made based on estimated quantities completed.

4. Soil Excavation, handling, storage, re-placement, to create final grades – This item includes the bulk excavation of unconsolidated materials necessary to accommodate the installation of the site facilities, foundations, basins, drainage aggregates and select soil planting materials. This item does not include Rock Excavation (see Items 6 and 7). This item does not include trench excavations for the installation of pipes, which is considered incidental to the installation of pipes. This item includes stockpiling, stockpiling for reuse, re-installation of general fill materials not explicitly itemized elsewhere (such as select soil fill materials), site grading, and subgrade preparation and compaction. Measurement of excavation will be by Cubic Yard, and Payment will be made on units completed at the bid unit price.
5. Excess earthen material removal from site (disposal at designated URA property) – This item includes the removal of all general materials, excess unconsolidated or consolidated materials, contaminated or unsuitable materials that are transported and stockpiled at the URA's designated disposal area located adjacent to the intersection of Butler and Suydam Streets. The grading and maintenance of the stockpiles at the disposal site are included in this item. Measurement is based on Tons of material disposed, and Payment will be made on units completed at the bid unit price.
6. Rock Excavation - open pit excavation – This item includes the excavation of consolidated materials (Rock) in open pit excavations, which will require excavation with specialty equipment (i.e., hoe-ram or other equipment) other than conventional excavation equipment (i.e., backhoe or front-end loader). An open excavation is defined as an excavation wide enough for the exaction and removal equipment to fully or partially enter the excavation to remove material. Measurement is by Cubic Yard, and Payment will be made on units completed at the bid unit price.
7. Rock Excavation - Trench excavation – This item includes excavation of consolidated earth materials (rock) in trench excavations, which will require excavation with specialty equipment (i.e., hoe-ram or other equipment) other than conventional excavation equipment (i.e., backhoe or front-end loader). A trench excavation is defined as an excavation that is not wide enough for the exaction and removal equipment to fully or partially enter the excavation to remove material. Measurement of is by Cubic Yard, and Payment will be made on units completed at the bid unit price.
8. Underground Detention (UGD-1) System (COMPLETE) – This item includes furnishing and installing the complete Underground Detention System (UGD-1). This item includes the complete assembly of the Cistern Tank; Cistern Mechanical System; Calming Inlet; Stormwater Detention Tank; access manholes, covers and assemblies; Outlet Structure and Top Hatch; granular bedding; underdrain piping; AASHTO #57 backfill aggregate; geotextile separation fabrics; access; and connecting pipes and fittings. Note that the LLDPE Liner System is included in Bid

Item 20. Measurement is by Lump Sum, and Payment will be made on percent completed at the bid unit price.

9. 12" HDPE Pipe – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, separation filter fabrics, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
10. 15" HDPE Pipe – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, separation filter fabrics, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
11. 18" HDPE Pipe – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, separation filter fabrics, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
12. 24" HDPE Pipe – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, separation filter fabrics, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
13. Bioswale Underdrain Piping – This item includes furnishing and installation of materials incidental to the bioswale underdrain piping system, including the underdrain piping, pipe fittings, cleanout risers and caps, drainage aggregates, and separation filter geotextile fabrics. Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
14. Yard Drains – This item includes furnishing and installing yard drains. This item includes the entire yard drain assembly, top sections, grates, and pipe connections. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, subbase aggregates, and soil backfill and compaction around the facilities. Measurement is per Yard Drain completed, with other materials and installation incidental to the yard drain unit.
15. Standard Manholes - 4' ID – This item includes furnishing and installing Standard 4-foot diameter Manholes. This item includes the entire manhole assembly, grade adjustment rings, top sections, covers, pipe connections, and inlet and outlet holes

prescribed on the Construction Drawings. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, subbase aggregates, and soil backfill and compaction around the facilities. Measurement is per Manhole completed, with other materials and installation incidental to the manhole unit.

16. Water Quality Manhole-CDS-4 (4' ID, MH-112) – This item includes furnishing and installing Water Quality Manhole-CDS-4 (designated as MH-112 on the Construction Drawings). This item includes the entire manhole assembly, water quality control inserts, grade adjustment rings, top sections, covers, pipe connections, and inlet and outlet holes prescribed on the Construction Drawings. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, subbase aggregates, and soil backfill and compaction around the facilities. Measurement is per Manhole completed, with other materials and installation incidental to the manhole unit.
17. Water Quality Manhole-CDS-6 (6' ID, MH-108A) – This item includes furnishing and installing Water Quality Manhole-CDS-6 (designated as MH-108A on the Construction Drawings). This item includes the entire manhole assembly, water quality control inserts, grade adjustment rings, top sections, covers, pipe connections, and inlet and outlet holes prescribed on the Construction Drawings. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, subbase aggregates, and soil backfill and compaction around the facilities. Measurement is per Manhole completed, with other materials and installation incidental to the manhole unit.
18. Catch Basins – This item includes furnishing and installing stormwater catch basins. This item includes the entire catch basin assembly, grade adjustment rings, top sections, grates, pipe connections, and inlet and outlet holes prescribed on the Construction Drawings. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, subbase aggregates, and soil backfill and compaction around the facilities. Measurement is per Catch Basin completed, with other materials and installation incidental to the catch basin.
19. Endwalls and riprap aprons – This item includes furnishing and installing endwalls at the outlets of stormwater discharge pipes and the installation of rip-rap erosion protection aprons at the endwalls. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, subbase aggregates, separation geotextile fabrics, and soil backfill and compaction behind the endwalls. The rip-rap to be used for the aprons is reused material in the existing stormwater swales at the Liberty Green site. Measurement is per Endwall completed, with other materials and installation incidental to the endwall.
20. LLDPE Liner System – This item includes furnishing and installing the Low-low density polyethylene liner (LLDPE) system beneath the bioswales and UGT-1 at Liberty Green. This item includes the fine grading of the soil subgrade and removal of unsuitable materials to the satisfaction of the Construction Manager. This item also includes furnishing and installing protective geotextile fabrics above and below the LLDPE; and the installation, seaming, and sealing of the LLDPE to the requirements and quality control/quality assurance testing specified in the Contract Documents and to the satisfaction of the Construction Manager. Measurement is

by Square Feet of LLDPE installed, and Payment will be made on units completed at the bid unit price.

21. Concrete Sidewalks / Vehicular Medium Broom Finish (6" Thick) – This Work consists of construction of 6" broom-finished concrete paving including reinforcing, grading, compaction of subgrade, compaction of subbase, forming, placing of joints, sawcut joints, finishing, curing and form removal in accordance with applicable sections of PennDOT Form 408, and as defined in the Contract Documents or as directed by Construction Manager. This item measured and paid complete in-place on a square foot (SF) basis.
22. Concrete Sidewalks / Vehicular Exposed Aggregate Finish (6" Thick) – This Work consists of construction of 6" exposed aggregate concrete paving including reinforcing, grading, compaction of subgrade, compaction of subbase, forming, placing of joints, sawcut joints, finishing, curing and form removal in accordance with applicable sections of PennDOT Form 408, and as defined in the Contract Documents, and within reasonably close conformity to the lines, grades, width and depth shown on the Contract Documents or as directed by Construction Manager. This item measured and paid complete in-place on a square foot (SF) basis.
23. Concrete Sidewalks / Pedestrian Medium Broom Finish (4" Thick) – This Work consists of construction of 4" broom-finished concrete paving including reinforcing, grading, compaction of subgrade, compaction of subbase, forming, placing of joints, sawcut joints, finishing, curing and form removal in accordance with applicable sections of PennDOT Form 408, and as defined in the Contract Documents or as directed by Construction Manager. This item measured and paid complete in-place on a square foot (SF) basis.
24. Concrete Sidewalks / Pedestrian Exposed Aggregate Finish (4" Thick) – This Work consists of construction of 4" exposed aggregate concrete paving including reinforcing, grading, compaction of subgrade, compaction of subbase, forming, placing of joints, sawcut joints, finishing, curing and form removal in accordance with applicable sections of PennDOT Form 408, and as defined in the Contract Documents, and within reasonably close conformity to the lines, grades, width and depth shown on the Contract Documents or as directed by Construction Manager. This item measured and paid complete in-place on a square foot (SF) basis.
25. Concrete Sidewalks / ADA Curbs & Ramp – This Work consists of the construction of 8 ADA curb ramps and their associated connections to the adjacent constructed sidewalks. This Work consists of construction of 6" concrete paving including reinforcing, grading, compaction of subgrade, compaction of subbase, forming, placing of joints, sawcut joints, finishing, curing and form removal in accordance with applicable sections of PennDOT Form 408, and as defined in the Contract Documents, and within reasonably close conformity to the lines, grades, width and depth shown on the Contract Documents or as directed by Construction Manager. This item measured and paid complete in-place on a lump sum (LS) basis.
26. Concrete Seat Walls – The Contract Unit Price shall include all costs for preparation of shop drawings for precast units as shown in Contract Drawings and finished per Technical Specifications, aggregate subbase, excavation, grading, concrete footers and reinforcement, anchoring connection pins, mortar setting bed and non-shrink

grout. It includes excavation, compaction of subgrade and aggregate subbase, and furnishing and installation of skateboard deterrents. This item measured and paid complete in-place on a linear foot (LF) basis.

27. Educational Signage – The Contract Unit Price shall include all costs for furnishing, placing, and installing Bioswale educational signage per Contract Documents. This item measured and paid complete in-place on a quantity basis.
28. Playground Signage – The Contract Unit Price shall include all costs for furnishing, placing, and installing playground entry signage per Contract Documents. This item measured and paid complete in-place on a quantity basis.
29. Park Signage – The Contract Unit Price shall include all costs for furnishing, placing, and installing Park informational signage per Contract Documents. This item measured and paid complete in-place on a quantity basis.
30. Picnic Table – The Contract Unit Price shall include all costs for furnishing, placing, and installing picnic tables per Contract Documents. This item measured and paid complete in-place on a quantity basis.
31. Grill – The Contract Unit Price shall include all costs for furnishing, placing, and installing grills per Contract Documents. This item measured and paid complete in-place on a quantity basis.
32. 6-Foot Bench – The Contract Unit Price shall include all costs for furnishing, placing, and installing benches per Contract Documents. This item measured and paid complete in-place on a quantity basis.
33. 8-Foot Bench – The Contract Unit Price shall include all costs for furnishing, placing, and installing benches per Contract Documents. This item measured and paid complete in-place on a quantity basis.
34. Fence – Wood Slat 1/L-503 – The Contract Unit Price shall include all costs for furnishing, placing, and installing Port-a-John screening fence per Contract Documents. This item measured and paid complete in-place on a linear foot (LF) basis. Furnishing and installing the Port-a-John is not included in this contract.
35. Fence – Omega 7/L-500 – The Contract Unit Price shall include all costs for furnishing, placing, and installing playground fencing per Contract Documents. This item measured and paid complete in-place on a linear foot (LF) basis.
36. Bike Rack – The Contract Unit Price shall include all costs for furnishing, placing, and installing bicycle racks per Contract Documents. This item measured and paid complete in-place on a quantity basis.
37. Trash Receptacles – The Contract Unit Price shall include all costs for furnishing, placing, and installing litter receptacles per Contract Documents. This item measured and paid complete in-place on a quantity basis.
38. Flush Concrete Curb – This work consists of construction of 6" wide 10" deep concrete flush curbs around the play areas, in accordance with Contract Documents.

All excavation, backfilling after poured, grading, forms, reinforcement, saw cutting, expansion joints, lawn restoration, and materials necessary to complete this item are incidental. This item measured and paid complete in-place on a linear foot (LF) basis.

39. 4.25" thick Play Surface / subsurface – This work includes delivery and color-coordinated installation of play surface tiles according to Contract Documents. Work includes installation of 4" perforated drainage tiles, aggregate subbase, geotextile filter fabric, grading, and joint adhesive. This item measured and paid complete in-place on a square foot (SF) basis.
40. Wood Deck & Elevated ADA ramp / complete – This work includes excavation, concrete footings, reinforcing, drainage, aggregate subbases, aggregate backfill and compaction. It includes installation of posts, beams, joists, decking, and handrails, including all hardware and fasteners in accordance with Contract Documents. This item measured and paid complete in-place on a lump sum basis.
41. Play Area Equipment – This work includes preparation and maintenance of the play equipment zones, for installation by representatives from play equipment manufacturer. This includes excavation and grading, subgrade compaction, preparation of subbase, and delivery and installation of safety surface tiles (Item #40) following installation of play equipment per Contract Documents. This item measured and paid complete in-place on a lump sum basis.
42. Play Area Water Feature Equipment – This work includes the installation of the play area water feature and associated materials and surfacing according to Contract Documents, including water feature concrete sealant and jointing. This item includes excavation for the water feature, concrete footing and reinforcement, and the installation of a wireless activation switch and associated control panel, pump, connection to water service, fittings, fasteners, and appurtenances to complete this item. This item measured and paid complete in-place on a lump sum (LS) basis.
43. Imported Soil – Structural Soil for Trees – this item includes furnishing and installing Structural Soil for tree rooting media. Material shall meet the requirements of the Technical Specifications, and placement shall be to the lines and dimensions indicated on the Construction Drawings. The Contract Unit Price shall include all costs for preparing soil, loading, hauling, placing, spreading, leveling and compacting. This item measured and paid complete in-place on a cubic yard (CY) basis.
44. Amended Soil/Planting Mix for Tree Pits and Planting Areas – this item includes furnishing and installing Amended Soil Planting Mix at tree pits and at designated planting areas. Contractor shall prepare soil mixtures to the texture, gradation, organic content, and nutrient amendments in conformance with the specifications in the Contract Documents. This soil mixture can be a combinations of current site soils suitable for the application, blended with off-site materials. Placement shall be to the lines and dimensions indicated on the Construction Drawings. The Contract Unit Price shall include all costs for preparing soil, loading, hauling, placing, spreading, leveling and compacting. This item measured and paid complete in-place on a cubic yard (CY) basis.

45. Amended Soil/Planting Mix for Bioswales – this item includes furnishing and installing Amended Soil Planting for Bioswales (also referred to as Stormwater Basins). Contractor shall prepare soil mixtures to the texture, gradation, organic content, and nutrient amendments in conformance with the specifications in the Contract Documents. This soil mixture can be a combinations of current site soils suitable for the application, blended with off-site materials. Placement shall be to the lines and dimensions indicated on the Construction Drawings. The Contract Unit Price shall include all costs for preparing soil, loading, hauling, placing, spreading, leveling and compacting. This item measured and paid complete in-place on a cubic yard (CY) basis.
46. NOT USED.
47. Stepping Stones – The Contract Unit Price shall include costs for transporting, placing, and installing dimensional stone and aggregate subbase as directed by Contract Documents. This includes costs for excavation, subgrade compaction, subbase compaction and necessary placement adjustments as guided by Construction Manager.

Trees and Shrubs (Items 48 – 69) –: The Contract Unit Price shall include costs for transporting, placing, and installing trees and shrubs as directed by Contract Documents. This includes costs for excavation, watering, and maintaining the plants' health as directed by the Contract Documents throughout the construction period and maintenance warrantee. This item measured and paid complete in-place on plant quantity basis.

Ornamental Grasses (Items 70 & 71) – This Work consists of supply and installation of all materials necessary to plant ornamental grasses as directed by Contract Documents. This includes costs for backfill, planting soil, soil amendments, mulch, watering, and all other materials and labor necessary to complete this item. These items measured and paid complete in-place on a per plant (Ea.) basis.

72. Lawn Area Grass – The Contract Unit Price shall include costs for delivery and installation of lawn seed mix PennDOT Formula B as specified in the Contract Documents. This includes subbase preparation, grading of lawn mounds, and soil amendments as needed to produce 6" deep planting soil according to Contract Documents. This item measured and paid complete in-place on a square foot (SF) basis.
73. Liberty Green Bioswales Drip Irrigation piping and fittings – This item includes the design, furnishing and installation of the Drip Irrigation System at the Liberty Green Bioswale areas, as indicated on the Construction Drawings, and to the performance specifications provided in the Contract Documents. Measurement is Lump Sum, Payment is by percent completed.
74. 3/4" Water Supply Pipe/ Fittings – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.

75. 1" Water Supply Pipe/ Fittings – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
76. 1-1/2" Water Supply Pipe/ Fittings – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
77. 2" Water Supply Pipe/ Fittings – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
78. Hose Bibs & Shut off Valve Lawn Boxes – This item includes furnishing and installing the hose bibs and shut-off valve lawn boxes, and related fittings, covers, frames, supports, bedding materials, backfill material placement and compaction, and final grading. The related excavation for the installation is also considered to be incidental to this item. Measurement is by Each assembly installed, and Payment will be made on units completed at the bid unit price.
79. PWSA Water Service Tap / Meter Pit / Meters – This item includes providing the water service tap in to the PWSA water main, meter pit, and water meter. The work shall be executed in conformance with the requirements of the PWSA. This item includes the complete assembly of fittings, pit structure, valves, meters and surface cover. This item includes excavation, trenching, bedding materials, backfill material placement and compaction, and final grading. Measurement and Payment are by Lump Sum installed.
80. Sewer Line to Water Feature – This item includes furnishing and installing pipe, pipe fittings, surface drain grate assembly, connections to terminal structure, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
81. Sewer Line to Drinking Fountain – This item includes furnishing and installing pipe, pipe fittings, surface drain grate assembly, connections to terminal structure, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under

separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.

82. Drinking Fountain – The Contract Unit Price shall include all costs for furnishing, placing, and installing the drinking fountain per Contract Documents. This item measured and paid complete in-place on a quantity basis.
83. Electrical Service Feeders – The Contract Unit Price shall include all costs for underground electrical cables and conduit between Duquesne Light transformer and Park Service Control Cabinet. Contract unit price includes all labor, tools, excavation, backfill, conduit, cable, protective coating, pull cords, miscellaneous hardware, satisfactory removal and disposal of unsuitable and surplus material, utility coordination, Duquesne Light facility charges, and testing for the placement of conduit and cable as indicated on Construction Documents and referenced sections of PennDOT Pub 408. Incidental to this item is cable installed in existing conduits under Larimer Avenue. This item measured and paid complete in-place on a linear foot (LF) basis.
84. Electrical Service and Control Cabinet – This work includes furnishing and installation of a metered power supply system to serve the park. This item includes all excavation, concrete pad, conduits, cable, enclosures, circuit breakers, electrical components, Musco control system, and miscellaneous hardware as indicated in Contract Documents, and referenced sections of PennDOT Pub. 408. This item includes all Musco coordination, utility coordination, inspections, tests, coordination with other disciplines, and appurtenances to complete this item. This item measured and paid complete in-place on a lump sum (LS) basis.
85. Electrical Outlets at Wood Deck – The Contract Unit Price shall include all costs for coordinating, furnishing, placing, and installing convenience receptacles per Contract Documents. Outlet box, weatherproof-in-use cover, and miscellaneous hardware are incidental to this item. This item measured and paid complete in-place on a quantity basis. Excluded: Direct Burial Cable and Conduit with branch circuit.
86. Water Play Feature Electrical Power & Controls System – This work includes furnishing and installation of electrical power and controls for a complete and operable Water Play Feature. This item includes all excavation, conduits, cable, connections, enclosures, electrical components, and miscellaneous hardware as indicated in Contract Documents, and Water Play Feature's Installation Instructions. This item includes all coordination, inspections, tests, coordination with other disciplines, and appurtenances to complete this item. This item measured and paid complete in-place on a lump sum (LS) basis.
87. Cistern Mechanical Electrical Power and Controls System – This work includes furnishing and installation of electrical power and controls for a complete and operable Cistern Mechanical system. This item includes all excavation, conduits, cable, connections, electrical components, and miscellaneous hardware as indicated in Contract Documents, and Solenoid Valve Installation Instructions. This item includes all coordination, inspections, tests, coordination with other disciplines, and appurtenances to complete this item. This item measured and paid complete in-place on a lump sum (LS) basis.

88. Irrigation System Power – This work includes furnishing and installation of electrical power and controls for a complete and operable Irrigation System. This item includes all excavation, conduits, cable, connections, electrical components, and miscellaneous hardware as indicated in Contract Documents. This item includes all coordination, inspections, tests, coordination with other disciplines, and appurtenances to complete this item. This item measured and paid complete in-place on a lump sum (LS) basis.
89. Direct Burial Lighting Conduit and Cable – The Contract Unit Price shall include all costs for labor, tools, excavation, backfill, conduit, cable, protective coating, pull cords, miscellaneous hardware, satisfactory removal and disposal of unsuitable and surplus material, and testing for the placement of lighting conduit and cable as indicated on Contract Documents and referenced sections of PennDOT Pub 408. Direct burial conduit and cable for convenience receptacles and street lighting are included in this item. This item measured and paid complete in-place on a linear foot (LF) basis.
90. 14' Standard Park Pole and Luminaire – This work is furnishing and installing light pole foundations, poles, and LED luminaires at the luminaire locations indicated on Contract Drawings and in accordance with Section 265600, and referenced parts of PennDOT Pub 408. Item includes all labor, materials, tools, anchor bolts, nuts and washers, conduit within foundation, equipment, and testing necessary to provide a complete and operable pole and luminaire unit. The satisfactory removal and disposal of all unsuitable and surplus material is also included. This item measured and paid complete in-place on a quantity basis.
91. Remove and Reinstall Existing Street Light Pole – This work includes the removal, protection, storage, and re-installation of existing street lights, luminaires, and miscellaneous hardware as indicated on Contract Documents. Testing after re-installation is also included. This item measured and paid complete in-place on a quantity basis.
92. 15' Decorative Street Light and Pole – This work is furnishing and installing light pole foundations, poles, and LED luminaires at the luminaire locations indicated on Contract Drawings and in accordance with Section 265600, and referenced parts of PennDOT Pub 408. Item includes all labor, materials, tools, anchor bolts, nuts and washers, conduit within foundation, testing, and equipment necessary to provide a complete and operable pole and luminaire unit. The satisfactory removal and disposal of all unsuitable and surplus material is also included. This item measured and paid complete in-place on a quantity basis.
93. Remove and Deliver Existing Streets Light Pole and Bracket Arms – The Contract Unit Price shall include the removal and delivery of existing street light poles, bracket arms and appurtenances as indicated on Contract Documents. High Pressure Sodium luminaires become the property of the Contractor. Item includes delivery of three (3) additional poles and arms that have been removed, but not delivered. Removal of concrete foundation to 1-foot below grade, coordination with Duquesne Light and the City of Pittsburgh are included in this item. This item measured and paid complete in-place on a lump sum (LS) basis.

94. City Standard Concrete Junction Box, Type JB-1 – This work is the excavation for, furnishing, installation, and backfilling of a standard City of Pittsburgh concrete junction box (Type JB-1) in accordance with City of Pittsburgh Signal Standard Drawing No. CTY-3, as shown on Contract Documents, and as directed. Includes all labor, materials, tools, and equipment necessary to complete the work and the satisfactory excavation and disposal of all unsuitable and surplus material. This item measured and paid complete in-place on a quantity basis.
95. Gabion Retaining Walls – This item includes furnishing and installing gabion retaining walls. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, subbase aggregates, separation geotextile fabrics, and soil backfill and compaction behind the gabion walls. The gabion fill materials that will be visible when completed must conform the material size and type provided in the Technical Specifications. For gabion fill material below grade or behind the visible material, the existing site rip-rap may be used to the satisfaction of the Construction Manager. Measurement is per cubic yard installed.
96. PVC Piping & Connections – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, separation filter fabrics, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
97. Pex, 1" to Hand Pump (inc. fittings) – This item includes furnishing and installing pipe, pipe fittings, connections to terminal structures, bedding materials, backfill material placement and compaction, and final grading. The related trench excavation for the pipe installation is also considered to be incidental to this item, except for trench rock excavation, which is paid under separate item (Item 7). Measurement is by Linear Feet installed, and Payment will be made on units completed at the bid unit price.
98. Hand Pump – This item includes furnishing and installing the hand pump. Pump foundation support, pedestal, and mounting supports are incidental to this item. Measurement and payment are lump sum.
99. Galvanized Steel and HDPE Overflows – This item includes furnishing and installing galvanized steel and HDPE overflow structures. All fittings, connectors, inserts, caps, grates, vents, and concrete support bases shown on the Contract Documents are included with this item. Measurement is by Each assembly installed, and Payment will be made on units completed at the bid unit price.
100. EPDM Liner System - This item includes furnishing and installing the EPDM liner system beneath the stormwater control features at River Roots (Basin 1 through 6, Stormwater Storage Tank, and gabion walls). This item includes the fine grading of the soil subgrade and removal of unsuitable materials to the satisfaction of the Construction Manager. This item also includes furnishing and installing protective geotextile fabrics above and below the EPDM; and the installation, seaming, and sealing of the EPDM to the requirements and quality control/quality assurance testing specified in the Contract Documents and to the satisfaction of the

Construction Manager. Measurement is by Square Feet of EPDM installed, and Payment will be made on units completed at the bid unit price.

101. Stormwater Storage Tank & Associated Equipment - This item includes furnishing and installing the Stormwater Storage Tank at River Roots Basin 2. This item includes the storage chamber and associated fittings. Measurement and payment are lump sum.
102. Riprap Aprons (Reuse existing site materials) - This item includes furnishing and installing riprap aprons at the outlets of stormwater discharge pipes at River Roots. This item includes incidental excavation to accommodate the facilities, as well as subgrade preparation, and separation geotextile fabrics. The rip-rap to be used for the aprons is reused material in the existing stormwater swales at the Liberty Green site. Measurement and payment is per unit completed.
103. AASHTO # 57 washed aggregate (basin underdrain material at River Roots) – This item includes the AASHTO #57 washed aggregate at the basin underdrains and stormwater storage tank at River Roots. Subgrade preparation and separation geotextiles are incidental to this item. Measurement is per Ton, and payment is per unit completed.
104. Sandy Planting Medium (Imported Soil) – This item includes furnishing and installing the Sandy Planting Medium at the River Roots Basins 1 through 6. The material will be acquired from an off-site source, and shall comply with the Technical Specifications. Measurement is per ton of soil delivered and installed, Payment is per unit completed.
105. Kalida St. Inlet Retrofitting (2) Piping/Fittings & street restoration – This item includes the furnishing and installing of the retrofit facilities at two existing Storm Inlets on Kalida St. as indicated on the Construction Drawings. The Work shall include all pipes, fittings, grates, inserts, and assemblies shown on the Contract Documents. The work includes the installation of a new storm sewer between the two inlets, including trenching, bedding materials, backfill material placement and compaction, and final grading. This work also includes the incidental repair to the street. Measurement and Payment is Lump Sum.
106. Sidewalks / Pedestrian Medium Broom Finish (4" Thick) - This Work consists of construction of 4" broom-finished concrete paving including reinforcing, grading, compaction of subgrade, compaction of subbase, forming, placing of joints, sawcut joints, finishing, curing and form removal in accordance with applicable sections of PennDOT Form 408, and as defined in the Contract Documents or as directed by Construction Manager. This item measured and paid complete in-place on a square foot (SF) basis.
107. Stairs & Risers – This item consists of furnishing and installing the Concrete Stairs and Risers, in conformance with the Contract Documents. This item includes incidental excavation, subgrade preparation, subbase installation, forming, steel reinforcement, and concrete placement, finishing and curing required. The stairs shall be constructed to accommodate the attachment requirements of ancillary items such as the railing, Corten Steel Channels, and Stone Treads.

108. Salvaged Stone Treads – This item consists of procuring and installing the Salvaged Stone Stair Treads at River Roots. The Contractor shall procure the salvaged materials as directed in the Technical Specifications, and install the treads within the dimensional tolerances of the stairs in accordance with the Contract Documents and Building Code. The Contractor shall affix the treads to the concrete stair structure and install sealants in all joints. Measurement and Payment are on a per Unit installed basis.
109. Alternate - New Stone Treads - This item consists of furnishing and installing the New Stone Stair Treads at River Roots if no suitable salvage material is available. The Contractor shall select the alternate product and submit to the Construction Manager for approval. The Technical Specifications provide guidance on acceptable materials. The Contractor shall install the treads within the dimensional tolerances of the stairs in accordance with the Contract Documents and Building Code. The Contractor shall affix the treads to the concrete stair structure and install sealants in all joints. Measurement and Payment are on a per Unit installed basis.
110. Concrete Splash Block Assembly at Basin #6 – This item consists of furnishing and installing the Concrete Splash Block Assembly at Basin #6, in conformance with the Contract Documents. This item includes incidental excavation, subgrade preparation, subbase installation, forming, steel reinforcement, and concrete placement, finishing and curing required. The Splash Block shall be constructed to accommodate the attachment requirements of ancillary items such as the tile, Corten Steel Channels, and other items and treatments as shown on the Construction Drawings. Measurement and payment is on a Lump Sum basis.
111. Educational Signage - The Contract Unit Price shall include all costs for furnishing, placing, and installing Bioswale educational signage per Contract Documents. This item measured and paid complete in-place on a quantity basis.
112. 8-Foot Bench - The Contract Unit Price shall include all costs for furnishing, placing, and installing benches per Contract Documents. This item measured and paid complete in-place on a quantity basis.
113. Trash Receptacles – The Contract Unit Price shall include all costs for furnishing, placing, and installing litter receptacles per Contract Documents. This item measured and paid complete in-place on a quantity basis.
114. Corten Steel Channels – This item includes furnishing and installing the Corten Steel Channels as shown on the Contract Documents. Contractor shall provide shop drawings to the Construction Manager prior to fabrication. Measurement is Lump Sum, and Payment is based on percentage completed.
115. Stair Railing - This item includes furnishing and installing the Stair Railing as shown on the Contract Documents. Measurement and Payment is on a Lump Sum basis.
116. Splash Block Tile Installation at Basin #6 – Tile will be provided by others. Contractor shall install the tile as directed by the Construction Manager, and shall furnish and install tile adhesives, grout, and finishing compounds required to complete the installation. Measurement and Payment is on a Lump Sum basis.

117. Install Water Creatures (placed in Gabions) – This item includes the installation of Water Creatures (supplied by others) in gabion baskets. The installation will be at the direction of the Supplier and/or Construction Manager. Measurement and Payment are on a per Unit completed basis.
118. Install Water Creatures (stone-mounted) – This item includes the installation of stone-mounted Water Creatures (supplied by others). The Water Creature will have a pre-installed mounting rod. The Contractor will be responsible for drilling a hole to accommodate the mounting rod, and furnishing and installing the object with adhesive, and sealing around the mounting surface as appropriate. The installation will be at the direction of the Supplier and/or Construction Manager. Measurement and Payment are on a per Unit completed basis.
119. Install Water Creatures (with cast-in-place footer) – This item includes the installation of free-standing Water Creatures (supplied by others), which require cast-in-place footers. The Water Creature will have a pre-installed mounting rod. The Contractor can cast the figure in place or install in a drilled hole in the finished footer. The Contractor will be responsible for drilling a hole to accommodate the mounting rod, and furnishing and installing the object with adhesive, and sealing around the mounting surface as appropriate. The installation will be at the direction of the Supplier and/or Construction Manager. Measurement and Payment are on a per Unit completed basis.
120. Install Sound Sculptures – This item includes the installation of free-standing Sound Sculptures (supplied by others), which require cast-in-place footers. The Sound Sculptures will have a pre-installed mounting plates with holes. The Contractor will be responsible for furnishing the footers, drilling holes to accommodate the mechanical anchors, and furnishing and installing and anchoring the object, and sealing around the mounting surface as appropriate. The installation will be at the direction of the Supplier and/or Construction Manager. Measurement and Payment are on a per Unit completed basis.
121. Wood Deck & Elevated Path – This work includes excavation, concrete footings, reinforcing, drainage, aggregate subbases, aggregate backfill and compaction. It includes installation of posts, beams, joists, decking, and handrails, including all hardware and fasteners in accordance with Contract Documents. This item also includes placement of riprap below the deck, as shown on the Contract Drawings. The riprap shall be reused existing material at the Liberty Green Site. This item measured and paid complete in-place on a lump sum basis.
122. Boulders – This item includes furnishing and installing landscaping boulders conforming to the material type, various sizes, and locations shown on the Contract Documents. Placement and acceptance shall be under the direction of the Construction Manager and/or Designer. Measurement and Payment are on a per unit installed basis.
123. Engraved Seating Stones – This item includes furnishing, engraving, and installing Engraved Seating Stones conforming to the material type, various sizes, and locations shown on the Contract Documents. Placement and acceptance shall be under the direction of the Construction Manager and/or Designer. Measurement and Payment are on a per unit installed basis.

Trees and Shrubs (Items 124 – 138) –: The Contract Unit Price shall include costs for transporting, placing, and installing trees and shrubs as directed by Contract Documents. This includes costs for excavation, watering, and maintaining the plants' health as directed by the Contract Documents throughout the construction period and maintenance warrantee. This item measured and paid complete in-place on plant quantity basis.

Ornamental Grasses (Items 139 & 140) – This Work consists of supply and installation of all materials necessary to plant ornamental grasses as directed by Contract Documents. This includes costs for backfill, planting soil, soil amendments, mulch, watering, and all other materials and labor necessary to complete this item. These items measured and paid complete in-place on plant quantity (Ea.) basis.

141. Lawn Area Grass – The Contract Unit Price shall include costs for delivery and installation of lawn seed mix PennDOT Formula B as specified in the Contract Documents. This includes subbase preparation, grading of lawn mounds, and soil amendments as needed to produce 6" deep planting soil according to Contract Documents. This item measured and paid complete in-place on a square foot (SF) basis.

142. Work Crew: Dump Truck and Operator, Excavator and Operator, and Laborer – This item includes providing equipment and labor (dump truck and operator, excavator and operator, and one laborer) to perform work tasks not otherwise included in the scope of the Contract, and perform additional non-scope tasks at the direction of the Construction Manager. Measurement and Payment is on a per hour per crew basis.

143. Deep Concrete Curb – This item includes furnishing and installing Deep Concrete Curbs where it is anticipated that existing curbs will be damaged by construction vehicles. All site access by construction vehicles shall be limited to the designated construction entrances shown on the Construction Drawings. Curb construction shall be in conformance with the current City of Pittsburgh Standards for Construction. Excavation, removal of existing curbs, subgrade preparation, forming, reinforcement, concrete placement, finishing and curing shall be included in the item. Measurement and Payment are on a Linear Feet installed basis.

C. ITEM DESCRIPTIONS AND TERMS OF MEASUREMENT AND PAYMENT –

ALTERNATE ADD ITEMS – LIBERTY GREEN

An "ADD" Alternate Planting Plan is provided for the Liberty Green area of construction, as shown on Drawing L-127. These planting materials are in addition to the planting plan in the Base Bid (Items 48 – 72). Bidder should provide contract pricing in the LIBERTY GREEN - ADD ALTERNATE "A" section of the Bid Tab Form. The Add Alternate "A" includes Items A.1 to A.7. Selection for construction of the Add Alternate "A" Planting Plan is at the sole discretion of the Owner.

Trees and Shrubs (Items A.1 – A.7) –: The Contract Unit Price shall include costs for transporting, placing, and installing trees and shrubs as directed by Contract Documents.

This includes costs for excavation, watering, and maintaining the plants' health as directed by the Contract Documents throughout the construction period and maintenance warranty. This item measured and paid complete in-place on plant quantity basis.

**D. ITEM DESCRIPTIONS AND TERMS OF MEASUREMENT AND PAYMENT –
ALTERNATE BID ITEMS – RIVER ROOTS**

An Alternate Planting Plan is provided for the River Roots area of construction, as shown on Drawing L.5. These planting materials would be a replacement alternative for the planting plan in the Base Bid (Items 124 – 140). Item 141 remains the same as the Base Bid. Bidder should provide contract pricing in the RIVER ROOTS ALTERNATE SITE PLANTING PLAN "B" section of the Bid Tab Form. The Alternate "B" includes Items B.1 to B.17. Execution of the Alternate "B" planting plan is at the sole discretion of the Owner.

Trees and Shrubs (Items B.1 – B.15) –: The Contract Unit Price shall include costs for transporting, placing, and installing trees and shrubs as directed by Contract Documents. This includes costs for excavation, watering, and maintaining the plants' health as directed by the Contract Documents throughout the construction period and maintenance warranty. This item measured and paid complete in-place on plant quantity basis.

Ornamental Grasses (Items B.16 & B.17) – This Work consists of supply and installation of all materials necessary to plant ornamental grasses as directed by Contract Documents. This includes costs for backfill, planting soil, soil amendments, mulch, watering, and all other materials and labor necessary to complete this item. These items measured and paid complete in-place on plant quantity (Ea.) basis.

END OF SECTION 012900

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 2. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 5. Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
 - 6. Divisions 02 through 49 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Construction Manager's responsive action.
- B. Informational Submittals: Written information that does not require Construction Manager's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Construction Manager for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Construction Manager reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Construction Manager's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 10 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Construction Manager's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Construction Manager and to Construction Manager's consultants, 10 days for review of each submittal. Submittal will be returned to Construction Manager before being returned to Contractor.
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Construction Manager.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Construction Manager.
 - d. Name and address of Contractor.

- e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Construction Manager observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- 1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Construction Manager.
 - 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Construction Manager will return submittals, without review, received from sources other than Contractor.
- 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
 - 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by

Construction Manager on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked "Reviewed" or "Reviewed with Comments as Noted."
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final submittals with mark indicating "Reviewed" or "Reviewed with Comments as Noted" taken by Construction Manager.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Submit electronic submittals directly to extranet specifically established for Project.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.

- m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - 4. Submit Product Data before or concurrent with Samples.
 - 5. Number of Copies: Submit an electronic version of Product Data, unless otherwise indicated.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal of Construction Manager's CAD Drawings are otherwise permitted.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
 - 3. Number of Copies: Submit an electronic version of each submittal.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.

- d. Number and title of appropriate Specification Section.
- 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Construction Manager will return submittal with options selected.
- 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Construction Manager will retain two Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.
- F. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

- H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number of Copies: Submit an electronic copy of subcontractor list, unless otherwise indicated.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Construction Manager will not return copies.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Landscape Architects and owners, and other information specified.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- M. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- N. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- O. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- P. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and

calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

- S. **Manufacturer's Instructions:** Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.
- T. **Manufacturer's Field Reports:** Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- U. **Insurance Certificates and Bonds:** Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- V. **Material Safety Data Sheets (MSDSs):** Submit information directly to Owner; do not submit to Construction Manager.
 - 1. Construction Manager will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Construction Manager.

- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 CONSTRUCTION MANAGER'S / ACTION

- A. General: Construction Manager will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Construction Manager will review each submittal, make marks to indicate corrections or modifications required, and return it. Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. "Reviewed" or "Reviewed with Comments as Noted."
- C. Informational Submittals: Construction Manager will review each submittal and will not return it, or will return it if it does not comply with requirements. Construction Manager will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Construction Manager, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 01 Section "Allowances" for testing and inspecting allowances.
 - 2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 3. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 4. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work

and completed construction comply with requirements. Services do not include contract enforcement activities performed by Construction Manager.

- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Construction Manager for a decision before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Construction Manager for a decision before proceeding.

1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

- c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
- 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Construction Manager.
 - 2. Notify Construction Manager seven days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Construction Manager's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed, unless otherwise indicated.
- J. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 02 through 49.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.

3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Construction Manager and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Construction Manager and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.

- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
- B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Construction Manager and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Construction Manager with copy to Contractor and to authorities having jurisdiction.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Construction Manager.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Construction Manager's during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Construction Manager's action on Contractor's submittals, applications, and requests, "approved" is limited to Construction Manager's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Construction Manager. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect

as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
 - 1. Division 01 Section "Summary" for limitations on utility interruptions and other work restrictions.
 - 2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 01 Section "Execution" for progress cleaning requirements.
 - 4. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Construction Manager, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to Construction Manager, Landscape Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations.

- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.
- E. Sewer, Water, and Electric Power Service: Use charges are specified in Division 01 Section "Multiple Contract Summary."

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each temporary service shall assume responsibility for operation, maintenance, and protection of each temporary service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete bases for supporting posts.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of ten individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack board.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.

5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
- E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- F. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.

1. Provide high speed internet in primary field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Provide temporary parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

E. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.

1. Provide temporary signs as provided by Owner.
2. Maintain and touchup signs so they are legible at all times.

F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and

that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary."
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 1. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 01 Section "References" for applicable industry standards for products specified.
 - 2. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 - 3. Initial Submittal: Within 30 days after date of commencement of the Work, submit an electronic copy of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 - 4. Completed List: Submit one electronic copy of completed product list at least 30 days prior to the anticipated installation date of the product. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 5. Construction Manager's Action: Construction Manager will respond in writing to Contractor within 15 days of receipt of completed product list. Construction Manager's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Construction Manager's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

- B. Substitution Requests: Submit an electronic copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Construction Managers and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 2. Construction Manager's Action: If necessary, Construction Manager will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Construction Manager will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order (only if cost adjustment is required). Otherwise written acceptance from the Construction Manager or Engineer is sufficient.

- b. Use product specified if Construction Manager cannot make a decision on use of a proposed substitution within time allocated.
- C. Comparable Product Requests: Submit one electronic copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Construction Manager's Action: If necessary, Construction Manager will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Construction Manager will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Construction Manager cannot make a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Construction Manager will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Construction Manager's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system,

- provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
 9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Construction Manager's sample. Construction Manager's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
 10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Construction Manager will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Construction Manager will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Construction Manager will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Construction Manager.
- B. Conditions: Construction Manager will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Construction Manager will return requests without action, except to record noncompliance with these requirements:
 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Construction Manager for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.

3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Construction Manager will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Construction Manager will return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of Construction Managers and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 2. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

- A. Qualification Data: For land surveyor, if requested.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Construction Manager. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Construction Manager promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Construction Manager when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for

mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Construction Manager.

3.4 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Construction Manager before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Construction Manager.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. N/A

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 5 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Construction Manager's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 1. Primary operational systems and equipment.
 2. Mechanical systems piping and ducts.
 3. Control systems.
 4. Communication systems.
 5. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
 1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Equipment supports.
 4. Piping, ductwork, vessels, and equipment.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the disposal of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
 - 1. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE GOALS

- A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 50 percent by weight of total waste generated by the Work.

1.5 SUBMITTALS

- A. Waste Management Plan: Submit one electronic copy of plan within 30 days of date established for the Notice to Proceed.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.7 WASTE MANAGEMENT PLAN

- A. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

3.2 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 01 Section "Execution" for progress cleaning of Project site.
 - 2. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.

10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Construction Manager will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Construction Manager, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Submit certified copy of Construction Manager's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Construction Manager. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Construction Manager will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Construction Manager.
 - d. Name of Contractor.
 - e. Page number.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on corporate letterhead for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Remove labels that are not permanent.
 - j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

- k. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Replace parts subject to unusual operating conditions.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - q. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up Record Prints.
 - 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal: Submit one set of marked-up Record Prints. Construction Manager will initial, date, and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Construction Manager will return prints for organizing into sets, printing, binding, and final submittal.
 - b. Final Submittal: Submit one set of marked-up Record Prints. Print each Drawing, whether or not changes and additional information were recorded.
 - 1) Provide one electronic copy in Adobe Acrobat PDF of Record Prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order.
 - k. Changes made following Construction Manager's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Construction Manager and Construction Manager. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.
1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
 2. Refer instances of uncertainty to Construction Manager for resolution.
 3. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
 4. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Construction Manager will make the Contract Drawings available to Contractor's print shop.
- C. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Construction Manager. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:
1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
 2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Construction Manager for resolution.
 4. Construction Manager will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information.
 - a. Construction Manager makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.
- D. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Construction Manager determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- E. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
3. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Construction Manager.
 - e. Name of Contractor.

2.2 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders and Record Drawings where applicable.

2.3 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do

not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Construction Manager's reference during normal working hours.

END OF SECTION 017839

SECTION 033000

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Furnish all labor, material, and equipment necessary to complete all cast-in-place concrete, reinforcement, formwork, and related work for all foundations and curbing.

1.2 RELATED SECTIONS

- A. Section 32 13 13 – Concrete Paving
- B. Section 321314 – Exposed Aggregate Paving
- C. Section 321373 – Concrete Paving Joint Sealants
- D. Section 321374 – Water Feature Concrete Paving Joint Sealants

1.3 SUBMITTALS

- A. Submit electronic copies of the following to the Construction Manager:
 - 1. Shop Drawings
 - a. Bar reinforcement shop drawings shall include setting plans, wall elevations, bending diagrams, cutting lists, and other information so as to completely and unambiguously define and establish the location, spacing, size, length, bending, shape, splicing, keying at construction joints and all other pertinent information as required. Drawings shall show grades of reinforcing steel. Opposite hand reinforcing shall be detailed separately. Wall reinforcing shall be detailed on wall elevations. Each shop drawing shall show splice length for every size and type of bar used.
 - b. Type, size, and location of all accessories required for the proper assembling, placing, and support of the reinforcement.
 - c. All openings, depressions, construction and control joints, trenches, sleeves, inserts, and all other project requirements affecting reinforcing details and placing.
 - B. Manufacturer's Data for standard factory manufactured materials.
 - C. Proposed concrete design mixes. Three copies of proposed mix and three copies of back-up data as required by ACI 318, Chapter 5. Each mix design shall be clearly marked for its intended purpose.
 - D. Submit the results from strength tests performed in accordance with Section 321313, Paragraph 3.11.
 - E. Submit batch ticket information for all concrete delivered to site.

1.4 CODES AND STANDARDS

- A. Comply with the latest provisions as adopted by the authorities having jurisdiction of ACI 301 "Specifications for Structural Concrete for Buildings" and ACI 318 "Building Code Requirements for Structural Concrete."
- B. Perform all work in accordance with rules and regulations of authorities having jurisdiction. In the absence of other authorities comply with State Building Code. In case of conflict most stringent shall govern.

1.5 RESPONSIBILITY OF CONTRACTOR

- A. The Contractor alone shall be fully responsible for the design, strength, safety, and adequacy of all formwork, shoring, bracing, and all methods of construction.

1.6 INSPECTION, TESTING, AND QUALITY CONTROL

- A. A testing agency will be employed by the Contractor to verify the acceptability of materials and the design of the basic concrete mixes.
- B. The Contractor shall pay for the cost of the services of the testing agency.
- C. In general, concrete testing for each class placed will consist of one set of six cylinders for each days casting, or every 50 cubic yards.
- D. The Contractor shall cooperate by allowing clear and safe access to the work for sampling, inspection, and storage of specimens and equipment. The Contractor shall construct a storage box on the site of sufficient size to store 24 cylinders and which will afford the protection required by ASTM C31, Paragraph 7 (A).
- E. Those portions of the structure that do not meet the Contract requirements shall be corrected or removed and replaced as directed by the Construction Manager, and all cost of correction, removal, and replacement shall be at the Contractor's expense.
- F. The Contractor shall notify the Construction Manager and testing agency not less than 24 hours in advance of the starting of any project concrete operations.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Wood Forms - Exposed Concrete
 - 1. HD overlay plywood Class I EXT-DFPA, in full size sheets where possible. Thickness as required for spans and pressures.
- B. Wood Forms - Concealed Concrete
 - 1. #4 common or better lumber or B-B plywood Class II EXT-DFPA. Thickness as required for spans and pressures.
- C. Metal Forms
 - 1. As approved and capable of producing finished surfaces equal to those produced by above specified wood forms.
- D. Round Concrete Column Forms

1. Description: Multiple layers of 100 percent recycled paperboard, spirally wound, and laminated with adhesive.
2. Interior Surface: Smooth with spiral seam. Alathon release and moisture barrier coating.
3. Exterior Surface: Micryl moisture barrier coating.
4. Spiral Mark: Impart visible spiral mark on concrete columns.
5. 1-piece, 1-time-use forms.
6. Recyclable.
7. Inside Diameter: As indicated on the Drawings.
8. Provide forms by Sonotube, or equal.

E. Form Ties

1. Shall be of approved design, minimum working strength 3,000 lbs. each, so adjustable as to permit complete tightening of forms. After removal of protruding part of tie no metal to be nearer than 1-1/2" to face of concrete. Ties at exposed surfaces shall have wood, plastic or metal cones. Ties below grade shall have water seal washers.

F. Form Release Agent Shall Be:

1. Clean Strip WB (J-4) by Dayton Superior
2. Debond Form Coating by L&M Construction Chemicals, Inc.
3. EUCOSLIP VOX by Euclid Chemical Company
4. Or equal.

2.2 MATERIALS

A. Bar Reinforcement - Newly rolled billet steel conforming to the following:

1. ASTM A615 Grade 40 for ties, stirrups and bars to be welded. Welded bars shall also comply with ASTM A706.
2. ASTM A615 Grade 60 for all other bars.

B. Welded wire fabric reinforcement shall conform to ASTM A185. Sizes as shown on the Drawings. Deliver in sheets, not in rolls.

C. Reinforcement Accessories:

1. Accessories shall be as manufactured by Meadow Burke, Dayton Superior, Royal Enterprises America., Inc. or equal.
2. Accessories shall include all spacers, chairs, ties, slab bolsters, clips, chair bars, and other devices for properly assembling, placing, spacing, supporting, and fastening the reinforcement.
3. Accessories in contact with surfaces exposed to view in the finished work shall conform to CRSI Bar Support Specifications, Class C or Class E.

2.3 MISCELLANEOUS RELATED MATERIALS

- A. Non-shrink grout shall be a mixture of water and a non-shrink, non-metallic specially formulated packaged mixture conforming to ASTM C1107 and Army Corps of Engineers CRD C 621 with a minimum compressive stress of 5,000 psi, such as:
 - 1. Set Grout by BASF Building Systems,
 - 2. NS Grout by Euclid Chemical Co.,
 - 3. Crystex by L&M Construction Chemicals,
 - 4. or equal.
- B. 6-mil polyethylene shall be installed under all slabs on grade, and shall be used in the widest possible width. Joints shall be lapped a minimum of 6".
- C. Concrete Curing and Sealing Compound shall be a VOC compliant, liquid membrane forming type conforming to ASTM C1315, such as:
 - 1. Kure 1315 - BASF Building Systems.
 - 2. Diamond Clear VOX - Euclid Chemical Company.
 - 3. Dress & Seal WB 30 - L&M Construction Chemicals, Inc.
 - 4. or equal.
- D. SUBBASE: AASHTO Number 57 Coarse Aggregate, Type C which shall conform to the PennDOT Publication 408, Section 703.2, latest edition, and any supplements thereto, on a prepared subgrade.

2.4 CONCRETE MIX MATERIALS - PITTSBURGH TYPE "P"

- A. Cement - Portland Cement, ASTM C150 Type I or Type II.
- B. Fine aggregate (normal weight) shall consist of washed, inert, natural sand conforming to ASTM C33.
- C. Coarse aggregate (normal weight) shall consist of well graded, crushed stone or washed gravel conforming to ASTM C33, 3/4" size.
- E. Water shall be potable.
- F. Water Reducing Admixture conforming to ASTM C494:
 - 1. WRDA 20 - W. R. Grace Co.,
 - 2. ACCELGUARD 80 - The Euclid Chemical Co.
 - 3. Pozzolite 200N - BASF Admixtures, Inc.,
 - 4. or, equal.
- G. Air Entraining Agent conforming to ASTM C260:
 - 1. Darex AEA - W.R. Grace Co.,
 - 2. Air Mix - The Euclid Chemical Co.,

3. MB-VR - BASF Admixtures, Inc.,
4. or equal.

2.5 CONCRETE MIX DESIGN – PITTSBURGH TYPE “P”

- A. Material and the construction of cement concrete will conform to the requirements of the City of Pittsburgh specifications for Concrete Pavement and Base Course, revised March 1978. No slag will be permitted. Concrete shall be City Class P, with air content of 6% +/-1%, and maximum allowable slump of 4-inches as per ASTM C-143.
- B. It is the intent of this Specification to secure, for every part of the work, concrete of homogeneous structure which, when hardened, will have the required strength, appearance and resistance to weathering.
- C. Basic mix proportions shall be established by the Contractor by means of current laboratory tests made with the constituents to be used in the work. If suitable data are not available, Contractor shall engage a testing laboratory to provide them.
- D. Proportions shall be selected to produce an average 28-day compressive strength determined by one of two methods using three different water-cement ratios as per section 5.3 ACI 318.

1,200 PSI greater than the design strength based on trial mixtures from three different water cement ratios.

Required average strength established from previous concrete test records based on the Standard Deviation Method using not less than 15 test records which span a period of not less than 45 days.

Maximum water-cement ratio shall be:

Foundations:	0.50
Exterior Slabs:	0.40

- E. Concrete in foundations, foundation walls, pavements and where flat surfaces are exposed to the weather shall have an entrained air content of 6 percent +/-1 percent.
- G. The consistency of the concrete at time of deposit as measured by ASTM C143, "Standard Method of Test for Slump" shall be as follows:
 1. Portion of the Structure Slump
Pavement and slab on ground 3" +/-1"
Footings 3" +/-1"
- H. No concrete may be placed in the work until the appropriate design mix has been approved by the Construction Manager.
- I. If, during the progress of the work, any difficulty should occur in securing concrete of the required workability and strength, the Construction Manager may order such changes in the proportions or materials, or both, as may be necessary. Any changes so ordered shall be made at the Contractor's expense.

2.6 MIXING AND DELIVERY OF CONCRETE

- A. All concrete shall be ready-mixed according to ASTM C 94/C 94M and ASTM C 1116, produced by a plant acceptable to the Construction Manager. All constituents, including admixtures, shall be batched at the central batch plant.
- B. Cold weather requirements: Cold Weather protection shall be determined as per ACI 306 "Cold Weather Concreting." As a minimum, when the air temperature is at or below 45 degrees F, or when weather reports indicate that the air temperature may fall below 45 degrees F within 24 hours immediately following the completion of concrete placement, the mixing water and, if necessary, the aggregates shall be heated so that the concrete shall have a temperature of 55 degrees to 80 degrees when placed. If the mixing water is heated, it shall not have a temperature in excess of 140 degrees F at the time it is added to the cement and aggregates.
- C. Hot weather requirements: Hot Weather protection shall be determined as per ACI 305 "Hot Weather Concreting." As a minimum, during hot weather the concrete shall, at the time it is placed, have a temperature from 55 to 80 degrees F but never above 90 degrees F. Provide crushed ice in lieu of equal weight of mixing water if necessary. Ice must be completely dissolved before placing.
- D. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes

2.7 CHEMICAL HARDENER

- A. A colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicate per gallon.
 - 1. Available Products:
 - a. Surfhard - Euclid Chemical Co.
 - b. Lapidolith – BASF Building Systems
 - c. FLUOHARD – L&M Construction Chemical, Inc.
 - d. or equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMS AND SHORING

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - D. Construct forms tight enough to prevent loss of concrete mortar.
 - E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.
 - F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
 - G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
 - H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
 - J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
 - K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
 - L. Forms shall be so designed by the Contractor to withstand all dead and live loads, including construction live loads, and to not move out of specified tolerances for line and elevation. Forms and form accessories shall be so designed that upon removal they will in no way damage concrete surfaces.
 - M. Forms shall be built mortar-tight.
 - N. Holes for concrete placement through sides of forms shall not be used.
 - O. Before form materials are re-used, surfaces that will be in contact with freshly cast concrete shall be thoroughly cleaned, damaged areas repaired, and all projecting nails withdrawn.
 - P. Before reinforcement is placed on or against formwork, surfaces of forms coming in contact with fresh concrete shall be cleaned and then treated with approved form release agent.
 - Q. Set and maintain concrete formwork to ensure completed work is within the tolerance limits listed in ACI 347.
- 3.2 CONSTRUCTION JOINTS
- A. Joints not indicated on Plans shall be located and constructed so as to least impair strength and appearance of work.
- 3.3 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.
 - 4. Coordinate installation of embedded items with other trades

3.4 INSTALLATION OF REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- A. Reinforcing shall be accurately placed and rigidly secured in position.
- B. Tie reinforcing with annealed #18 gauge (min.) wire, and bend all wire back beyond general plane of reinforcing.
- C. Welded wire fabric reinforcement in slabs shall be continuous, shall have joints lapped at least one full mesh, but not less than 6" and shall be supported at proper elevations by accessories.
- D. Bending, tack welding, cutting or substituting reinforcement in the field, other than shown on the Contract Drawings, in any manner is prohibited, unless specific approval for each case is given by the Construction Manager or his designate.
- E. At the time the concrete is placed, all reinforcement shall be free from excessive rust, scale, or other coatings which might destroy or reduce the bond.
- F. Before concrete is cast, check all reinforcement after it is placed to ensure that reinforcement conforms to Contract Drawings and approved shop detail drawings and Specification requirements. Such checking shall be done only by qualified experienced personnel. In addition, the Construction Manager's representative shall be notified at least 36 hours prior to concrete placement and given the opportunity to inspect the completed reinforcement and formwork before concrete placement.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Construction Manager.
- C. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

- D. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth as shown on plans and details.
- E. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
- F. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
- G. Joint Sealant Installation: Refer to Sections 321313 – Concrete Paving Joint Sealants and 321314 – Water Feature Paving Joint Sealants

3.5 PLACING CONCRETE

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Construction Manager.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.6 SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

3.7 WALKWAYS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Surface Finish – As shown in plans and details.
 1. Broom Finish
 - a. Apply a broom finish to concrete walkways, steps, and ramps, and elsewhere as indicated on the Contract Drawings and as specified in Section 321313 – Concrete Paving.

2. Exposed Aggregate Finish

- b. Apply an exposed aggregate finish to walkways as indicated on the Contract Drawings and as specified in Section 321314 – Exposed Aggregate Concrete Paving.

3.8 REPAIR AND FINISH OF CONCRETE SURFACES

- A. Defective Concrete: Repair and patch defective areas when approved by Construction Manager. Remove and replace concrete that cannot be repaired and patched to Construction Manager's approval.
- B. Concrete surfaces shall be repaired by using either the same material as originally cast or by use of a dry-pack material. Areas affected shall be chipped back square and to a depth of 1 inch minimum. Holes shall then be moistened with water for minimum of two (2) hours. Then followed by a brush coat of Euco weld as manufactured by Euclid Chemical Co., Cleveland, Ohio. As soon as Euco weld becomes tacky, immediately plug the hole with a dry pack material consisting of 1:1-1/2 mixture of cement and concrete sand mixed slightly damp to the touch. Hammer the dry-pack into the hole until dense and excess of paste appears on the surface. Finish the patch to the same texture as surrounding concrete. Color of patch after curing shall match adjacent concrete exactly. Adjust color if necessary using white cement or limestone aggregate.

3.9 FINISHING OF FORMED CONCRETE SURFACES

- A. Formed concrete surfaces to be painted or exposed to view in the finished work shall be finished as follows:
 1. As soon as the forms have been stripped, fins and other projections shall be removed, surface defects shall be patched, and repairs to defective concrete and honeycombed areas shall be made, clean all exposed concrete surfaces and adjoining work stained by the leakage of concrete, to the approval of the Construction Manager.
 2. Immediately after removal of forms, remove form tie plugs. Holes shall then be promptly filled upon stripping as follows: Moisten the hole with water, followed by a 1/16 inch brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1:1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of balling). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spider web. Fill hole flush with concrete surface and finish smooth.

3.10 FINISHING FLATWORK

- A. Steel Troweled Finish
 1. Provide a steel troweled finish on the following:
 - a. Stairs and slabs left exposed and not specified to receive another finish.
 2. Surfaces to receive steel troweled finish shall be thoroughly consolidated by Kelly Float, power trowel and hand troweling operations, finished to produce a smooth

glassy surface free of defects and trowel marks. The finished surface shall conform to the elevations shown on the Drawings within 1/4 inch.

B. Floated Finish

1. Provide floated finish on the following surfaces:
 - a. Top surfaces of walls, curbs, slabs that receive additional finishes, or other surfaces not requiring a steel troweled surface. Surfaces specified to receive another finish.
2. Surfaces to receive floated finish shall be finished to a uniform, smooth, granular texture.
 - a. Conforming to the finished elevations shown on the Drawings and accurate to within 1/4 inch in 10'-0" as determined by a 10-foot straightedge placed anywhere on the slab in any direction.

C. Sealed Concrete Surface

1. The following concrete surfaces shall be sealed:
 - a. All horizontal surfaces exposed to the weather or subjected to salt or deicers.
2. Concrete surfaces to be sealed shall be given two (2) coats of sealing compound applied uniformly over clean surface at the rate of 200 sq. ft./gal. for each coat. Apply first coat to a dry surface as soon as concrete has taken its initial set. Allow first coat to dry before applying second coat.

D. Broomed Finish

1. Provide broomed finish on the following surfaces:

Traffic paving and ramp traffic surfaces. Exterior walkway and paving.
2. Slabs to receive broomed finish shall be finished as follows:
 - a. After initial consolidation and floating, and just prior to final set, broom the entire surface uniformly with a stiff bristle broom to remove all scum, laitance, etc., without muddying the surface. Before finishing broomed finished slabs to be exposed to view in the finished work, prepare sample panel for approval.

E. For Exposed Aggregate Finish, See Section 321314.

3.11 CURING, PROTECTION, AND FORM REMOVAL

- A. Formed surfaces shall be periodically sprayed with water while forms are in place and, after forms are stripped, kept continuously wet and at a minimum temperature of 50 degrees F for 7 days.
- B. Unformed surfaces, such as slabs, shall be moist cured at a minimum temperature of 50 degrees F for 7 days or given two (2) successive uniform coatings of approved curing and sealing compound. Each coat shall consist of not less than 1 gal. to 400 sq. ft.
- C. Cold weather protection - Cold Weather protection shall be determined as per ACI 306 "Cold Weather Concreting." As a minimum, when the air temperature is at or below 45

degrees F or when weather reports indicate that the temperature may fall below 45 degrees F within the 24 hour period following placement of concrete, take all adequate and proper measures as required to maintain the temperature of the concrete between 50 degrees F and 70 degrees F for the specified curing period and to protect the concrete against damage by freezing or the cold, including but not limited to the following:

1. Ascertain that the requirements for heating of aggregates and water have been followed.
 2. Heat formwork, reinforcing and underlying subgrades with live saturated steam so as to raise the temperature well above the freezing point. Concrete surfaces shall be covered to prevent direct contact with the steam.
 3. After placing of concrete, protect against cold by means of tight covering and supply of sufficient heat, where required, to maintain the temperature of the concrete at a temperature of 50 to 70 degrees F for at least 7 days after placement of concrete. The concrete shall not be protected with salt, hay, manure or any other material containing live or organic acids. Concrete shall be kept continually moist during the curing periods.
 4. The section to be concreted shall be completely housed or enclosed wherever practicable before placing of concrete, in a manner that will ensure the maintenance of the required temperatures. Such enclosures shall be left in place of the curing period.
- D. Hot weather protection – Hot Weather protection shall be determined as per ACI 305 “Hot Weather Concreting.” As a minimum, take special care during the concreting operations during hot or dry weather. Wet forms just before placing of concrete and keep exposed surface continuously damp. Take special precautions in placing of slabs in unshaded locations so as to prevent flash setting of concrete. Provide a continuous fog spray of water immediately after screeding and maintain in moist condition and take such other protective measures as required to prevent damage from flash setting of concrete. Do not use retardant admixtures, other than specified by the Construction Manager.
- E. Removal of Forms
1. Remove forms only after concrete has attained sufficient strength to support its own weight and all loads thereon.

3.12 GROUT OF ANCHOR BOLTS AND BASE PLATES

- A. Grout shall consist of the approved package grout mixture and water only. Use the minimum amount of water required to produce a flowable grout.
- B. The materials and water shall be mixed in a paddle type mortar mixer for not less than three (3) minutes as close to the area to be grouted.
- C. Place the grout quickly and continuously.
- D. After the grout has acquired its initial set and will not sag, cut off all unconfirmed, exposed edges, leaving sloping "shoulders". Paint the entire exposed area within 24 hours with a vapor proof paint or specified sealing compound.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample (consisting of six test cylinders) for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 - 5. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days, and retain two specimens in reserve.
 - 6. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
 - 7. Test results shall be reported in writing to Construction Manager, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
 - 8. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 - 9. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 033000

SECTION 034500 - PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Architectural precast concrete seatwalls.
 - 2. Connections, including anchorage devices.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for installing connection anchors in concrete.

1.3 DEFINITION

- A. Design Reference Sample: Sample of approved Architectural precast concrete color, finish and texture, preapproved by Construction Manager.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.
- C. Shop Drawings: Detail fabrication and installation of Architectural precast concrete units. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit. Indicate joints, reveals, and extent and location of each surface finish. ~~Indicate details at building corners.~~
- D. Samples: For each type of finish indicated on exposed surfaces of Architectural precast concrete units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.
- E. Material Test Reports: For aggregates.

- F. Material Certificates: Signed by manufacturers:

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm that assumes responsibility for engineering Architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 - 1. Participates in PCI's plant certification program at time of bidding and is designated a PCI-certified plant for Group A, Category A1 - Architectural Cladding and Load Bearing Units or participates in APA's "Plant Certification Program for Production of Architectural Precast Concrete Products" and is designated an APA-certified plant.
- B. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of Architectural precast concrete units indicated.
- C. Quality-Control Standard: 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."
- D. Sample Panels: After sample approval and before fabricating Architectural precast concrete units, produce a minimum of two full-sized sample pieces in area for review by Construction Manager. Incorporate full-scale details of Architectural features, finishes, textures, and transitions in sample panels.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver Architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground.
- B. Support units during shipment on nonstaining shock-absorbing material.
- C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
- D. Place stored units so identification marks are clearly visible, and units can be inspected.
- E. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses which would cause cracking or damage.
- F. Lift and support units only at designated points shown on Shop Drawings.

1.7 SEQUENCING

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.2 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.
 - 1. For surfaces exposed to view in finished structure, mix gray with white cement, of same type, brand, and mill source.
- B. Supplementary Cementitious Materials:
 - 1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
 - 2. Metakaolin Admixture: ASTM C 618, Class N.
 - 3. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
- D. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

2.3 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

2.4 STAINLESS-STEEL CONNECTION MATERIALS

- A. Stainless-Steel Shapes and Pins: ASTM A 304.

2.5 GROUT MATERIALS

- A. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881/C 881M, of type, grade, and class to suit requirements.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
- B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at Architectural precast concrete fabricator's option.
- C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.
- D. Normal-Weight Concrete Mixtures: Proportion mixtures 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 with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi minimum.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
 - 3. Slump: 3 in minimum to 5 in maximum.
- E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 117.
- F. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.7 FABRICATION

- A. General: Design and fabricate precast concrete units to comply with manufacturing and testing procedures, quality control recommendations and dimensional tolerances of PCI MNL-117, unless otherwise indicated.
- B. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.
- C. Reinforce Architectural precast concrete units to resist handling, transportation, and erection stresses.
- D. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.
- E. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 117.
 1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."
- F. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.
- G. Identify pickup points of Architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each Architectural precast concrete unit on a surface that will not show in finished structure.
- H. 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. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- I. Discard and replace Architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Construction Manager's approval.

2.8 FABRICATION TOLERANCES

- A. Fabricate Architectural precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

2.9 APPEARANCE AND FINISHES

- A. Panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of Architectural precast concrete units as follows: Light to Medium Sand Blast Finish.
- B. Finish exposed surfaces: Light to Medium Sand Blast Finish.
- C. Finish unexposed surfaces of Architectural precast concrete units by float finish.
- D. Color: White to Light Gray.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting Architectural precast concrete units to supporting members and backup materials.
- B. Erect Architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected.
 - 1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
 - 2. Unless otherwise indicated, maintain uniform joint widths of 1/8 in between units.
- C. Connect Architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
- D. Grouting Connections: 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.

3.2 REPAIRS

- A. Repair damaged Architectural precast concrete units if permitted by Construction Manager. The Construction Manager reserves the right to reject repaired units that do not comply with requirements.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.
- C. Remove and replace damaged Architectural precast concrete units when repairs do not comply with requirements.

3.3 CLEANING

- A. Clean surfaces of precast concrete units exposed to view.
- B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034500

SECTION 044300 - STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes the following applications of stone masonry:
 - 1. Boulder stepping stone path.
- B. Related Sections:
 - 1. N/A

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Source Limitations for Stone: Obtain stone, from one quarry, as specified in this Section, with resources to provide materials of consistent quality in appearance and physical properties.
- C. Mockups: Construction Manager to field verify positioning of boulders before final placement.

1.4 PROJECT CONDITIONS

- A. Protection of Stone Masonry: During construction, protect boulders from impact or chipping.

PART 2 - PRODUCTS

2.1 GRANITE

- A. Granite: Comply with ASTM C 615.

1. Products: Subject to compliance with requirements stone varieties that may be incorporated into the Work include, but are not limited to, the following:
 - a. Champlain Stone: Saratoga Granite or American Granite
 - b. Or approved equal.
- B. Description: Uniform, medium-grained, gray to copper stone.
- C. Match Construction Manager's samples for color, finish, and other stone characteristics relating to aesthetic effects.

2.2 FABRICATION

- A. Construction Manager to select stone in quarry of appropriate color, thickness, size, and shape indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 SETTING OF STONE MASONRY, GENERAL

- A. Perform necessary field cutting and trimming as stone is set.
 1. Use hammer and chisel to split stone that is fabricated with split surfaces. Remove protrusions and sharp corners, matching similar surfaces that were shop or quarry fabricated.
 2. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Construction Manager to confirm final placement of boulders in field.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry of the following description:
 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Construction Manager.
 2. Defective joints.
 3. Stone masonry not matching approved samples and mockups.
 4. Stone masonry not complying with other requirements indicated.

- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

3.4 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Construction Manager.

END OF SECTION 044300

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Wood blocking and nailers.
- B. Related Sections include the following:
 - 1. Division 06 Section "Wood Decking."

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Timber: Lumber of 5 inches nominal or greater in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. RIS: Redwood Inspection Service.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

- C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- D. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
 - 1. Wood-preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Engineered wood products.
 - 4. Power-driven fasteners.
 - 5. Powder-actuated fasteners.
 - 6. Expansion anchors.
 - 7. Metal framing anchors.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.
- B. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":
 - 1. Dimension lumber framing.
 - 2. Timber.
 - 3. Laminated veneer lumber.
 - 4. Parallel-strand lumber.
 - 5. Prefabricated wood I-joists.
 - 6. Rim boards.
 - 7. Miscellaneous lumber.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPAC2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX).
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- D. Application: Treat all rough carpentry, unless otherwise indicated.

2.3 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness.
- B. Load-Bearing Beams: Select Structural or No. 1 Construction grade and any of the following species:
 1. Hem-fir (north); NLGA.
 2. Southern pine; SPIB.
- C. Joists, Rafters, and Other Framing Not Listed Above: Select Structural or No. 1 Construction grade and any of the following species:
 1. Hem-fir (north); NLGA.
 2. Southern pine; SPIB.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
- B. For items of dimension lumber size, provide Construction or No. 2 Standard grade lumber with 19 percent maximum moisture content of any species.
- C. For items of dimension lumber size, Construction or No. 2 Standard grade lumber with 19 percent maximum moisture content and any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Mixed southern pine; SPIB.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.6 METAL FRAMING ANCHORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:
 - 1. Simpson Strong-Tie Co., Inc.
 - 2. Or approved equal.
- D. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- E. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations where stainless steel is not indicated.
- F. Joist Hangers: U-shaped joist hangers with 2-inch- long seat and 1-1/4-inch- wide nailing flanges at least 85 percent of joist depth.
 - 1. Thickness: 0.050 inch.
- G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch- minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

- D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- E. Do not splice structural members between supports, unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
- J. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 - 1. Comply with indicated fastener patterns where applicable.
 - 2. Use finishing nails, unless otherwise indicated.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061500 - WOOD DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Solid-sawn floor decking.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for dimension lumber items associated with wood decking.

1.3 SUBMITTALS

- A. Product Data: For each type of product and process indicated and incorporated into items of exterior architectural woodwork during fabrication, finishing, and installation.
 - 1. Wood Decking
 - 2. Decking Fasteners
 - 3. Sealants
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of blocking and nailers, including concealed blocking and reinforcement specified in other sections.
 - 3. Apply WI-certified compliance label to first page of Shop Drawings.
- C. Samples for verification:
 - 1. Lumber, not less than 50 sq. in. for each species.
- D. Product Certificates: For each type of product, signed by product manufacturer.
- E. Provide Mock-up of connections for Construction Manager's approval.

1.4 QUALITY ASSURANCE

- A. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of exterior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 - 1. Provide AWI Quality Certification Program labels and certificates indicating that woodwork, including installation, complies with requirements of grades specified.
- B. Weather Limitations: Proceed with installation of exterior woodwork only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.
- C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- D. Forest Certification: Provide wood decking produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."
- E. Fabricator and Installer Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.5 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, reinforcements, and other related units of Work specified in other Sections to ensure that exterior architectural woodwork can be supported and installed as indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery of wood decking to avoid extended on-site storage and to avoid delaying the Work.
- B. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary

coverings. Stack wood decking with surfaces that are to be exposed in the final work protected from exposure to sunlight.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. General: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Grade Stamps: Provide solid-sawn wood decking with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, species, grade, moisture content at time of surfacing, and mill. Apply grade stamp to surfaces that will not be exposed to view.

2.2 SOLID-SAWN WOOD DECKING

- A. Decking Species: Douglas fir larch (North), hem-fir (North) Southern pine, or Black Locust.
- B. Decking Nominal Size: 1x4 and 1x6
- C. Decking Grade: FAS1 grade or Green Dex – #1 Grade or Approved Equal.
- D. Face Surface: Smooth.
- E. Edge Pattern: Radius edge all sides.
- F. Do not use plain-sawn lumber with exposed, flat surfaces more than 3 inches wide.
- G. Lumber shall be in sound condition, free from worm holes, knots, longitudinal heart cracks, firm or soft sap wood, fungus, and deformation (twisting or cupping) which cannot be removed during installation using normal installation methods and tools. Natural drying checks, to a maximum of 1/8" in width, will be acceptable.
- H. Dimensional tolerances (measured at 19% moisture content) shall be plus or minus .08" in both width and thickness.
- I. Hardwood slats shall meet or exceed the mechanical properties as defined by U.S. Forest Product Laboratories testing methods 50 millimeters (2" standard) as follows: Bending Strength: 153 Mpa (22,200 psi); Modulus of elasticity: 16 Mpa 2,370,000 psi.
- J. Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
- K. National Hardwood Lumber Association (NHLA) grading rules shall apply. Retain one of two options in paragraph below. 15 percent is usually specified for laminated decking

and Select grade solid-sawn decking and is required by AITC 112 for 2-inch nominal solid-sawn decking.

2.3 FASTENERS AND ACCESSORY MATERIALS

- A. Fasteners for Solid-Sawn Decking: Provide fastener size and type complying with decking standard for thickness of deck used. Install fasteners as shown on drawings and as per manufacturers instructions.
- B. Fastener Material: Hot-dip galvanized steel.

2.4 FABRICATION

- A. Shop Fabrication: Where preservative-treated decking is indicated, complete cutting, trimming, surfacing, and sanding before treating.
- B. Fabricate decking in lengths for controlled random lay-up.
- C. Predrill decking for lateral spiking to adjacent units to comply with referenced decking standard.
- D. Seal Coat: After fabricating and surfacing decking, apply a saturation coat of penetrating sealer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.
- C. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with same grade specified in Part 2 for type of woodwork involved.
- B. Install woodwork true and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- D. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWP A M4.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk concealed fasteners and blind nailing. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork.
- F. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
- G. Complete finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail and screw holes with matching filler where exposed.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged decking if repairs are not approved by Construction Manager.
- B. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; replace woodwork where not possible to repair. Adjust joinery for uniform appearance.
- C. Clean woodwork on exposed and semiexposed surfaces.

3.4 PROTECTION

- A. Provide temporary waterproof covering to protect exposed decking before applying roofing.

END OF SECTION 061500

SECTION 083100

SECTION 08 31 00 - FLOOR ACCESS DOORS (BILCO TYPE J-AL)

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: Provide factory-fabricated floor access doors.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

1.3 QUALITY ASSURANCE

- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.5 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of twenty five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Manufacturer: Type J-AL Access Door by The Bilco Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-933-8478, Web: www.bilco.com.
- B. Or approved equal.

2.2 ACCESS DOOR

- A. Furnish and install where indicated on plans vault access door Type J-AL, size: width (4.5') x length (4.5'). Length denotes hinge sides. The floor access door shall be single leaf and pre-assembled from the manufacturer.
- B. Performance characteristics:
 - 1. Cover: Shall be reinforced to support a minimum live load of 300 psf (1464 kg/m²) with a maximum deflection of 1/150th of the span.
 - 2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - 3. Operation of the cover shall not be affected by temperature.
 - 4. Entire door, including all hardware components, shall be highly corrosion resistant.
- C. Cover: Shall be 1/4" (6mm) aluminum diamond pattern.
- D. Frame: Channel frame shall be extruded aluminum with bend down anchor tabs around the perimeter.
- E. Hinges: Shall be specifically designed for horizontal installation and shall be through bolted to covers with tamperproof Type 316 stainless steel lock bolts and shall be through bolted to the frame with Type 316 stainless steel bolts and locknuts.
- F. Drain Coupling: Provide a 1-1/2" (38mm) drain coupling located in the right front corner of the channel frame [note: can be placed at a different location if specified].
- G. Lifting mechanisms: Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the covers when closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe fastened to a formed 1/4" (6mm) gusset support plate.
- H. A removable exterior turn/lift handle with a spring loaded ball detent shall be provided to open the cover and the latch release shall be protected by a flush, gasketed, removable screw plug.

- I. Hardware:
 - 1. Hinges: Heavy forged Type 316 stainless steel hinges, each having a minimum 1/4" (6mm) diameter Type 316 stainless steel pin, shall be provided and shall pivot so the covers do not protrude into the channel frame.
 - 2. Cover shall be equipped with a hold open arm which automatically locks each cover in the open position.
 - 3. Cover shall be fitted with the required number and size of compression spring operators. Springs and spring tubes shall be Type 316 stainless steel.
 - 4. A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of one cover.
 - 5. Hardware: Shall be Type 316 stainless steel throughout.
- J. Finishes: Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
 - 1. Test units for proper function and adjust until proper operation is achieved.
 - 2. Repair finishes damaged during installation.
 - 3. Restore finishes so no evidence remains of corrective work.

3.3 ADJUSTING AND CLEANING

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION

SECTION 117000 - PLAY EQUIPMENT AND STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.
- B. The following related items of work are included under other sections:
 - 1. Division 31 Section "Earth Moving" for subgrade preparation.
 - 2. Division 03 Section "Cast-In-Place Concrete"

1.2 SUMMARY

- A. The work required under this Section consists of furnishing all labor, materials, equipment, services and related items necessary to supply and install play equipment and structures, and all related work, complete, as indicated on the drawings or specified herein.
- B. Major items of work include, but are not limited to, supplying and installing:
 - 1. Playground Play Structures

1.3 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's shop drawings and/or catalogue cuts for each item of play equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Children's Playground Equipment, as illustrated in the Drawings:
 - 1. Structures as manufactured by KOMPAN, Inc., 821 Grand Avenue Parkway, Pflugerville, TX 78660; 800-426-9788.
 - i. Or approved equal.
 - 2. City of Pittsburgh Standard: Safety Surface tiles as manufactured by SofSurfaces Rubber Tile Solutions; 4393 Discovery Line, Petrolia, ON Canada, N0N 1R0; 519-882-8799.
 - i. Or approved equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the subgrade, finish surfaces and installation conditions. Do not commence work until all unsatisfactory conditions are corrected.

3.2 LAYING OUT THE WORK

- A. The trade performing the work of this section assumes full and sole responsibility for the accuracy and correctness of all layouts, lines, levels, grades and other aspects of the work under this Section.

3.3 INSTALLATION OF EQUIPMENT

- A. Layout and installation of all play equipment and structures to be performed by KOMPAN, Inc., unless otherwise specified by Owner.
- B. Any item locations not specifically detailed in the Contract Documents shall be located at the direction of the Owner.
- C. Clean and touch-up paint all abraded, welded, and scratched surfaces with matching paint provided by each manufacturer.
- D. Layout and installation of all safety surface tiles to be performed by Contractor in coordination with KOMPAN, Inc. representatives after installation of play structures is complete.

3.4 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work.
- B. Remove from the project site all excess material and equipment at the completion of the work of this section.
- C. Repair damage resulting from play equipment and structures work.

END OF SECTION 117000

SECTION 117001 – WATER PLAY EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to work of this section.
- B. The following related items of work are included under other sections:
 - 1. Division 31 Section "Earth Moving" for subgrade preparation.
 - 2. Division 22 Section "Facility Water Distribution"
 - 3. Division 03 Section "Cast-in-Place Concrete" for foundation.
 - 4. Division 26 Section "Exterior Lighting and Power" for power requirements and connections

1.2 SUMMARY

- A. The work required under this Section consists of furnishing all labor, materials, equipment, services and related items necessary to supply and install water play equipment, and all related work, complete, as indicated on the drawings or specified herein.
- B. Major items of work include, but are not limited to, supplying and installing:
 - 1. Water play feature.
 - 2. Water Quality Management System.
 - 3. Water Containment System.
 - 4. Activation Devices.
 - 5. System Controller.

1.3 GENERAL

- A. The water play products shall be suitable for installation in aquatic facilities and public play areas. They shall be specifically designed for use by children and adults and be manufactured by a company that has at least five years experience in the design and engineering of children's aquatic play areas.

1.4 QUALITY ASSURANCE

- A. It shall be the obligation of the Contractor to insure that all criteria are satisfied and the burden or proof of conformance shall rest with the contractor. The Engineer shall require complete calculation, past performance records, and if required, inspection trips of similar facilities to substantiate conformance with these criteria. The Engineer shall be the sole judge of conformance and the Contractor is cautioned that he will be required to Bid and provide a finished product meeting all stated criteria. It is rec-

ommended that the contractor or project manager follow an inspection and approval process, as provided by manufacturer.

B. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum 10 years experience in the manufacture of aquatic play features and components. The person(s) responsible for installation shall have supervised/installed a minimum of 3 (three) installations in the State/Country of Pennsylvania.
2. Manufacturer shall provide independent and accredited certification that it applies an environmental management system which meets the requirements of ISO 14001:2004 in its design, manufacturing, sales, marketing and servicing of recreational aquatic products and accessories.
3. Manufacturer shall provide independent and accredited certification that it applies a quality management system which meets the requirements of ISO 9001:2008 in its design, manufacturing, sales, marketing and servicing of recreational aquatic products and accessories.
4. The person(s) responsible for installation shall be on-site performing such service.
5. Licensed plumbers and electricians shall be used as required by local codes.
6. General contractor shall have experience managing the installation of at least three (3) previous splash pads.

1.5 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's shop drawings and/or catalogue cuts for each item of play equipment.

1.6 COMMISSIONING OF WATER PLAY EQUIPMENT

- A. Upon completion of construction, the general contractor shall provide the owner/operator adequate training on facility operations and maintenance. The contractor may request that the equipment manufacturer and/or manufacturer's representative provide on-site start-up and training for the owner/operator.

PART 2 – PRODUCTS

2.1 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All aquatic play products and associated equipment must be properly wrapped and secured in place while in transport to the project site. Care shall be observed during offloading and handling to prevent excessive stress and abrasions.
- B. At the site, the play products and associated equipment are to be stored in safe areas, out of the way of traffic and other construction activities, until the actual time of installation. If required, safety barricades or other like precautions must be taken for the protection of public and adjacent property.

- C. Protective wrapping on the water play feature must be left in place until construction work is complete.
- D. Water play features and water management systems shall be Waterplay® named designs and model numbers, as manufactured by Waterplay Solutions Corp., 1451B Ellis Street, Kelowna, BC, V1Y 2A3, Canada. (Tel. 01-250-712-3393); Represented Locally by Recreation Resource USA, 425 McFarlan Road #100, Kennett Square, PA 19348. info@recreation-resource.com or Tel 610-444-4402.
- E. All equipment shall be installed in accordance with the installation specifications. The contractor shall use due care when installing the features. Protective wrapping shall be left intact throughout the installation and be removed only upon completion. Structures shall be installed in accurate locations, square, centered, plumbed, and at the required elevation relative to final grade on footings as per the layout.
- F. All phases of the installation shall be inspected by the owner, or an authorized representative of the owner, up to and including the final inspection as laid out in the Waterplay Project Inspection Checklist.

2.2 PLAY PRODUCT INSTALLATION - GENERAL

- A. Embedded Anchoring and leveling Systems: The anchoring system shall have an integrated leveling system facilitating installation, ensuring product is plumb and installed at the desired height.
- B. When applicable, templates shall be supplied to facilitate the installation of embedded anchoring equipment.
- C. All play products shall have electrical grounding studs incorporated into their associated anchoring equipment. All play products shall be grounded by the installer per local codes.
- D. All installation conduit wiring including electrical supply panel, PVC connections, piping, elbows, tees, play product assembly if required and other items relating to the installation shall be supplied by the general contractor.
- E. Drawings and Instructions: Product drawings and installation manuals shall be supplied by the manufacturer for ease of installation.

2.3 PRODUCT CONSTRUCTION

- A. In-ground aquatic play features shall be 2 ½" schedule 40 or 6" schedule 40, type A304 stainless steel canisters with a machined nozzle seat. Each fixture will have a 1" NPT coupler water inlet. Each fixture shall have mounting holes to accommodate stainless steel L-type anchor bolts to be set in a concrete footing.
- B. Aquatic play features are to meet ADA compliance for handicap accessibility, and meet or exceed current ASTM playground safety standards.
- C. Aquatic play features will be supplied with all necessary anchoring hardware and installation templates to accommodate site work.
- D. Aquatic play features anchoring system shall provide the ability to add, remove and interchange products without having to change infrastructure and footings. The component shall be fastened directly to the base flange with an EPDM gasket to provide a water tight seal between the component flange and the base flange. The base must be flush-to-grade with no visible hardware or dome cover. The base must have the ability to attach a grounding lug.
- E. All aquatic play features shall have fittings that allow for winter close off.
- F. All aquatic play features of below grade design shall address winterization.
- G. The contractor shall provide and install the following aquatic play features as manufactured by Waterplay Solutions Corp., 1451b Ellis Street, Kelowna, BC Canada v1y 2a3, (250) 712-3393, or approved equal.
- H. Earth Bonding / Grounding: All Play products are to be equipped with a Grounding Lug and are to be grounded against a lightning strike as per article 680 of the N.E.C.
- I. Drawings and Instructions: Product drawings and installation manuals shall be supplied by the manufacturer for ease of installation.

1. Group Volcano: CO2-182

Product Structure: The Group Volcano shall be constructed of A304 stainless steel. The included anchoring and leveling system shall be used to mount the product to a 3' square slab footing. The spray nozzles shall be made of CNC machined acetal copolymer with tamper resistant fasteners.

Overall Product Dimensions: The product is embedded 1' deep in the surface of the play area, to sit flush with the surface. It has an overall spray zone of 18' in diameter. The central nozzle can reach a spray height of 6'.

Product Interactivity: Users can enjoy the spray fountain from all directions.

Hydraulic Activity/Components: The loop of nozzles on the feature shall have eight (8) 2 ½" nozzles and one (1) 6" nozzle in the center of the circle to produce varying heights of water spray depending on which nozzles are open or covered.

Hydraulic Requirements: The combined hydraulic requirements of all nine (9) spray nozzles shall be approximately 15 gpm @ 15 psi.

J. Nozzles

Aquatic play feature nozzles shall be constructed of acetal copolymer or urethane. Nozzles shall be non-corrosive, impervious to galling, precision machined. Brass and Nylon are not acceptable. A mechanical workbook must be supplied to show individual flow rates for each feature including maximum and average flow for each pre-programmed sequence step.

Nozzles shall be secured using stainless steel fasteners.

2.5 WATER DISTRIBUTION SYSTEM

A. General Materials Specifications:

1. See Section 221113 Facility Water Distribution.

2.6 ACTIVATION DEVICES

1. The contractor shall provide and install the following activation devices as manufactured by Water Odyssey by Fountain People Inc.; PO BOX 807, 4600 Highway 123, San Marcos, TX 78667; 512-392-1155:
 - i. Wireless Touch & Go Bollard Activator W009-W.
 - ii. Or approved equal.

Play Product Structure: The Bollard Activator shall be constructed of 4" type 304 stainless steel, with a base plate of type 304 stainless steel. The tactile push button shall be machined from polymer materials. The Bollard Activator shall be anchored and leveled with the supplied materials.

Overall Play Product Dimensions: The Bollard Activator shall have an overall height of 37" above the final grade.

Play Product Interactivity: The Bollard Activator shall be the direct interface between the users of the Water Play Equipment. Programming of the water sequence is controlled by the mounted control box as shown in the drawing, and shall be activated only when the touch-activated sensor cap on the Bollard Activator is touched by the user.

Hydraulic Activity/Components: N/A

Hydraulic Requirements: N/A

PART 3 – EXECUTION

3.1 GENERAL

- A. Substitutions of products other than the products specified herein, shall only be approved when the Contractor can show that proposed substitutions are equal in quality and value to the products specified:

- 1. The Contractor shall submit specifications, cut sheets, and performance data, along with an itemization listing each and every deviation from the specifications herein.

- B. The manufacturer shall furnish the Owner with at least two sets of complete installation and operating manuals. The installation manual will illustrate the installation of the entire system. It shall describe the start-up procedure and day- to- day operation of the system.

3.2 INSPECTION

- A. Examine the subgrade, finish surfaces and installation conditions. Do not commence work until all unsatisfactory conditions are corrected.

3.2 LAYING OUT THE WORK

- A. The trade performing the work of this section assumes full and sole responsibility for the accuracy and correctness of all layouts, lines, levels, grades and other aspects of the work under this Section. Lay out all work in accordance with the requirements as indicated in the drawings and as per manufacturer's directions and recommendations.

3.3 INSTALLATION

- A. Locate water play equipment where indicated on the drawings, and attach as detailed on the drawings and in conformance with manufacturer's recommendations and instructions.
- B. Clean and touch-up paint all abraded, welded, and scratched surfaces with matching paint provided by each manufacturer.

3.4 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work.
- B. Remove from the project site all excess material and equipment at the completion of the work of this section.
- C. Repair damage resulting from play equipment and structures work.

3.5 TESTING

- A. Testing: All aquatic play feature lead lines shall be water pressure tested as directed by local codes and the manufacturer's recommendations before backfilling and pouring of concrete slabs. The contractor is to ensure all water supply lines are free of debris, and flushed of any foreign material, prior to the hook-up of any aquatic play features, and the contractor shall have inspected the entire system (including all elec-

tronic systems) in the presence of the Owners Representative. The contractor is to ensure all nozzles are adjusted and secured to the owner's satisfaction. The contractor is to test all drainage systems of the aquatic play features. Refer to the Installation manual for a full description of related tasks prior to completion.

END OF SECTION 117001

SECTION 221113 - FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes water-distribution piping and related components outside for **water service**.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

- A. PE: Polyethylene plastic.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
 - 1. Wiring Diagrams: Power, signal, and control wiring for alarms.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

G. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping. **Include marking "NSF-pw" on piping.**
2. Comply with NSF 61 Annex G for materials for water-service piping and specialties for domestic water.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.

2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.9 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 1. Notify **Owner** no fewer than **two** days in advance of proposed interruption of service.
 2. Do not proceed with interruption of water-distribution service without **Owner's** written permission.

1.10 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: **ASTM B 88, Type K** water tube, annealed temper.
 1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
 2. Copper, Pressure-Seal Fittings:

- a. NPS 2 (DN 50) and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
- b. NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.

2.2 PE PIPE AND FITTINGS

- A. PE, ASTM Pipe: ASTM D 2239, SIDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than **200 psig**.
 - 1. PEXa pipe installation, corporation, and curb stops shall be compression type fitting and shall have tracer wire installed per manufacturer's specifications.

2.3 GATE VALVES

- A. Gate valves to be in accordance with Pittsburgh Water and Sewer Authority requirements.

2.4 METERS

- A. Meters to be in accordance with Pittsburgh Water and Sewer Authority requirements.

2.5 BACKFLOW PREVENTERS

- A. Backflow preventers to be in accordance with Pittsburgh Water and Sewer Authority requirements.

2.6 TAP

- A. Taps to be in accordance with Pittsburgh Water and Sewer Authority requirements.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Refer to Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping **NPS 3/4 to NPS 3 1" to 2"** shall be **any of** the following:
 - 1. Soft copper tube, **ASTM B 88, Type K** in accordance with Pittsburgh Water and Sewer Authority Standards.
 - 2. PEXa, ASTM pipe; in accordance with Pittsburgh Water and Sewer Authority Standards.

3.3 VALVE APPLICATIONS

- A. Valves to be in accordance with Pittsburgh Water and Sewer Requirements

3.4 PIPING INSTALLATION

- A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
- B. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- C. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- D. Sleeves are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- E. Mechanical sleeve seals are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- F. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.5 JOINT CONSTRUCTION

- A. Make pipe joints according to the following:

1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
2. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.

3.6 VALVE INSTALLATION

- A. Valves to be in accordance with Pittsburgh Water and Sewer Authority Requirements

3.7 DETECTOR-CHECK VALVE INSTALLATION

- A. Install in pit.
- B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.8 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's written instructions.

3.9 ROUGHING-IN FOR WATER METERS

- A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.10 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

3.11 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

- C. Prepare reports of testing activities.

3.12 IDENTIFICATION

- A. Install continuous underground **detectable** warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section 312000 "Earth Moving."
- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Section 330500 "Common Work Results for Utilities" for identifying devices.

3.13 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION

SECTION 221313 - FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings.
 - 2. Cleanouts.

1.3 DEFINITIONS

- A. FRP: Fiberglass-reinforced plastic.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Expansion joints and deflection fittings.
 - 2. Backwater valves.
- B. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system and other utility piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- B. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.
- C. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify **Owner** no fewer than **two** days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of service without **Owner's** written permission.
- B. All work and materials shall be in accordance with Pittsburgh Water and Sewer Authority Specifications and Requirements.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

- A. PVC Type PSM Sewer Piping:
 - 1. Pipe: ASTM D 3034, **SDR 35**, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
 - 2. Fittings: ASTM D 3034, PVC with bell ends.
 - 3. Gaskets: ASTM F 477, elastomeric seals.

2.2 CLEANOUTS

- A. Cast-Iron Cleanouts:
 - 1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
 - 2. Top-Loading Classification(s): **Heavy Duty**.
 - 3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.
- B. PVC Cleanouts:
 - 1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure, drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow, at minimum slope of **2** percent unless otherwise indicated.
 - 2. Install PVC gravity sewer piping according to ASTM D 2321 and ASTM F 1668.
- G. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure, drainage piping according to the following:
 - 1. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
 - 2. Join dissimilar pipe materials with nonpressure-type, flexible couplings.

3.4 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 - 1. Use Light-Duty, top-loading classification cleanouts in **earth or unpaved foot-traffic** areas.
 - 2. Use Heavy-Duty, top-loading classification cleanouts in **paved** areas.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, **18 by 18 by 12 inches** deep. Set with tops **1 inch above** surrounding grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 CONNECTIONS

- A. Make connections to existing piping per PWSA requirements.
 - 1. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.6 CLOSING ABANDONED SANITARY SEWER SYSTEMS

- A. Abandoned Piping: Abandon using a PWSA approved balloon to prevent grout from entering main. Grout lateral from open end to main.
- B. Backfill to grade according to Section 312000 "Earth Moving."

3.7 IDENTIFICATION

- A. Comply with requirements in Section 31200 "Earth Moving" for underground utility identification devices. Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.
 - 1. Use detectable warning tape over ferrous piping.
 - 2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.8 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate report for each test.
 - 5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
 - a. Fill sewer piping with water. Test with pressure of at least 10-foot head of water, and maintain such pressure without leakage for at least 15 minutes.
 - b. Close openings in system and fill with water.
 - c. Purge air and refill with water.
 - d. Disconnect water supply.
 - e. Test and inspect joints for leaks.
 - 6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Option: Test plastic gravity sewer piping according to ASTM F 1417.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.9 CLEANING

- A. Clean dirt and superfluous material from interior of piping

END OF SECTION

SECTION 265600 - EXTERIOR LIGHTING AND POWER

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements for indicated electrical system including service and power distribution for site work and consisting of indicated conduit, pull boxes, pole foundations, poles, luminaires, drivers, cable, enclosures, equipment, devices, tests, and restoration. This work also includes connection to existing City of Pittsburgh street lighting circuits and installation of stored materials.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Sections, apply to this Section.
- B. Section 033000 – Cast-in-Place Concrete
- C. Section 117001 – Water Play Equipment
- D. Section 328400 – Drip Irrigation System
- E. Section 328401 – Irrigation Mechanical System

1.3 REFERENCES

- A. Pennsylvania Department of Transportation (PennDOT) Publication 408, latest edition, with all supplements. (Herein referred to as PDT(section no.)).
- B. Pennsylvania Department of Transportation (PDT) Publication 72M Standard Roadway Construction Drawings for highway lighting terminology and construction.
- C. IES RP-8 - Recommended Practice for Roadway Lighting.
- D. NFPA 70 - National Electric Code
- E. American Standard Testing and Materials (ASTM): All applicable specifications referred to in this project specification section.
- F. American National Standards Institute (ANSI): All applicable specifications referred to in this project specification section.
- G. National Foundation for American Policy (NFAP): All applicable specifications referred to in this project specification section from the National Electrical Code (NEC).
- H. Institute of Electrical and Electronic Engineers (IEEE): All applicable specifications

referred to in this project specification section from the National Electrical Safety Code (NESC).

- I. National Electrical Manufacturers Association (NEMA) - All applicable specifications referred to in this project specification section.

1.3 DEFINITIONS

- A. Refer to PennDOT Standard Drawing RC-83 for lighting terminology.

1.4 DESIGN REQUIREMENTS

- A. Meet standards for electrical material in accordance with IEEE, ASTM, NEMA, and ANSI.

1.5 ELECTRICAL COORDINATION

- A. Work Provided Outside this Contract:
 - 1. Details of equipment and construction for all Specification Divisions which affect Work covered under Division 26 – Electrical.
 - 2. Coordinate with adjacent construction project, Larimer Phase 2, regarding street lighting on Larimer Avenue.

1.6 PERFORMANCE REQUIREMENTS

- A. Conduit
 - 1. Provide necessary conduits, wiring, etc. as indicated on the contract documents.
- B. Enclosure
 - 1. Outside electrical equipment shall be in NEMA 3R enclosures.
- C. Grounding
 - 1. Exposed non-current carrying metallic parts, equipment, metallic frames of equipment, structural steel and systems neutrals shall be grounded per grounding requirements of NEC.
 - 2. Provide light pole units with a two-fold grounding system. Ground each light pole foundation per the Contract Drawings. Provide a separate ground wire with the lighting circuitry and ground each indicated light pole location to the system ground

in the electrical enclosure (main service cabinet). Provide equipment grounding conductors the same size as it's companion circuit.

1.6 SUBMITTALS

- A. Shop Drawings. Submit details, materials dimensions and arrangement necessary for fabrication and installation of material and equipment.
- B. Product Data. Submit to Engineer for approval, prior to purchase, catalog cuts, drawings, and manufacturer's specifications of proposed junction boxes, conduits, panelboards, fixtures, lighting contactors, photo cells, control relays and timers, wire and cable, and wiring devices. Include sufficient information to ascertain full compliance with specifications.
- C. Test Reports. Furnish reports including procedures and results. Furnish photometric test reports for luminaire and I.E.S. formatted digital file for the luminaire.
- D. Progress Prints. A set of detailed working Drawings shall be kept up to date with the Project indicating actual placement of lighting fixtures, conduit, panelboards, etc. Furnish one set of progress prints to the Engineer once each month or periodically on request of Engineer.
- E. Samples. Submit when requested by Engineer samples of any or all listed products and any additional materials listed in this Section.
- F. Quality Control Submittals:
 - 1. Voltage Field Test Report
 - 2. Voltage Balance Report
 - 3. Equipment Line Current Report
- G. Record Drawings: Document installed work on Project Record Documents. Show horizontal and vertical locations (distance from baselines) and accurate routing into construction including pole foundations and pull boxes; show sizes and number of conduit, etc. An "As Built" set of Drawings must be completed and delivered at final inspection.

1.7 REGULATORY REQUIREMENTS

- A. Comply with local government, electric utility company, and state codes or requirements; electric requirements of the Department of Labor and Industry; and applicable construction requirements of NEC and NESC.
- B. Conform with requirements of ANSI/NFPA 70.
- C. Furnish products listed, classified and labeled by Underwriters Laboratories, Inc. as suitable for the specified and indicated purpose.

- D. Meet standards for electrical material in accordance with IEEE, ASTM, NEMA, and ANSI.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling and Unloading

1. Inspect products for damage prior to delivery onto the job site.
2. Deliver materials in the manufacturer's original unopened protective packages.
3. After completion of shop tests, products shall be match-marked and components disassembled for shipment.
4. Protect equipment and exposed finishes during transportation.
5. Disconnect and tag electrical terminals and connections for shipment.
6. Unload and handle in a manner to prevent misalignment of parts.
7. Wire and Cable
 - a. Do not use wire and cable manufactured more than 12 months before delivery to the Worksite.
 - b. Deliver to the site in unbroken standard coils or reels to which shall be attached a tag bearing the manufacturer's name, trade name of the wire, and UL label.

B. Storage and Protection

1. Protect equipment from humidity, corrosion and dirt by storing in a safe, dry, clean area, well-ventilated and heated environment to prevent condensation.
2. Store materials in their original protective packaging and protect them against physical damage.
3. Protect conduit from the entrance of debris by storing above ground and providing a flat surface and an appropriate covering.
4. Protect steel conduit from corrosion and PVC conduit from sunlight.

1.9 LIGHTING CONTROL SYSTEM

- A. Street Lighting: photocontrol integral to the luminaire.
- B. Park Lighting: Park lights will be connected to a Musco Lighting Contactor Panel. The park lights will be added to an existing agreement between the City of Pittsburgh and Musco Lighting. Contact Joe Fox at Musco Lighting at 641-676-2340. Coordinate with Musco.

1.10 ELECTRICAL IDENTIFICATION

- A. Identification Devices: A single type of identification product for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. Raceway and Cable Labels: Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.

1. Type: Pretensioned, wraparound plastic sleeves. Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the item it identifies.
 2. Type: Preprinted, flexible, self-adhesive, vinyl. Legend is overlaminated with a clear, weather- and chemical-resistant coating.
 3. Color: Black letters on orange background.
 4. Legend: Indicates voltage.
- C. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick.
- D. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape with the following features:
1. Not less than 6 inches wide by 4 mils thick.
 2. Compounded for permanent direct-burial service.
 3. Embedded continuous metallic strip or core.
 4. Printed legend that indicates type of underground line.
- E. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.
- G. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch minimum thickness for signs up to 20 sq. in. and 1/8-inch minimum thickness for larger sizes. Engraved legend in black letters on white background.
- H. Interior Warning and Caution Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145. Preprinted, aluminum, baked-enamel-finish signs, punched or drilled for mechanical fasteners, with colors, legend, and size appropriate to the application.
- I. Exterior Warning and Caution Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch, galvanized-steel backing, with colors, legend, and size appropriate to the application. 1/4-inch grommets in corners for mounting.

- J. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide materials and equipment listed by UL wherever standards have been established.
- B. Ensure compatibility between lighting components.
- C. Provide manufacturers' standard finish and color, except where specific color is indicated. If manufacturer has no standard color, furnish equipment with ANSI No. 61 light gray color.

2.2 BASIC MATERIALS

- A. Anchor Bolts, Nuts and Washers: PDT 1101.04.
- B. Aggregate: PDT 703.2, #57, Type C or better

2.3 JUNCTION BOXES

- A. Polymer Concrete Junction Box:
 - 1. Box: Quazite # PG1324BG18
 - 2. Cover: Quazite #PG1324HG
 - 3. Cover Marking: Electrical or as shown
 - 4. Color: Green or Gray – match surrounding grade finish.
- B. Concrete Junction Boxes: City of Pittsburgh Type JB-1.
 - 1. In accordance with the current City of Pittsburgh Traffic Signal Standards for Concrete Junction Box JB-1.
 - a. Concrete. 4,000 psi compression within 28 days. Conforming to the requirements of the City of Pittsburgh Specifications titled, "Specification for Concrete Pavement and Base Course, March, 1978".

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- b. Curing. In accordance with ACI Specifications 318-56 as amended to date.
- c. Reinforcement Bars. Intermediate grade open-hearth steel in accordance with ASTM A15-39.
- d. Hatch Cover Frame and Hatch Cover Support Frame. 6061-T6 Aluminum.
- e. Junction box will have a concrete floor with drain hole, similar to PennDOT JB-12.
- f. Backfill Type 2A aggregate in accordance with PennDOT Publication 408 Section 703, except no slag will be permitted.

C. Equivalent as approved by Engineer and Architect.

2.4 LIGHT POLE FOUNDATIONS

- A. Provide anchor bolts, nuts and washers in accordance with PDT 1101.04 (Delete references to high mast lighting.) Match existing bolt circle.
- B. Provide pole foundations as shown on contract drawings and applicable parts of PDT RC-80M.

2.5 LIGHTING, POLES AND BASES

- A. City of Pittsburgh Park Light Pole:
 - 1. The 12 ft. round fluted aluminum pole:
Spring City Model No. APSCMP-18-12.00-E3-TN2.88/3.00-CU or Approved Equal.
 - 2. Provide Black anodized finish.
 - 3. Provide anchor bolts, nuts and washers per PDT 1101.04.
 - 4. Provide pole foundations as shown on contract documents.
 - 5. Verify bolt circle dimensions.
- B. City of Pittsburgh Street Light Pole: 8-Foot Ornamental Lighting Pole in accordance with applicable the City of Pittsburgh Standards of Construction and as follows;

1. Shaft. - 11D- 6 x 4.40 x 8' Schedule 40 seamless steel pipe, ASTM A-53 GRB.
2. Anchor Bolts, nuts and washers. - In accordance with PennDOT Section 1101.04, except full galvanization.
3. Handhole. - 4" x 6½" (inside frame) with ½"-13 brass ground lug and ¾" long SS hex nut and 11Ga cover with ¼ x 20 mechanical SS screws. Handhole to be located 12" above sidewalk.
4. Base Cover. - Cast leaf covers, mechanically secured to pole with self tapping stainless steel screws.
5. Base. - 10" square x ½" thick A-36 steel, machined for four (4) new 1" diameter fully H. D Galvanized anchor bolts on a 9 ½" bolt circle.
6. Paint. - Support poles, arms, and scrolls will be hot dipped galvanized to ASTM A153 and lightly sand (brushed) blasted as per the standard SSPC-SP7 Brush Off Blast Cleaning. Galvanized and blasted items and balance of parts will be prime painted Sherwin-Williams Recoatable Epoxy Primer B67-5 series, 3 to 4 mils dry film thickness. All primed items will be finish painted with Sherwin Williams Acrolon 218 HS Acrylic Polyurethane Semi-Gloss with a color to match the City of Pittsburgh Standard Black, or an approved equal.
7. Furnish and install painted pedestrian lighting poles as manufactured by the following manufacturer: Valmont Industries, Inc., West Highway #275, Valley, NE, 68064 Design #FL210-800A080-P9FP-SPEAR CAP-HH-FLUTED NC-AB, Valmont Drawing No. PA4Z18503-D, with top and bottom banner arms and two flower basket arms.

C. Equivalent by Union Metal as approved by Engineer and Architect.

2.6 LUMINAIRES

A. Park Luminaires:

1. City of Pittsburgh Park LED Post Top Luminaire: Spring City Model No. ALMSHA-LE090/EVX/L18-22-CR3-PF85-CU or Approved Equal.
2. Lamp: 4000K LED Array
3. Ballast: 0-10V Dimming Driver
4. Provide house side shields were indicated.
5. Performance: Luminaire must provide target design levels of 1-2 foot-candles and not exceed minimum uniformity ratio of 4:1.

B. Street Light Luminaire: Ornamental Luminaire with LED Lamp, Post Top Mount: In accordance with applicable sections of 1101.06 and the City of Pittsburgh CBD Standards of Construction Drawing No. LF-1, except with an LED source, and as follows:

1. Optical Assembly. - 13" thermal-resistant glass reflector/refractor with a 3" decorative clear finial & tool-less easy access to lamp chamber. External Array optics with optical control baffles, IES Type III-Cutoff Distribution with octagonal extruded aluminum heat sink and vented finial providing dynamic airflow.
 2. Source. - Solid state source, 60-watt, 120-volt.
 3. Electric Cable. - American Wire Gage No. 10 Copper Conductor, Type THWN, rated 600 Volts, 75C.
 4. Paint. - Sherwin-Williams Recoatable Epoxy Primer B67-5 series, 3 to 4 mils dry film thickness. All primed items will be finish painted with Sherwin Williams Acrolon 218
 5. HS Acrylic Polyurethane Semi-Gloss with a color to match the City of Pittsburgh Standard Black, or an approved equal.
 6. Photometric Performance. - Provide luminaires with photometric performance sufficient to meet the target design average of 1.0 fc at end of rated life with a Uniformity Ratio not exceeding 4:1 and meet AASHTO glare requirements.
 7. All other appurtenances necessary for installation of luminaire.
 8. Warranty - Fixture should provide a minimum of a five-year warranty on materials.
 9. Furnish and install post top-mounted, approximately 60-watt luminaires similar to those as manufactured by the following manufacturers. Ensure compatibility with approved street lighting poles:
 - a. King Luminaire Company, P.O. Box 266, Jefferson, Ohio, 1153 State Route 46N, 44047, Sol-Lux Series – K445R-So-Lux LED; Model #K445-T1GR-V-60(SSL)-120-CXAK13PEBK.
- C. Equivalent as approved by Engineer and Architect.

2.7 LIGHTING CONTROL EQUIPMENT

- A. 100A, 120/240V or 120/208V, NEMA 1 Load Center.
- B. NEMA 3R Enclosure; Per PDT 1101.11(c) and sized to fit all components.
- C. Musco Control Link System. Coordinate with Joe Fox at Musco, 641-676-2340.

2.8 CONDUIT

- A. PVC Conduit: PDT 1101.09(c)2.; direct burial or encased, sizes as indicated. Provide ground wire for each rigid nonmetallic conduit where noted.

- B. Galvanized Rigid Steel Conduit (GRS): PDT 1101.09(c)1 in areas requiring exposed conduit above grade.

2.9 CABLE AND WIRE

- A. General Rating, Insulation, Jacket, Temperature, Code, Application, Testing and Shipping: PDT 1101.08.
- B. Lighting
 - 1. Direct Burial Cable: PDT 1101.08.
 - 2. Conductor: Single, copper, minimum size #10 AWG, AWG #6 for lighting.
 - 3. Insulation: Type RHW/RHH/USE rated 75° C.
 - 4. Wiring Connectors
 - a. Splices: Pre-molded, in-line fuse, waterproof, disconnectable, connector kits, rated for 600 volt.

2.10 GROUNDING

- A. Materials
 - 1. Conductors
 - a. General Rating, Insulation, Jacket, Temperature, Code, Application, Testing and Shipping: PDT 1101.08. Size in accordance with the NEC, except where the sizes specified herein or indicated on Contract Documents are larger than those required by NEC.
 - b. Lighting Grounding Conductors: PDT 1101.08 Type RHW rated 75° C, with a green color jacket.
 - 2. Connectors
 - a. Grounding Connectors Above Grade: Bolted, solderless type made of high strength electrical bronze with silicon bronze clamping bolts and hardware; designed such that bolts, nuts, lock washers and similar hardware which might nick or otherwise damage the ground wire will not directly contact the ground wire.
 - b. Grounding Connectors Below Grade: Made using the exothermic weld process.
 - 3. Ground Rods

- a. Cone-pointed copper-clad steel.
- b. Length in feet and the manufacturer's trademark die stamped near the top.
- c. Clean, smooth, continuous copper surfaces, and the proportion of copper shall be uniform throughout the length of the rod.
- d. Size: 3/4 inch in diameter, eight feet long minimum. Multiple ground rods of shorter lengths may be used at locations where sufficient depth is not available for the eight-foot rods.
- e. Provide a maximum resistance of 25 ohms for light pole locations.

2.11 BURIED UTILITY IDENTIFICATION TAPE

- A. Tape: Three inches wide polyethylene, suitable for direct burial with face resistant colors, yellow background with black letters to read "Electric Line", magnetically detectable

2.12 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Enclosures: Flush- and surface-mounted cabinets.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
 - d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4 .
 - 2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
 - 4. Directory Card: Inside panelboard door, mounted in transparent card holder.
 - 5. Surface mount on 3/4" steel channels.
- B. Incoming Mains Location: Top and bottom.
- C. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity.

- D. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Main and Neutral Lugs: Mechanical type.
 - 3. Ground Lugs and Bus Configured Terminators: Compression type.
 - 4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 - 5. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
- E. Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.
- F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- G. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, and listed and labeled for series-connected short-circuit rating by an NRTL.
- H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.13 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D.
- B. Provide 120/240V, 3-wire, IR 42,000, Top Feed, Feed-thru Provision, Surface Mount, Bus Rating 250A, Bus Material: Copper, Plating: Tin, NEMA 1 Indoor. Refer to contract drawings for breakers required.
- C. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

- D. Mains: Circuit breaker or lugs only, as indicated on construction drawings.
- E. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- F. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 - 1. External Control-Power Source: 120-V branch circuit.
- G. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.14 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch-diameter slotted holes at a maximum of 2 inches o.c., in webs.
- D. Slotted-Steel Channel Supports:
 - 1. Channel Thickness: Selected to suit structural loading.
 - 2. Fittings and Accessories: Products of the same manufacturer as channel supports.
- E. Nonmetallic Channel and Angle Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch diameter holes at a maximum of 8 inches o.c., in at least one surface.
 - 1. Fittings and Accessories: Products of the same manufacturer as channels and angles.
 - 2. Fittings and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
- F. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- G. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

- H. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- I. Expansion Anchors: Carbon-steel wedge or sleeve type.
- J. Toggle Bolts: All-steel springhead type.
- K. Powder-Driven Threaded Studs: Heat-treated steel.

2.15 FABRICATION AND SOURCE QUALITY CONTROL

- A. Manufacture and test lighting material and equipment in accordance with IEEE, ASTM, NEMA and ANSI standards.
- B. Fabricate lighting materials complete with anchorages and attachments, ready for installation and in accordance with the Contract Documents and the requirements of the AASHTO Specifications, and PDT 1101 and 1105.
- C. After completion of shop tests, products shall be match-marked and components disassembled for shipment.

2.16 RECEPTACLES

- A. NEMA WD 1, heavy-duty general-use receptacle.
- B. Manufacturers:
 - 1. Hubbell - Series 5362.
 - 2. Leviton.
 - 3. Cooper.
- C. Device Body: Gray plastic.
- D. Configuration: NEMA WD 6, type as specified and indicated.
- E. Convenience Receptacle: Type 5-20, 20 Amp, 125 volt.
- F. Ground fault receptacle: GF5362

2.17 OUTLET BOXES

A. Cast Metal

1. Malleable Iron
2. Covers: Gasketed, Weatherproof, Malleable Iron.
3. Hubs: Threaded
4. Lugs: Cast Mounting

B. Cast Aluminum

1. Box: Cast Copper Free Aluminum
2. Covers: Cast Copper Free Aluminum, Gasketed, Weatherproof-In-Use Type.

PART 3 - EXECUTION

3.1 GENERAL

- G. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- H. Install Work in accordance with NECA Standard of Installation, unless otherwise specified.
- I. Cleanup is required at end of each workday. Contractor will be back-charged at cost for any additional required cleanup by Owner's personnel.
- J. Required outage period for power distribution changes will be scheduled two (2) weeks in advance.
- K. The General and Electrical Contractors are encouraged to coordinate their efforts in regard to the installation, use and removal of temporary lighting and power.
- L. All Excavations are unclassified.

3.2 INSTALLATION

A. General

1. Install equipment, components, accessories in accordance with NEC, manufacturer's published instructions and written recommendations, applicable standards, and in accordance with recognized industry practices to ensure that products serve intended function.

2. Install items as indicated, to be rigid and secure, plumb and level, and in true alignment with related and adjoining work.
 - a. Do not weld electrical materials for attachment or support.
 - b. Install supporting members, fastenings, framing, hangers, bracing, brackets, straps, bolts and angles as required to rigidly set and connect work.
 - c. Control erection tolerance requirements. Do not impair the strength, safety, serviceability, or appearance of the installations. Determine exact location of conduit.
3. Arrange equipment, components, accessories with adequate access for operation and maintenance.
4. Coordinate required penetrations.
- B. Trench Excavation and Backfill. Excavate, backfill, and compact per PDT 910.3(c), and Contract Documents.
- C. Conduit. Place conduit as applicable per PDT 910.3(g) and below; cap exposed ends with plastic caps. Install PVC conduit as follows:
 1. Do not obstruct conduit.
 - a. Rod and swab embedded conduit to remove foreign matter.
 - b. Protect conduit ends to prevent foreign material from entering the conduit.
 2. Do not use PVC conduit for exposed conduit installations.
 - a. PVC conduit shall be used for embedded conduit in non-hazardous installations.
 - b. PVC conduit shall be direct burial a minimum of 24 inches below finished grade.
 - c. Concrete for encased duct - PDT 704, Class A.
 3. Bend in accordance with NEC, with not more than three bends per run.
 - a. Where more than three bends are required in a particular run, install pull boxes to facilitate pulling conductors.
- D. Pole Foundations. Install pole foundations per PDT 910.3(b) and (d).
- E. Lighting Poles and Accessories. Four, hot-dipped galvanized "L" type anchor bolts to be provided with the post for anchorage. provide a door for wiring and anchor bolt access. It will be secured with two, tamper proof, stainless steel screws. Post will be

provided with a grounding stud mounted on the base floor opposite the access door.

F. Luminaires. Install per PDT 910.3(j).

- a. Install poles plumb. Use aluminum shims with aluminum bases; and use stainless steel shims with steel bases. Place shims under no more than three bolts of any base. Orient the handhole in the direction of traffic, unless otherwise indicated.
- b. Install electric cables in the pole shaft between the pole base and the luminaire. Allow adequate cable lengths for satisfactory splicing. Furnish and install wiring from the luminaires to hand hole. Furnish and install #10 copper AWG minimum 600-volt rated wiring, of the type and length required. Line-splice at the pole base in an acceptable manner using compression-type or split bolt connectors. An in-line waterproof fuse holder, with a 5-amp fuse is also required.

G. Junction/Pull Boxes.

1. Install per PDT 910.3(p).
2. Provide concrete junction boxes for street lighting circuits.
3. Provide polymer concrete junction boxes for park circuits.

H. Photocells – Integral to street light luminaire. Aim facing north. Adjust at night for proper operation.

I. Wire and Cable

1. Install per PDT 910.3(h).
 - a. Do not pull wire into any conduit until conduits and outlets have been thoroughly cleaned and swabbed to remove water and debris.

J. Splices and Terminations

1. Make wire and cable splices only in junction or pull boxes, or in equipment cabinets.
2. Make no splices in conduit.
3. For inspection purposes, clearly mark die numbers on the installed connectors.

K. Panelboards

1. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

2. Install overcurrent protective devices and controllers not already factory installed.
3. Install filler plates in unused spaces.
4. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
5. Comply with NECA 1.
6. Provide arc flash protection labeling on all electrical equipment. Determine correct labeling.
7. Provide panelboard nameplate and typed directory.

L. Grounding

1. Install ground rods as indicated.
 - a. Ground rods shall have a diameter sufficient to permit driving to the required depth without being bent or damaged.
2. Make exposed ground connections with approved ground clamps.
3. Enclosure Grounding. Ground metal enclosures of electrical equipment (switches, panels, etc.) at two places. Ground wire size shall be as indicated or in accordance with the NEC.
4. Lighting Grounding
 - a. Ground lighting per Section 1.05 C.2.

M. Wiring Devices

1. Install in accordance with NECA "Standard of Installation."
2. Install devices plumb and level.
3. Install receptacles with grounding pole on top.
5. Connect wiring device grounding terminal to outlet box with bonding jumper.

N. Boxes

1. Install boxes in accordance with NECA "Standard of Installation."
2. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
3. Support boxes independently of conduit.

3.2 COORDINATION/SEQUENCE OF OPERATIONS

- A. Coordinate pole foundations with regard to anchor bolts, bolt circle diameters, conduit placement, grounding, and pole setback.
- B. Locate pole foundations as shown on Contract Drawings. At locations where existing buried utilities are shown to be present, locate these utilities carefully and excavate or drill for pole foundations away from these utilities. Notify Engineer of any potential utility conflicts prior to excavation.
- C. Coordinate installation of Larimer Street Lighting with schedule of Larimer Avenue reconstruction (Larimer Phase 2 contract.) Schedule work so that Larimer Avenue will have street lighting when road is open to traffic.

3.3 FIELD QUALITY CONTROL

- A. Conduits. Test per PDT 910.3(g), 9th paragraph, as applicable.
- B. Distribution Conductors, 600 Volt Class. After wiring is completed and prior to placing systems in service and before any branch circuit breakers are closed, make insulation resistance tests on circuits.
 - 1. Measure the insulation resistance between conductors and between each conductor and ground.
 - 2. Measure at an applied potential of 1000 volts DC.
 - 3. Take readings after applying the voltage for a minimum of one minute.
- C. Ground
 - 1. Test the grounds to determine their resistance.
 - 2. Site Lighting. The resistance between any point on the ground grid and earth shall not exceed 5.0 ohms when tested by the fall-of-potential method, or by a type CVM megger ground tester.
 - a. If ground resistance of 5.0 ohms or less cannot be obtained with the grounding as indicated, install additional ground rods until the specified resistance to ground has been obtained.
- D. Panelboard
 - 1. Perform tests and inspections.

2. Tests and Inspections:

- a. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- b. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3. Panelboards will be considered defective if they do not pass tests and inspections.

- E. Lighting System. Conduct energization and operations test per PDT 910.3 (u), paragraphs 4-7 and Paragraph 1.6F in this Section.
- F. Test Reports: Record test values and results on forms acceptable to Engineer.
- G. Correct defective equipment, components, accessories disclosed as the result of field tests at no cost to Owner.
- H. Test each receptacle device for proper polarity and grounding.

3.4 REPAIR AND CLEANING

- A. Clean and repair damage in accordance with PDT 910.3(b), 3(c), 3(d), 3(g) and 3(p), and with manufacturer's recommendations. Remove and replace electrical equipment, components, accessories damaged, faulty, or requiring repairs. Touch-up of panelboards and similar equipment which are scratched or defaced during construction with enameled or lacquered finish by manufacturer, and refinish and restore to the original finish. Satisfactorily repair field damage to other finishes per manufacturers recommendations.

3.5 RECORD DRAWINGS

- A. A set of detailed working Drawings shall be kept up to date with the Project indicating actual placement of lighting fixtures, conduit, panelboards, etc.
- B. An "As Built" set of Drawings must be completed and delivered at final inspection including typewritten circuit directories for each panelboard as modified.

3.6 OPERATION AND MAINTENANCE MANUAL

- A. Operation and Maintenance Manual shall be delivered at final inspection and must include as a minimum:

Table of Contents

Approved brochures or catalog cuts indicating equipment used in the Project for:

Liberty Green

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- Luminaires and lamps.
- Panelboards.
- Control system.
- Cable.
- Conduit.

In addition to catalog cuts or brochures, any specific operation, installation, and maintenance manuals are to be included.

END OF SECTION 265600

DIVISION 31

SECTION 31 05 16 – AGGREGATES FOR EARTHWORK

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, equipment and appurtenances and materials necessary for the provision and installation of site aggregate in accordance with the Contract Specifications and Drawings or as directed by the Owner/Owner's Representative.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 31 23 17 – Trenching
- C. Section 31 25 00 – Erosion Controls
- D. Section 31 37 00 – Rip Rap
- E. Section 33 30 00 – Sanitary Sewerage Utilities
- F. Section 33 41 00 – Storm Utility Drainage Piping

1.3 QUALITY ASSURANCE

- A. Aggregate utilized for site work shall be clean material with no debris, trash, soil, or other foreign material, and shall meet the applicable specifications of the City of Pittsburgh to the satisfaction of the ENGINEER and the City of Pittsburgh engineer.
- B. Aggregate must be supplied by a source listed in PennDOT Bulletin 14.

1.4 SUBMITTALS

- A. The Contractor must submit sources of supply for aggregates.

1.5 REFERENCES

- A. Pennsylvania Department of Transportation (PennDOT) Publication 408, Specifications, latest edition and subsequent supplements.
- B. PennDOT Publication 34 – Aggregate Producers: Bulletin 14, latest edition.
- C. Final Approved Erosion and Sediment Pollution Control Drawings and Narrative.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate as specified in the Pennsylvania Department of Transportation Publication 408, Section 703.

PART 3 – EXECUTION

3.1 PLACEMENT

- A. Compaction for earth fills not supporting structures and greater than three feet below finished grade shall be a minimum of 60% relative density. Granular soils should be placed in loose lift thickness not exceeding 8 inches and compacted with a vibratory roller. The limits for determining relative density of granular soils shall be determined according to ASTM Test Designations D4253 and D4254.
- B. Place and compact pipe bedding in accordance with City of Pittsburgh and pipe manufacturer requirements.
- C. Install rock construction entrances as directed in the approved erosion control narrative.
- D. Place riprap in accordance with Section 31 37 00 – Riprap.

END OF SECTION

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Removing existing trees, shrubs, groundcovers, plants, and grass. Transport street trees to DPW facility in Highland Park.
 - 2. Clearing and grubbing.
 - 3. Stripping and stockpiling topsoil.
 - 4. Removing above- and below-grade site improvements.
 - 5. Disconnecting, capping or sealing, four sewer laterals in Station Street.
 - 6. Temporary erosion and sedimentation control measures.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities and temporary erosion and sedimentation control procedures.
 - 2. Division 01 Section "Execution" for verifying utility locations and for recording field measurements.
 - 3. Division 31 Section "Earth Moving" for soil materials, excavating, backfilling, and site grading.
 - 4. Division 32 Section "Turf and Grasses" for finish grading including preparing and placing planting soil mixes and testing of topsoil material.
 - 5. Division 32 Section "Planting" for finish grading including preparing and placing planting soil mixes and testing of topsoil material.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

1.4 MATERIAL OWNERSHIP

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

1.5 SUBMITTALS

- A. Record drawings, according to Division 01 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - EXECUTION

2.1 PREPARATION

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

2.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according sediment and erosion control Drawings.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

2.3 UTILITIES

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
 - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
 - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- D. Excavate for and remove underground utilities indicated to be removed.

2.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

2.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.

- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Limit height of topsoil stockpiles to 72 inches (1800 mm).
 - 2. Do not stockpile topsoil within tree protection zones.
 - 3. Dispose of excess topsoil as specified for waste material disposal.
 - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

2.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

2.7 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
 - 1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Drainage course for slabs-on-grade.
 - 4. Subbase course for concrete walks and pavements.
 - 5. Subbase and base course for asphalt paving.
 - 6. Excavating and backfilling for utility trenches.
 - 7. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
 - 2. Division 03 Section "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
 - 3. Divisions 21, 22, 23, 26, 27, and 28 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
 - 4. Division 31 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
 - 5. Division 32 Section "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.
 - 6. Division 32 Section "Planting" for planting bed establishment and tree and shrub pit excavation and planting.

1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Construction Manager. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
 - 2. Bulk Excavation: Excavation more than 10 feet (3 m) in width and more than 30 feet (9 m) in length.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Construction Manager. Unauthorized excavation, as well as remedial work directed by Construction Manager, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. (0.76 cu. m) for bulk excavation or 3/4 cu. yd. (0.57 cu. m) for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- (1065-mm-) wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp (103-kW) flywheel power with bucket-curling force of not less than 28,090 lbf (125 kN) and stick-crowd force of not less than 18,650 lbf (83 kN); measured according to SAE J-1179.
 - 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp (157-kW) flywheel power and developing a minimum of 48,510-lbf (216-kN) breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- K. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of plastic warning tape.
 - 2. Geotextile.
- B. Samples: 12-by-12-inch Sample of separation geotextile.

1.5 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Construction Manager and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Construction Manager's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide approved borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Provide soil free of debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups, including man-made fills, trash, refuse, backfills from previous construction, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.
- J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile (Stormwater Basins): Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with Class 1, PADOT Form 408 Section 735.
- B. Separation Geotextile (Safety Surface): Woven or non-woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with Class 4, Type A PADOT Form 408, Section 735.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR WALKS AND PAVEMENTS

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

3.4 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: As indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches (150 mm) in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.

3. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches (100 mm) deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
 1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.5 SUBGRADE INSPECTION

- A. Notify Construction Manager when excavations have reached required subgrade.
- B. If Construction Manager determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Construction Manager, and replace with compacted backfill or fill as directed.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Construction Manager, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION

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

3.7 STORAGE OF SOIL MATERIALS

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

2. Install erosion control device around soil piles.

3.8 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for Record Documents.
 3. Testing and inspecting underground utilities.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring and bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.9 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."
- D. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.
- E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the utility pipe or conduit.
- G. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- H. Place and compact final backfill of satisfactory soil to final subgrade elevation.

- I. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.
- J. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.11 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
 - 2. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 - 3. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.

3.14 SUBBASE AND BASE COURSES

- A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
 - 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place base course material over subbase course under hot-mix asphalt pavement.
 - 3. Shape subbase and base course to required crown elevations and cross-slope grades.
 - 4. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
 - 5. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 6. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
- C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.15 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.16 PROTECTION

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

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
- B. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property, located near the intersection of Butler Street and 62nd Street in the Lawrenceville neighborhood of Pittsburgh. Stockpile or spread soil as directed by Construction Manager.
 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 312000

DIVISION 31

SECTION 31 23 17 – TRENCHING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, equipment and appurtenances and materials necessary for the excavation of trenches; including but not limited to the installation of water, sewer, stormwater, electric (temporary or permanent) lines and other appurtenances in accordance with the Contract Specifications and Drawings or as directed by the Owner/Owner's Representative.

1.2 RELATED SECTIONS

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 31 05 16 – Aggregates for Earthwork
- C. Section 31 23 19 – Dewatering
- D. Section 31 23 20 – Sheet piling, Bracing, and Shoring
- E. Section 31 25 00 – Erosion and Sediment Controls
- F. Section 33 11 13 – Public Water Utility Distribution Piping
- G. Section 33 30 00 – Sanitary Sewerage Utilities
- H. Section 33 41 00 – Storm Utility Drainage Piping

1.3 SUBMITTALS

- A. The contractor must submit the sources of supply for backfill materials.

1.4 REFERENCES

- A. Pennsylvania Department of Transportation (PennDOT) Publication 408, latest edition and subsequent supplements.
- B. Final Approved Erosion and Sediment Control Plans and Narrative.
- C. ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
- D. AASHTO T191 – Standard Method of Test for Density of Soil In-Place by the Sand-Cone Method.
- E. AASHTO T310 – Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- F. City of Pittsburgh Standards for Materials – Construction.

1.5 REGULATORY REQUIREMENTS

- A. In open trenching or boring on State and/or Local highways, the Contractor shall be governed by the conditions, restrictions, and regulations made by PennDOT and/or the City of Pittsburgh. Any such regulations shall be considered part of these Specifications.
- B. The Contractor shall be responsible at all times for carrying out excavation operations in a safe and prudent manner to protect all workmen and the public from unreasonable hazard. The necessary sheeting and bracing should be determined in accordance with the field conditions encountered. Applicable OSHA requirements must be strictly adhered to.

1.6 EXCAVATION

- A. Excavation shall be unclassified unless otherwise specified.
- B. In instances when rock excavation is classified, payment shall be as indicated in the Contract and on the construction plans.

1.7 BLASTING

- A. Blasting is not permitted.

1.8 WORK DURING INCLEMENT WEATHER

- A. The OWNER reserves the right to order cessation of work during inclement weather, if, in the opinion of the OWNER, the safety of the workman is endangered or if the quality of the work may be affected.

1.9 ACCESS AND INSPECTION

- A. Work in this section is subject to Inspection by the OWNER or its representative and shall have full access to the project for the same.

PART 2 – PRODUCTS

2.1 BACKFILL MATERIALS

- A. Type I: Granular materials meeting the specifications of PennDOT Publication 408, Section 703.3.
- B. Type II: Material such as sand, quarry waste, and screenings all with no gradation larger than one (1) inch.
- C. Type III: Suitable excavated material free of debris, organic material, and rock larger than three (3) inches.
- D. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, frozen soil, slag, or other unsuitable material. When the type of backfill material is not indicated on the plans or is not specified, the excavated material may be used, provided that this material consists of loam, clay, sand, gravel, or other suitable materials.

2.2 CONCRETE BACKFILL

- A. Where applicable as backfill, concrete shall meet the requirements of Section 03 30 00: Cast-in-Place Concrete and PennDOT Publication 408 for Modified Class C (2500 PSI/28 Days).

PART 3 – EXECUTION

3.1 EXAMINATION

- A. The Contractor's attention is directed to his responsibilities in accordance with Act 287 of 1974, as amended by Act 181 of 2008. Any underground utility lines, not limited to those shown on the construction drawings, should be located prior to beginning earth disturbance activities on this site.
- B. Maintain and protect existing utilities to remain that pass through the work area.
- C. Before starting any earthwork activity under this Section, the Contractor shall insure that all Erosion and Sediment Controls are in place.
- D. Verify backfill materials to be used are acceptable.
- E. Verify that survey benchmarks and intended elevations for Work are as shown on the Drawings.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Protect plant life and other natural features to remain as part of the post-construction site.
- C. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.
- D. In the event of property damage, immediately make repairs and replacements as approved by the possessing party and at no additional cost to the OWNER.
- E. Pavement and road surfaces shall be removed as part of the trench excavation. The amount removed shall depend on the width of trench required for the installation of the pipe and the dimensions of the area into which valves, hydrants, specials, manholes, or other structures will be installed. The dimensions of pavement removed shall not exceed the dimensions of the opening required for installation of pipe, valves, hydrants, specials, manholes, and other structures by more than six inches in any direction, unless otherwise stipulated in the specifications. Saw cutting shall be used to ensure the breakage of pavement along neat straight lines.

3.3 EXCAVATION

- A. Where trenching occurs through bituminous or concrete pavement, the edge(s) shall first be cut through full depth to avoid impacting the remaining edge(s) during excavation.
- B. The trench shall be excavated to the required alignment, depth, and width specified or shown on the plans, profiles, and details. The bottom of the trench must be graded to a line so that the pipe as nearly as possible will have a bearing for its full length. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.
- C. If rock or concrete is encountered in the excavation, the trench must be excavated to a depth of not less than 9" below the intended bottom of trench and filled back with well-compacted PennDOT No. 2A aggregate to the originally intended bottom of trench. It is the intention that there shall be at least 9" of PennDOT No. 2A aggregate between the bottom or sides of the pipe bedding and any rock. Removed rock or concrete may be used as a part of the upper backfill materials provided that it meets the backfill criteria.

1. These clearances and bedding procedures shall also be observed for pieces of concrete or masonry and other debris or subterranean structures, such as masonry walls, piers, or foundations that may be encountered during excavation.
 2. This installation procedure shall be followed when gravel formations containing loose cobbles or boulders greater than approximately eight (8) inches in diameter are encountered.
 3. In all cases, the specified clearances shall be maintained between the pipe and appurtenances and any part, projection, or point of rock, boulder, or stone of sufficient size and placement that could cause a fulcrum point or point load.
- D. If the trench passes over a previous excavation, such as a sewer, the trench bottom shall be sufficiently compacted to provide support equal to that of the native soil or conform to other regulatory requirements in a manner that will prevent damage to the existing installation.
- E. Temporary support, adequate protection, and maintenance of all underground and surface structures, drains, sewers, and other obstructions encountered during the work shall be provided in accordance with specifications or applicable regulations.
- F. Surface material removed by excavating within paved areas may be kept separate for use in resurfacing, where of sufficient value. If an additional surfacing material is needed in restoring any paved area, the same shall be furnished by and at the expense of the Contractor. The finished surface of any paved area that has been disturbed shall be left in a condition that is substantially equal or the same as it was prior to the making of any excavation.
- G. Where pipe is installed in private right of way, the Contractor will confine his operations to the temporary construction easements as depicted on the contract drawings.
- H. Excavated material shall be placed in a manner that will not obstruct the work nor endanger the workers or the public, or obstruct sidewalks, driveways, roadways, or other structures. Where necessary to bridge over and street intersection or driveways, to permit uninterrupted use, such bridging shall be furnished by and at the expense of the Contractor.
- I. During the entire completion of the work, the Contractor will be responsible for all open excavations and shall maintain required traffic control as specified under the permit conditions. As a further means of protection, the Contractor shall display warning and danger signs on all open excavations or other locations where there is a chance of injury to the public. The Contractor shall assume full responsibility for any damage to persons or property which may be occasioned by or result from the performance of the work from the date of the contract until final payment for the work is made, and shall carry adequate insurance against such risk.
- J. Excavate subsoil required for conduits, sewer piping, manholes, inlets, and other appurtenances. Allow for six (6) inches (minimum) bedding/support depth or the minimum depth as specified on the construction details. Use laser or other ENGINEER-approved method to maintain the grade specified.
- K. Excavation shall not interfere with normal forty-five (45) degree bearing splay of foundations.
- L. Correct unauthorized excavation at no cost to Owner.

1. Unforeseen conditions encountered, such as sinkholes, shall be stabilized at a negotiated price.
- M. Correct areas over-excavated by error by backfilling with satisfactorily compacted Type I or Type II material, at no additional expense to the Owner.
- N. The Contractor shall dewater trenches to provide a dry trench bottom prior to any installations. Trench water shall be discharged by through an approved pumped water filter bag to natural drainage channels, storm drains, or other points in accordance with the approved Erosion & Sediment Pollution Control plan. Discharges from trench dewatering pumps shall be directed away from the trench to prevent trench instability. Where pumping is required, the Contractor shall provide sufficient pump capacity to maintain the trench bottom in a dry condition.
- O. Remove excess material not being used to an approved on-site waste area or legally dispose of at the Contractor's expense.
- P. Holes for the bells shall be provided at each joint, and they shall be no larger than necessary to allow joint assembly and to ensure that the pipe barrel will lie flat on the trench bottom. The dimensions of bell-hole depressions for push-on type joints should be large enough to ensure that the pipe is not resting on the bells and is supported by the full length of the pipe barrel. Bell holes must be excavated of such width and length and depth as will permit the joints to be properly yarned and poured or caulked or jacked into place.
- Q. Other than noted previously, the trench bottom shall be true and even to provide support for the full length of the pipe barrel. A slight depression may be provided to allow withdrawal of pipe slings or other lifting tackle without damaging coating or polyethylene encasement.
- R. When the material is found to include ashes, cinders, refuse, organic material, or other unsuitable material, this material shall be removed to a minimum of at least six (6) inches below the bottom of the pipe or to the depth required by the specifications. The removed material shall be replaced with clean, stable backfill material. Each of these unsuitable areas shall be immediately reported to the engineer to determine if any additional measures shall be incorporated.
- S. When the bottom of the trench consists of material that is unstable to such a degree that its removal is impractical, a foundation for the pipe or appurtenances shall be constructed using piling, treated timber, concrete, or other materials, in accordance with the specifications and with the approval of the engineer.

3.4 BEDDING

- A. For utilities, place pipe bedding in accordance with the individual utility companies specifications and as per the construction drawings. The Contractor shall coordinate with the utility companies as to the applicable installations.

3.5 BACKFILLING

- A. Backfill trenches to contours and elevations with unfrozen materials of the Specified type.
- B. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Employ a placement method that does not disturb or damage pipe in trench.
- D. Backfill ABOVE twelve (12) inches over Pipe: Place and compact materials in continuous layers not exceeding 8 inches in compacted depth using standard compaction equipment. No Hydra-Hammers shall be used until a minimum of two (2) feet above the top of pipe is reached.
 - 1. PennDOT roads and improved shoulders - Type I
 - 2. City roads, unimproved PennDOT areas, Commercial and Private areas - Type III if available, if not, use Type I.
- E. Refer to Sub-Part 2.1 for material specifications.
- F. Maintain optimum moisture content of backfill materials to attain required compaction density.
- G. Remove surplus backfill materials from site as directed by the Engineer, if applicable.

3.7 TOLERANCES

- A. Top Surface of Backfilling: For under paved areas, plus or minus one-half (1/2) inch from required elevation for aggregate base.
- B. Top Surface of General Backfilling: Plus or minus one (1) inch from required elevations.

3.8 FIELD QUALITY CONTROL

- A. Compaction testing and analysis of fill material will be performed in accordance with ANSI/ASTM D698. Refer to PennDOT Publication 408, Section 206.3.b. for a complete list of specifications and as modified here-in.
 - 1. Compaction Requirements:
 - a. Compact soil more than 1 foot above pipe for full width to 100% of the required dry mass (dry weight) density, ASTM D698.
 - b. In-place density will be determined according to AASHTO T191 or AASHTO T310.
 - c. Maintain material to within $\pm 3\%$ of optimum moisture content at the time of compaction.
- B. Visual inspection of non-movement under compaction equipment may be used where material is too coarse for testing.
- C. The use of HYDRA-HAMMER for compacting backfill in trenches is prohibited until a minimum of 2 feet of cover over the top of pipe is completed by other equipment.

- D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to the OWNER.
- E. Frequency of Tests: Maximum of Every eight (8) Inches

END OF SECTION

DIVISION 31

SECTION 31 23 19 – DEWATERING

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. The Contractor shall furnish all labor, equipment and appurtenances, and materials necessary for the satisfactory dewatering of excavations and other work areas specified in the Contract Drawings or in the Erosion and Sedimentation Control Plan, where necessary, or as directed by the Engineer.
- B. The Work covered by this Section includes dewatering of excavations, trenches, sumps, and any other areas where water has collected and must be removed before the Work can progress.

1.2 RELATED SECTIONS

- A. Section 31 23 17 – Trenching
- B. Section 31 25 00 – Erosion and Sediment Controls
- C. Section 31 25 14 – Geotextiles

1.3 REFERENCES

- A. Final Approved Erosion and Sediment Control Plans and Narrative.
- B. Pennsylvania Department of Transportation (PennDOT) Publication 408, Specifications, latest edition and subsequent supplements.
- C. Pennsylvania Department of Environmental Protection (PaDEP), *Erosion and Sediment Pollution Program Control Manual* (dated March 2012) and the PaDEP Chapter 102 Rules and Regulations.

1.4 REGULATORY REQUIREMENTS

- A. The Contractor is required to comply with all rules and regulations stipulated under the Erosion and Sedimentation Control Plan and/or applicable PaDEP permits, rules, and regulations for the project. The Contractor shall be responsible for all violations, fines, remediation, etc. imposed by local, state and/or federal agencies responsible for the monitoring, inspection, and enforcement of the permits issued for the site construction.
- B. Contractor is required to discharge into erosion and sedimentation control facilities such as a pumped water filter bag in accordance with the NPDES Permit.

1.5 RELATED DOCUMENTS

- A. All construction drawings, details, and Erosion and Sediment Control Plans and Narrative Report are to be considered as part of this contract.
- B. Unless modified herein, conform to the Pennsylvania Department of Transportation (PENNDOT) Publication 408, Section 204.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.1 CONSTRUCTION METHODS

- A. The Contractor shall keep excavations and other work areas free from running or standing water, at his/her own expense, while installation and construction Work is in progress. The Contractor shall build dams, cofferdams, sheet pile walls, sediment removal devices and other items necessary for dewatering the Work area(s), including but not limited to lowering the water table below the bottom of excavations by well points pumping and/or operating pumps of sufficient capacity.
- B. Unless otherwise specified, dewater all excavations prior to placing concrete. Remove water that has accumulated in the excavation after final inspection and prior to concrete placement, using approved methods.
- C. The Contractor shall provide for the disposal of the water removed from excavations and other work areas **in an approved manner**. The disposal shall neither be a detriment to public health, public or private properties, or work completed or in progress, nor produce any impediment or contamination to roadways, watercourses, wetlands, and storm and sanitary sewers. Water pumped from excavation areas, trenches, erosion and sedimentation controls, and other work areas shall be filtered, pumped, and conveyed to the proper discharge locations approved by the Engineer and permitted by regulating authorities.
- D. In no case shall pumping occur without implementation of Erosion and Sediment Controls.

END OF SECTION

DIVISION 31

SECTION 31 25 00 - EROSION AND SEDIMENT CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Erosion and Sediment Controls: The Contractor shall furnish all labor, equipment and appurtenances, and materials necessary for the implementation, construction, and maintenance of proposed erosion and sedimentation control measures as shown on the Contract Drawings or in the Erosion and Sedimentation Control Narrative and Drawings, or as directed by the Owner/Owner's Representative.

1.2 RELATED SECTIONS

- A. Section 31 05 16 – Aggregates for Earthwork
- B. Section 31 10 00 – Site Clearing
- C. Section 31 22 00 – Grading
- D. Section 31 23 17 – Trenching
- E. Section 31 23 19 – Dewatering
- F. Section 31 25 14 – Geotextiles
- G. Section 31 37 00 – Rip Rap
- H. Section 32 92 19 – Seeding and Soils Supplements

1.3 REFERENCE DOCUMENTS

- A. All construction drawings, details, and Erosion and Sediment Control Plans and Narrative are to be considered as part of this contract.
- B. Unless modified herein, conform to the Pennsylvania Department of Transportation (PENNDOT) Publication 408, Section 806.
- C. Pennsylvania Department of Environmental Protection (PaDEP), *Erosion and Sediment Pollution Control Program Manual* (dated 2012) and the PaDEP Chapter 102 rules and regulations.
- D. Approved NPDES Permit, Act 2 Clean Up Plan and other permits as applicable.

1.4 DESCRIPTION OF WORK

- A. Erosion and sediment control measures shall be as indicated on the Drawings and shall satisfy the requirements of the PaDEP and Allegheny County Conservation District.
- B. The Contractor is required to comply with any rules and regulations stipulated under the Erosion and Sediment Control Plan approved for the Project. The Contractor shall be responsible for any violations, fines, remediations, etc. imposed by local, state and/or federal agencies responsible for the monitoring, inspection and enforcement of the permits issued for construction of the project Site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products and materials shall comply with the Drawings, the requirements of the PaDEP *Erosion and Sediment Pollution Control Program Manual* (dated 2012), and the Erosion and Sediment Control Plan approved for the project.

PART 3 - EXECUTION

3.1 PREPARATION

- A. The Contractor shall take all necessary precautions to prevent the silting of wetlands, rivers, streams, creeks, or water impoundments during construction of the Project Site and during periods when the work may be temporarily suspended.
- B. Modifications to the Erosion and Sediment Control Plan to facilitate the Contractor's scheduling of the proposed Work may entail additional or modified erosion and sedimentation control measures. The required modifications shall be done by the Contractor at no additional cost to the Owner.
 - 1. Any modification to the Erosion and Sediment Control Plan must be approved by the Allegheny County Conservation District and/or the PaDEP.
- C. The Contractor shall prepare an erosion and sedimentation control plan for proposed laydown and staging areas not shown on the Drawings. The erosion and sediment control plan shall be submitted to the Allegheny County Conservation District and/or the PaDEP for review and approval. Erosion and sediment controls shall be installed in laydown and staging areas before any equipment or materials are placed in these areas.
- D. The Contractor shall be responsible for preparing an erosion and sediment control plan and obtaining necessary permits and approvals for any borrow sources of fill or topsoil materials used to construct the Project Site (if applicable). The Contractor shall submit copies of the permits or approval letters for the borrow site to the Owner's Representative, prior to importing any borrow materials to the Owner's Site.

3.2 CONSTRUCTION SEQUENCE

- A. The construction sequence, as detailed in the Erosion and Sediment Control Narrative and Drawings, shall be implemented for the site construction activities. This sequence is not intended as an all-inclusive description of the tasks; however key installation features are sequenced according to PaDEP best management practices (BMPs).

3.3 MAINTENANCE

- A. The Contractor shall inspect and maintain the erosion and sedimentation control measures weekly and after every rainfall event. Cost of this maintenance is the Contractor's responsibility.
- B. At the discretion of the PaDEP or the Allegheny County Conservation District, any erosion and sediment control measures that have not been maintained by the Contractor may be repaired by PaDEP. All costs for these emergency

repairs will be billed to the Contractor. The Contractor is normally forewarned of these deficiencies by the agencies.

- C. Erosion and sediment controls shall be inspected by the Contractor or his/her representative a minimum of weekly and within 24 hours of any runoff event. Cost of this maintenance is the Contractor's responsibility.
- D. Any damaged controls shall be repaired or replaced immediately.
- E. The Contractor shall perform maintenance on the individual BMP's as specified in the Erosion and Sediment Pollution Control Report and Drawings.
- F. The Contractor shall maintain a copy of the approved Erosion and Sediment Control Narrative and Drawings, applicable permits, and records of all inspections. A legible copy of these documents must be kept on Site.
- G. Upon vegetative stabilization of the site, the contractor shall remove temporary structural BMPs (e.g. filter fabric fence) and dispose of the BMPs at an approved disposal site.

3.4 PROTECTION

- A. The Contractor shall maintain erosion and sediment control measures throughout the life of the Contract.

END OF SECTION

DIVISION 31

SECTION 31 25 14 – GEOTEXTILES

PART – 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, equipment and appurtenances, and materials necessary for the installation of Geotextiles in the completion of the Site Work in accordance with the Contract Specifications and Drawings or as directed by the Owner/Owner's Representative.

1.2 RELATED SECTIONS

- A. Section 31 23 19 - Dewatering
- B. Section 31 25 00 – Erosion Controls
- C. Section 31 37 00 – Rip Rap

1.3 REFERENCES

- A. Final Approved Erosion and Sediment Pollution Control Drawings and Narrative
- B. Pennsylvania Department of Transportation (PennDOT) Publication 408, Specifications, latest edition and subsequent supplements.
- C. Pennsylvania Department of Environmental Protection (PaDEP), *Erosion and Sediment Pollution Control Program Manual* (dated 2012) and the PaDEP Chapter 102 rules and regulations.

1.4 REGULATORY REQUIREMENTS

- A. Except as modified herein, the Work shall conform to the applicable portions of PennDOT Publication 408, Section 735.

PART – 2 PRODUCTS

2.1 MATERIALS

- A. Unless as modified herein, materials shall be as specified in the PennDOT Publication 408, Section 735. Geotextile class shall be as required by PennDOT Publication 408, Section 735, Table A, and the Contract Drawings. Liner to be Class 4 Nonwoven geotextile.

PART – 3 EXECUTION

3.1 CONSTRUCTION

- A. Install as per Manufacturer's specifications.

END OF SECTION

DIVISION 31

SECTION 31 25 15 – Linear Low Density Polyethylene (LLDPE) Liner

PART – 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, equipment and appurtenances, and materials necessary for the installation of **Linear Low Density Polyethylene (LLDPE) Liner** in the completion of the Site Work in accordance with the Contract Specifications and Drawings or as directed by the Owner/Owner's Representative.

1.2 RELATED SECTIONS

- A. Section 33 44 20 - Dewatering
- B. Section 33 44 21 – Erosion Controls
- C. Section 31 25 14 – Geotextile

1.3 REFERENCES

- A. Final Approved Drawings and Narrative
- B. Pennsylvania Department of Transportation (PennDOT) Publication 408, Specifications, latest edition and subsequent supplements.
- C. Pennsylvania Department of Environmental Protection (PaDEP), *Erosion and Sediment Pollution Control Program Manual* (dated 2012) and the PaDEP Chapter 102 rules and regulations.

1.4 REGULATORY REQUIREMENTS

- A. Except as modified herein, the Work shall conform to the applicable portions of PennDOT Publication 408, Section 735.

PART – 2 PRODUCTS

2.1 MATERIALS

- A. Rufco 3010B by Frank Roberts & Sons Inc. (814-938-5000) or Approved Equal,
Thickness: 30 Mil
Weight: 142 lbs/MSF
Tensile Strength: 114lbf/in
Elongation at Break: 800%
Tear Resistance: 16 lbf

Mullen Burst: 170 psi

Puncture resistance: 45 lbf

Volatile Loss: < 1%

Dimensional Stability <2%

Maximum Use Temperature: 180 degrees F

Minimum Use Temperature: -70 degrees F

Perms: 0.031 Perms

Bonded Seam Strength: 74 lbf/in

Seam Peel Adhesion: 52 lbf/in

PART – 3 EXECUTION

3.1 CONSTRUCTION

- A. Install as per Manufacturer's specifications.
- B. Install PENNDOT Class 4 nonwoven geotextile on both sides of liner to reduce tearing.

END OF SECTION

DIVISION 31

SECTION 31 37 00 – RIPRAP

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, equipment and appurtenances, and materials necessary for the provision and installation of rock rip-rap, in accordance with the Contract Specifications and Drawings or as directed by the Owner/Owner's Representative.

1.2 RELATED SECTIONS

- A. Section 31 05 16 – Aggregates for Earthwork
- B. Section 31 25 00 – Erosion and Sediment Controls
- C. Section 31 25 14 – Geotextiles

1.3 REFERENCES

- A. Pennsylvania Department of Transportation (PennDOT), latest edition, and subsequent supplements.
- B. Approved Erosion and Sediment Control Plan and Narrative.
- C. Pennsylvania Department of Environmental Protection (PaDEP), *Erosion and Sediment Pollution Control Program Manual* (dated 2012) and the PaDEP Chapter 102 rules and regulations.

1.4 REGULATORY REQUIREMENTS

- A. Unless modified herein, conform to the Pennsylvania Department of Transportation (PennDOT) Publication 408, section 850.
- B. Erosion and Sediment Control Plan and Narrative.
- C. Pennsylvania Department of Environmental Protection (PaDEP), *Erosion and Sediment Pollution Control Program Manual* (dated March 2012) and the PaDEP Chapter 102 rules and regulations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Rock: As specified in the PennDOT Publication 408, Section 850.2, and the Construction Drawings.
- B. Geotextile Fabric: Non-biodegradable as specified in PennDOT Publication 408, Section 735, and as indicated in the Construction Drawings.

PART 3 – EXECUTION

3.1 PLACEMENT

- A. As specified in the Pennsylvania Department of Transportation (PennDOT) Publication 408, Section 850.3, Approved Erosion and Sediment Control Plan, and the Construction Drawings.

END OF SECTION

SECTION 316000

STRUCTURAL SOILS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural Soil.

- B. Structural Soil shall be defined as "CU-Structural Soil" by AMEREQ, Inc., (800) 832-8788, or soil conforming with US Patent #5,849,069, or approved equal.

1.2 REFERENCES AND STANDARDS

A. The following references are used herein and shall mean:

1. ASTM: American Society of Testing Materials.
2. USDA: United States Department of Agriculture.
3. ASHTO: American Association of State Highway and Transportation Officials.
4. Standard Specifications: Regional or Municipal Standard Specifications
5. Documentation for location of proposed usage.
6. AOAC: Association of Official Agricultural Chemists.

1.3 SAMPLES AND SUBMITTALS

- A. At least 30 days prior to ordering materials, the Contractor shall submit to the Construction Manager samples, certificates, manufacturer's literature and certified tests for materials specified below. No materials shall be ordered until the required samples, certificates, manufacturer's literature and test results have been reviewed and approved by the Construction Manager. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Construction Manager reserves the right to reject, on or after delivery, any material that does not meet these specifications.
- B. Submit two - one half cubic foot representative samples of Clay Loam and two - two cubic foot representative samples Structural Soil mixes in this section for testing, analysis and approval. Submit one set of samples for every 500 CY of material to be delivered. In the event of multiple source fields for Clay Loam, submit a minimum of one set of samples per source field or stockpile. Samples shall be taken randomly throughout the field or stockpile at locations as directed by the Construction Manager and packaged in the presence of the Construction Manager. Contractor shall deliver all samples to testing laboratories and shall have the test results sent directly to the Construction Manager. Samples shall be labeled to include the location of the source of the material, the date of the sample and the Contractors name. One of the two samples is to be used

by the testing laboratory for testing purposes. The second sample of all Clay Loam and Structural Soil shall be submitted to the Construction Manager at the same time as test analysis as a record of the soil color and texture.

1. Submit the locations of all source fields for Clay Loam.
 2. Submit a list of all chemicals and herbicides applied to the Clay Loam for the last five years and a list of all crops grown in the Clay Loam source fields for the last three years.
- C. Submit soil test analysis reports for each sample of Clay Loam and Structural Soil from an approved soil-testing laboratory. The test results shall report the following:
1. The soil testing laboratory shall be approved by the Construction Manager. The testing laboratory for particle size and chemical analysis may be a public agricultural extension service agency or agricultural experiment station.
 2. Submit a bulk density of the sample and particle size analysis using ASTM D6913 and D7928.
 3. Submit a chemical analysis, performed in accordance with current AOAC Standards, including the following:
 - a. pH and Buffer pH.
 - b. Percent organic matter as determined by the loss of ignition of oven dried samples. Test samples shall be oven dried to a constant weight at a temperature of 230 degrees F, plus or minus 9 degrees.
 - c. Analysis for nutrient levels by parts per million including nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, magnesium, manganese, iron, zinc, calcium and extractable aluminum. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil as calculated by the amount of material to be added per volume of soil for the type of plants to be grown in the soil.
 - d. Analysis for levels of toxic elements and compounds including arsenic, boron, cadmium, chromium, copper, lead mercury, molybdenum, nickel, and zinc. Test results shall be cited in milligrams per kilogram.
 - e. Soluble salt by electrical conductivity of a 1:2 soil/water sample measured in Millimho per cm.
 - f. Cation Exchange Capacity (CEC).
 - g. Carbon/Nitrogen Ratio.
 4. Submit 5-point minimum moisture density curve AASHTO T 99 test results for each Structural Soil sample without removing oversized aggregate.
 5. Submit measured dry-weight percentage of stone in the mixture.
 6. The approved Structural soil samples shall be the standard for each lot of 500 cubic yards of material.
 7. All testing and analysis shall be at the expense of the Contractor.
- D. Maintenance Instructions: Prior to the time of Final Acceptance of the Work, submit maintenance instructions for the use, removal and replacement of Structural Soil for the licensor's (Amereq Corp.) use. The instructions shall be reviewed by the Construction Manager as a pre-condition for Final Acceptance of the Work.
- E. Submit to the Construction Manager for review a proposed plan and vertical section layout of all structural soil.

- F. Submit one cubic foot sample per each 500 cubic yards of required material, and for each sample, the following analysis for all Crushed Stone. The soil testing laboratory shall be approved by the Construction Manager.
 - 1. Provide the manufacturers analysis of the following:
 - a. Loose and rodded unit weight.
 - b. Bulk specific gravity and absorbency.
 - c. Stone dimension and surface texture description.
 - d. Documentation of acceptance for use as DOT approved aggregate by NJDOT.
 - 2. Provide a percent pore space analysis defined as follows: $(1\text{-Rodded Unit Weight divided by the Bulk Specific Gravity}) \times 100$
- G. Submit one pound sample of each type of fertilizer and 3 certificates showing composition and analysis. Submit the purchasing receipt for each fertilizer showing the total quantity purchased for the project prior to installation.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver or place soils in frozen, wet, or muddy conditions. Material shall be delivered at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698). Do not deliver or place materials in an excessively moist condition (beyond 2 percent above optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698).
- B. Protect soils and mixes from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior to compaction. If water is introduced into the material after grading, allow material to drain or aerate to optimum compaction moisture content.

1.5 PROJECT CONDITIONS

- A. All areas to receive structural soil shall be inspected by the Contractor before starting work and all defects such as incorrect grading, compaction and inadequate drainage etc. shall be reported to the Construction Manager prior to beginning this work.
- B. The Contractor shall be responsible for judging the full extent of work requirements involved, including but not limited to the potential need for temporary storage and staging of soils, including moving soil stock piles at the site to accommodate scheduling of other work and the need to protect installed soils from compaction, erosion and contamination.
- C. The Contractor shall refer to phasing plans for staging and coordination of work.

PART 2 - PRODUCTS

2.1 CLAY LOAM

- A. Clay Loam shall be a "clay loam" based on the "USDA classification system" as determined by mechanical analysis (ASTM D-6913) and it shall be of uniform composition, without admixture of subsoil. It shall be free of stones greater than one-half inch, lumps, plants and their roots, debris and other extraneous matter over one inch in diameter or excess of smaller pieces of the same materials as determined by the Construction Manager. It shall not contain toxic substances harmful to plant growth. It shall be obtained from naturally well-drained areas, which have never been stripped of topsoil before and have a history of satisfactory vegetative growth. Clay Loam shall contain not less than 2% nor more than 5% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F., plus or minus 9 degrees.

- B. Mechanical analysis for a Loam / Clay Loam shall be as follows:

Textural Class	% of total weight
Gravel	less than 5%
Sand	20 - 45%
Silt	20 - 50%
Clay	20 - 40%

- C. Chemical analysis: Meet or be amended to meet the following criteria.

1. pH between 5.5 to 6.5
2. Percent organic matter 2 -5% by dry weight.
3. Nutrient levels as required by the testing laboratory recommendations for the type of plants to be grown in the soil.
4. Toxic elements and compounds below the United States Environmental Protection Agency Standards for Exceptional Quality sludge or local standard; whichever is more stringent.
5. Soluble salt less than 1.0 Millimho per cm.
6. Cation Exchange Capacity (CEC) greater than 10 7. Carbon/Nitrogen Ratio less than 33:1.

- D. Clay Loam shall be the product of a commercial processing facility specializing in production of stripped natural topsoil. No topsoil shall come from USDA - classified prime farmland.

2.2 FERTILIZER (if needed)

- A. Commercial fertilizer complying with State and United States fertilizer laws. Deliver fertilizer in original unopened containers, which shall bear the manufacturer's certificate of compliance covering analysis, which shall be furnished to the Construction Manager. Fertilizer shall be formulated for mixing into the soil and be certified by the manufacturer to provide controlled release of nitrogen continuously for a period of no less than 9 months and no more than 12 months.

- B. Fertilizer percentages of weight of ingredients and application rates shall be as recommended by the soil testing results.

2.3 SULFUR (if needed)

- A. Sulfur shall be commercial granular, 96% pure sulfur, delivered in containers with the name of the manufacturer, material and analysis appearing in the container.
- B. Sulfur used to lower soil pH above 6.5 shall be ferrous sulfate formulation.

2.4 LIME (if needed)

- A. Agricultural limestone containing a minimum of 85% carbonates. Minimum gradation: 100% passing 10 mesh sieve; 98% passing 20 mesh sieve; 55% passing 60 mesh sieve and 40% passing 100 mesh sieve.

2.5 CRUSHED STONE

- A. Crushed Stone shall be a DOT certified crushed stone. All crushed stone shall be a non-limestone aggregate. The maximum allowable aggregate able to pass the ½ inch sieve is 10 percent. A ratio of nominal maximum to nominal minimum particle size of 2.
- B. Acceptable aggregate dimensions will not exceed 2.5:1.0 for any two dimensions chosen.
- C. Minimum 90 percent with one fractured face, minimum 75 percent with two or more fractured faces.
- D. Results of Aggregate Soundness Loss test shall not exceed 18 percent.
- E. Losses from LA Abrasion tests shall not exceed 40%.

2.6 HYDROGEL

- A. Hydrogel shall be a potassium propenoate-propenamide copolymer Hydrogel manufactured as Gelscape by Amereq Corporation. (800) 832-8788, or approved equal.

2.7 WATER

- A. The Contractor shall be responsible to furnish his own supply of water to the site at no extra cost. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

2.8 STRUCTURAL SOIL

Uniformly blended mixture of Crushed Stone, Clay Loam and Hydrogel, mixed to the following proportion:

MATERIAL	UNIT OF WEIGHT (either metric or English)
Crushed Stone	100
Loam (dry)	(Approx. 20) determined by the test of the mix
Hydrogel	0.03
Total moisture	(AASHTO T-99 optimum moisture)

- A. The initial mix design for testing shall be determined by adjusting the ratio between the Crushed Stone and the Clay loam. Adjust final mix dry weight mixing proportion to decrease soil in mixture if CBR test results fail to meet acceptance (CBR # 50).

PART 3 - EXECUTION

3.1 MIX DESIGN

- A. Prepare sample Structural Soil mixes to determine the ratio of mix components. Submit for approval.
1. Submit samples and the test results of each mix component for approval. Based on samples and the analysis of the mix components, the Construction Manager and the Contractor will jointly determine a mix ratio to be tested for conformance with the requirements of the specifications. For Structural Soil quantities greater than 500 cubic yards, test the mix ratio for each Clay Loam or Crushed Stone where the testing indicates a significant difference in physical analysis of the Clay Loam or Crushed Stone as determined by the Construction Manager.
 2. The Contractor shall prepare the samples of the proposed mix ratio options and obtain soil test as described in paragraph 1.04. C. Submit the samples of each of the mixes with the test results.
 3. The Construction Manager may request additional structural soil mix ratio samples to be tested in the event that further refinement of the mix is necessary.
 4. Submit to the Construction Manager proposed fertility amendment recommendations including amounts and types of fertilizers and pH adjustments for each mix ratio. Fertility adjustments shall be included as part of the mixing process.

3.2 SOIL MIXING AND QUALITY CONTROL TESTING

- A. All Structural Soil mixing shall be performed at the Contractor's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to

assure proper quality control and consistent mix ratios. No mixing of Structural Soil at the project site shall be permitted. Portable pugging may be used.

1. Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry. The contractor shall measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.
 2. A mixing procedure for front-end loader shall be as follows:
 - a. On a flat asphalt or concrete paved surface, spread an 8 inch to 12 inch layer of crushed stone.
 - b. Spread evenly over the stone the specified amount of dry hydrogel.
 - c. Spread over the dry hydrogel and crushed stone a proportional amount of clay loam according to the mix design.
 - d. Blend the entire amount by turning, using a front-end loader or other suitable equipment until a consistent blend is produced.
 - e. Add moisture gradually and evenly during the blending and turning operation as required to achieve the required moisture content. Delay applications of moisture for 10 minutes prior to successive applications. Once established, mixing should produce a material within 1% of the optimum moisture level for compaction.
 3. pugging operation mixing procedure may be as follows:
 - a. Feed a known weight of crushed stone into the mixing trough.
 - b. Add hydrogel as a slurry into trough and mix slurry and stone into a uniform blend.
 - c. Meter in soil in proper proportion of Clay Loam soil while stone-slurry mixture is in motion.
 - d. Add water to bring mixture to target moisture content after factoring in water from the slurry and the Clay Loam moisture.
 - e. Auger out to stock pile or transport vehicle (or into pit if using a portable pugging operation).
 4. Add soil amendments to alter soil fertility including fertilizers and pH adjustment at the time of mixing at the rates recommended by the soil test.
 - a. Soil pH shall be adjusted to fall within a value of 5.5 and 6.5 two months after mixing if the material is stored, unless mixing with a high pH stone. Once pavement is laid, no adjustment should be imposed.
 - b. Soil component Carbon / nitrogen ratio shall be adjusted to be less than 33:1 within two months after mixing.
- B. The Contractor shall mix sufficient material in advance of the time needed at the job site to allow adequate time for final quality control testing as required by the progress of the work. Structural Soil shall be stored in piles of approximately 500 cubic yards and each

pile shall be numbered for identification and quality control purposes. Storage piles shall be protected from rain and erosion by covering with plastic sheeting.

- C. During the mixing process, the Contractor shall take two - one cubic foot quality control samples per 500 cubic yards of production from the final Structural Soil. The samples shall be taken from random locations in the numbered stockpiles as required by paragraph 1.03.B of this specification. Each sample shall be tested for particle size analysis and chemical analysis as described in Paragraph 1.03. C.2 and 3 above. Submit the results directly to the Construction Manager for review and approval.
- D. The quality control sample Clay Loam-Crushed Stone ratio's shall be no greater or less than 2% of the approved test sample as determined by splitting a known weight of oven dried material on a #4 sieve. In the event that the quality control samples vary significantly from the approved Structural soil sample, as determined by the Construction Manager, remix and retest any lot of soil that fails to meet the correct analysis making adjustments to the mixing ratios and procedures to achieve the approved consistency.

3.3 UNDERGROUND UTILITIES AND SUBSURFACE CONDITIONS

- A. Notify the Construction Manager of any subsurface conditions which will affect the Contractor's ability to complete the work.
- B. Locate and confirm the location of all underground utility lines and structures prior to the start of any excavation.
- C. Repair any underground utilities or foundations damaged by the Contractor during the progress of this work. The cost of all repairs shall be at the Contractor's expense.

3.4 SITE PREPARATION

- A. Do not proceed with the installation of the Structural Soil material until all walls, curb footings and utility work in the area have been installed. For site elements dependent on Structural Soil for foundation support, postpone installation until immediately after the installation of Structural Soil.
- B. Install any subsurface drain lines as shown on the Drawings prior to installation of Structural Soil material.
- C. Excavate and compact the proposed sub-grade to depths, slopes and widths as shown on the Drawings. Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not over excavate compacted sub-grades of adjacent pavement or structures.
- D. Confirm that the sub-grade is at the proper elevation and compacted as required. Sub-grade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the drawings.

- E. Clear the excavation of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout silts or other material harmful to plants have been spilled into the sub-grade material, excavate the soil sufficiently to remove the harmful material. Fill any over excavation with approved fill and compact to the required sub-grade compaction.
- F. Do not proceed with the installation of Structural Soil until all utility work in the area has been installed. All subsurface drainage systems shall be operational prior to installation of structural soils.
- G. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 1/2" plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.
 - 1. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.
 - 2. Any damage to the paving or landscape architectural work caused by the soils installation Contractor shall be repaired by the general Contractor at the soils installation Contractor's expense.
- H. Maintain all silt and sediment control devices required by applicable regulations. Provide adequate methods to assure that trucks and other equipment do not track soil from the site onto adjacent property and the public right of way.

3.5 INSTALLATION OF STRUCTURAL SOIL MATERIAL

- A. Install structural soil in 6 inch lifts and compact each lift.
- B. Compact all materials to peak dry density from a standard compaction curve (ASTM D698). No compaction shall occur when moisture content exceeds maximum as listed herein. Delay compaction 24 hours if moisture content exceeds maximum allowable and protect structural soil during delays in compaction with plastic or plywood as directed by the Construction Manager.
- C. Bring Structural Soils to finished grades as shown on the Drawings. Immediately protect the structural soil material from contamination by toxic materials, trash, debris, water containing cement, clay, silt or materials that will alter the particle size distribution of the mix with plastic or plywood as directed by the Construction Manager.
- D. The Construction Manager may periodically check the material being delivered and installed at the site for color and texture consistency with the approved sample provided by the Contractor as part of the submittal for Structural Soil. In the event that the installed material varies significantly from the approved sample, the Construction Manager may request that the Contractor test the installed structural soil. Any soil which varies significantly from the approved testing results, as determined by the Construction Manager, shall be removed and new Structural Soil installed that meets these specifications.

3.6 FINE GRADING

- A. After the initial placement and rough grading of the structural soil but prior to the start of fine grading, the Contractor shall request review of the rough grading by the Construction Manager. The Contractor shall set sufficient grade stakes for checking the finished grades.
- B. Adjust the finish grades to meet field conditions as directed.
 - 1. Provide smooth transitions between slopes of different gradients and direction.
 - 2. Fill all dips and remove any bumps in the overall plane of the slope.
 - a. The tolerance for dips and bumps in structural soil areas shall be a 3" deviation from the plane in 10'.
 - 3. All fine grading shall be inspected and approved by the Construction Manager prior to the installation of other items to be placed on the structural soil.

3.7 ACCEPTANCE STANDARDS

- A. The Construction Manager will inspect the work upon the request of the Contractor. Request for inspection shall be received by the Construction Manager at least 10 days before the anticipated date of inspection.

3.8 CLEAN-UP

- A. Upon completion of the Structural Soil installation operations, clean areas within the contract limits. Remove all excess fills, soils and mix stockpiles and legally dispose of all waste materials, trash and debris. Remove all tools and equipment and provide a clean, clear site. Sweep, do not wash, all paving and other exposed surfaces of dirt and mud until the paving has been installed over the structural soil material. Do no washing until finished materials covering Structural Soil material are in place.

END OF SECTION

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement City of Pittsburgh Type P mix for the following:
 - 1. Driveways and roadways.
 - 2. Parking lots.
 - 3. Curbs and gutters.
 - 4. Walkways.
 - 5. Unit paver base.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
 - 2. Division 31 Section "Earth Moving" for subgrade preparation, grading, and subbase course.
 - 3. Division 32 Section "Concrete Paving Joint Sealants" and "Water Feature Concrete Paving Joint Sealants" for joint sealants of joints in concrete pavement and at isolation joints of concrete pavement with adjacent construction.
 - 4. Division 33 Section "Exposed Aggregate Concrete Paving."

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.

- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Samples: 10-lb sample of exposed aggregate.
- D. Qualification Data: For manufacturer.
- E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing in conformance with quality control testing described in Part 3 – Execution, Section 3.11.
- F. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- G. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Applied finish materials.
 - 7. Bonding agent or epoxy adhesive.
 - 8. Joint fillers.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

- E. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.
 - 1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Construction Manager.
 - 2. Notify Construction Manager seven days in advance of dates and times when mockups will be constructed.
 - 3. Obtain Construction Manager's approval of mockups before starting construction.
 - 4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
 - 5. Demolish and remove approved mockups from the site when directed by Construction Manager.
 - 6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves with a radius 100 feet (30.5 m) or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: See Section "033000 – Cast-in-Place Concrete."
- B. Exposed Aggregate: See Section "321314 – Exposed Aggregate Concrete Paving."
- C. Water: ASTM C 94/C 94M and potable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Minimum Compressive Strength: 3500 psi at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45.

3. Slump Limit: 4 inches plus or minus 1 inch.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 1. Air Content: 4-1/2 percent plus or minus 1.5 percent for 1-inch nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements as follows:
 1. Fly Ash or Pozzolan: 25 percent.
 2. Ground Granulated Blast-Furnace Slag: 50 percent.
 3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For concrete mixes of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For concrete mixes larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
 - 2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
 - 3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) require correction according to requirements in Division 31 Section "Earth Moving."
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

- D. Install welded wire reinforcement 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.
- E. Zinc-Coated Reinforcement: Use galvanized steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.
- F. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch (50-mm) overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 - 2. Provide tie bars at sides of pavement strips where indicated.
 - 3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 - 5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 20 feet, unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows: Select type of joint-forming method required from first two subparagraphs below, or retain both at Contractor's option. Add spacing of joints if not indicated on Drawings.
 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch (6-mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 - 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Construction Manager.
- J. Screed pavement surfaces with a straightedge and strike off.
- K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- L. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- M. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- N. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 SPECIAL FINISHES

- A. Exposed Aggregate Finish: See Section "321314 – Exposed Aggregate Concrete Paving."
- B. Colored Concrete Finish: See Section "321315 – Colored Concrete Paving."

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or

adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch (6 mm).
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (6 mm).
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch (25 mm).
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch (6 mm).
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch (13 mm).
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches (6 mm per 300 mm).
8. Joint Spacing: 3 inches (75 mm).
9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.11 FIELD QUALITY CONTROL

- #### A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- #### B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 5000 sq. ft. (465 sq. m) or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Construction Manager, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Construction Manager but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Construction Manager.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Construction Manager, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 321314 - EXPOSED AGGREGATE CONCRETE PAVING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawing and general provisions of the contract, including the General and Supplementing Conditions and Division 1 Technical Specification section apply to this section.

1.02 SUMMARY OF WORK

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
- B. Provide concrete paving as shown and specified on the Drawings. The work includes:
 - 1. Final sub-grade preparation and walk/pavement base.
 - 2. Exposed aggregate concrete paving.
 - 3. Include repair or replacement of existing concrete walks and pavements disturbed or damaged as result of construction work.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 311000 – Site Clearing
 - 2. Section 312000 – Earth Moving
 - 3. Section 321373 – Concrete Paving Joint Sealants
 - 4. Section 321374 – Water Feature Concrete Paving Joint Sealants

1.03 QUALITY ASSURANCE

- A. General: Submit the following according to Conditions of the Contract and Division 1 Technical Specification sections.
- B. Materials and methods of construction shall comply with the latest provisions of the following standards:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. American Concrete Institute; (ACI).
 - a. ACI 347 "Recommended Practice for Concrete Formwork."
 - b. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete."
 - c. Concrete reinforcing Steel Institute, "Manual of Standard Practice"
- C. Workmanship: The Contractor is responsible for the correction of concrete work

which does not conform to the specified requirements: including strength, tolerances, and finishes. Correct deficient concrete as directed by the Construction Manager.

1.04 SUBMITTALS

- A. Where Shop Drawings are required by these Technical Specifications, submission shall be made to the Construction Manager. Include dimensioned sections and details of slabs and connections. Show accessory items. Provide all templates and applicable installation instructions. Provide Shop Drawings for the following:
 - 1. Expansion joints: Joint layout for all walkways and pavement areas.
 - 2. Contraction joints: Joint layout for all walkways and pavement areas.
- B. Material Certificates: Provide material certificates certifying that each material item complies with, or exceeds, specified requirements.
- C. Course Aggregation Samples: Provide course aggregate materials as per Section 2.01.
- D. Mockup: Prior to installing the exposed aggregate concrete, construct a mockup of the paving to demonstrate the color and finish required to verify the submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. The mockup shall be constructed as a two foot (2') by two foot (2') square panel. Build mockup to comply with the following requirements and using the materials indicated for final unit of work, including the same base construction as indicated below.
 - 1. Locate the mockup on-site in the location and of the size indicated as directed by the Construction Manager.
 - 2. The mockup cannot be part of the completed Work.
- E. Field Quality Control Testing; See Section 321313 Concrete Paving.

1.05 PROJECT CONDITIONS

- A. Work Notification: Notify the Construction Manager at least ten (10) days prior to installation of the concrete work.
- B. Establish and maintain required lines and grade elevations.
- C. Do not install concrete work over wet, saturated, muddy, or frozen subgrade.
- D. Do not install concrete when air temperature is below forty (40) degrees F. Use of calcium chloride, salt, or any other admixture to prevent concrete

from freezing is prohibited.

- E. Protect adjacent work.
- F. Provide temporary barricades and warning lights as required for protection of construction and public safety.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. The forms will be in accordance with the City of Pittsburgh Specifications, Section 479, entitled “Forms, General.”
- B. The Portland Cement Concrete will conform to the requirements of the City of Pittsburgh, Section 104, entitled “Portland Cement, General Requirements.” Use one (1) brand of cement throughout the project. The normal weight aggregates will conform to the requirements of the City of Pittsburgh Specifications for Concrete Pavement and Base Course, revised March 1978. For exposed aggregate concrete sidewalk, provide aggregates from a single source.
 - 1. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.
 - 2. Fine aggregate for the exposed aggregate concrete mix will be natural sand dredged from the Ohio River between the Dashields Lock & Dam and the Pike Island Lock & Dam. The natural sand shall conform to ASTM C-33.
 - 3. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:

Aggregate Sizes: 3/4 to 1 inch nominal.

Aggregate Source, Shape, and Color: Source and sample subject to approval by Construction Manager, aggregate is to be rounded smooth in tones of light gray, dark gray, and beige.

<u>Sieve</u>	<u>% Passing (range)</u>
1"	100
3/4"	90-100
1/2"	(no spec)
3/8"	20-55
#4	0-10
#8	0-5

- C. Air-entraining mixture will conform to the requirements of the City of Pittsburgh Specifications for Concrete Pavement and Base Course (revised March 1978). No calcium chloride or any admixture containing calcium chloride will be permitted in the concrete.
- D. Aggregate subbase material will be AASHTO Number 57 Crushed Stone Aggregate, Type C, as specified in PennDOT specifications (publications from 408, latest edition) Section 703.2, except slag will not be permitted.
- E. Curing and protective covers will be in accordance with the City of Pittsburgh Specifications, Section 506, entitled "Curing Concrete and Grout."
- F. Retardant for exposed the aggregate concrete surface will be Preco E.A.C.S. for "medium reveal" as manufactured by the Preco Chemical Company, or an acceptable equivalent.
- G. The penetrating concrete sealer will be Dymeric 240, a three (3) component, chemically curing, epoxidized polyurethane sealant specially formulated for dynamically moving building joints that will not stain the surface of the concrete.

Finish: Light Matte

- H. Reinforcing steel shall conform to City of Pittsburgh specifications for concrete pavement and base course (revised March 1978).

PART 3 – EXECUTION

3.01 CONSTRUCTION

- A. This work will be done in accordance with the details shown on the Drawings and in accordance with the City of Pittsburgh Specifications for Concrete Pavement and Base Course (revised March 1978) and the City of Pittsburgh Specifications, 1938.
- B. The subbase depth will be as shown in Contract Drawings for Exposed Aggregate Concrete. Construct one (1) test panel five (5) feet long by three (3) feet wide by four (4) inches thick for approval by the Construction Manager prior to the placement of the pavement.
- C. Set forms to required grades and lines, braced and secured. Establish and confirm grade and alignment as per the following tolerances:
 - 1. Top of forms not more than one-eighth (1/8") in ten (10').
 - 2. Vertical face on longitudinal axis, not more than one-quarter of an inch 1/4" in ten feet (10').

- D. The concrete placement will comply with the requirements of ACI 304 for mixing and placing concrete.
- E. All joints will be constructed in accordance with the City of Pittsburgh Standard Specifications for Construction. Construct expansion, contraction (scorelines and sawcuts) and construction joints true to line with face perpendicular to surface of concrete. Joints in sidewalk to align with joints in adjacent curb and sidewalk. Place expansion and contraction joints as shown on the Drawings. Provide premolded joint filler for expansion joints in paving and abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated. See Section 321313 for additional joint construction requirements.
- F. The exposed aggregate finish for pavements will be constructed as follows:
 - 1. Apply retardant in strict accordance with the Manufacturer's recommendations within one (1) hour after concrete is placed. Within twenty-four (24) hours after concrete is placed, remove the soft retarded mortar with a hose spray and stiff broom. If it is necessary to wait until the next working day to remove the retarded mortar (to achieve the degree of reveal specified), spray with a fine mist and apply moisture curing material as soon as possible. After twenty-four (24) hours curing, clean exposed aggregate surface with a five (5) percent solution of muriatic acid, brush and flush with water. Re-apply moisture curing material and leave in place a minimum of seventy-two (72) hours. Do not remove forms for twenty-four (24) hours after concrete has been placed. After removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas slabs with major defects, as directed by Construction Manager.
- G. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than seventy-two (72) hours. Apply curing and protective covers as necessary to cover entire surface. Begin final curing procedure immediately following initial curing and before concrete has dried. Continue final curing for at least three (3) days and in accordance with ACI 301 procedures. Avoid rapid drying at the end of final curing period.
- H. Finished concrete surfaces will be sealed with a penetrating concrete sealer.

3.02 PROTECTION

- A. Protect concrete work from damage due to construction and vehicular traffic until final acceptance. Exclude construction and vehicular traffic from concrete pavements for at least fourteen (14) days.

3.03 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from concrete operations.
- B. Sweep concrete sidewalks, wash all concrete curbs, walls, etc. free of stains, discoloration, dirt, and other foreign material immediately prior to final acceptance.

3.04 Field Quality Control Testing; See Section 321313 Concrete Paving.

END OF SECTION 02525

SECTION 321315 COLORED CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place colored concrete as indicated in the drawings, including formwork, mixture design, placement procedures, joint types and colors, finishes and necessary mock-ups for the following:
 - 1. Cast-In-Place colored concrete
- B. Related Sections include the following:
 - 1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
 - 2. Division 03 Section "Cast-In-Place Concrete" for concrete pavement and walks.
 - 3. Division 32 Section "Concrete Paving Joint Sealants."
 - 4. Division 32 Section "Water Feature Concrete Paving Joint Sealants."

1.3 DEFINITIONS

- A. Cast-In-Place Architectural Paving: Formed concrete for pavement at the playground and splash park that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place architectural concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Cast-in-place architectural concrete subcontractor.

2. Review concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction joints, forms and form-removal limitations, reinforcement accessory installation, concrete repair procedures, and protection of cast-in-place architectural concrete.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Formwork Shop Drawings: Show formwork construction including board form layout and joints, corners, openings, rustications, construction and contraction joints, form joint-sealant details, form tie locations and patterns, inserts and embedments, cutouts, cleanout panels, and other items that visually affect cast-in-place architectural concrete.
- D. Samples: For each of the following materials:
 1. Color Pigments for concrete paving
 2. Joint Filler
 3. Joint Sealant – See Section “Concrete Paving Joint Sealants.”
- E. Qualification Data: Installer to provide examples of previous work of similar complexity regarding the installation of colored concrete and the forming of concrete pavement as indicated in the drawings.
- F. Material Certificates: For each of the following, signed by manufacturers:
 1. Cementitious materials.
 2. Admixtures.
 3. Form materials and form-release agents.
 4. Semirigid joint filler.
 5. Joint-filler strips.
 6. Joint sealants
 7. Repair materials.
- G. Field quality-control test and inspection reports.
- H. Minutes of preinstallation conference.
- I. Drawings for each required mock-up indicating the type of colored concrete, type and color of expansion joint filler and sealant, curved formwork to match design intent, type of control joints and finishes. Drawings are to be approved by Construction Manager prior to installation of field mock-ups.

1.6 QUALITY ASSURANCE

- A. **Installer Qualifications:** A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. **Testing Agency Qualifications:** An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. **Source Limitations:** Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. **ACI Publications:** Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. **Concrete Testing Service:** Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- G. **Mock-ups:** After approval of verification samples and before casting architectural concrete paving, produce field sample mock-ups to demonstrate the approved range of selections made under Sample submittals. For each mockup contractor is to submit drawings of each field mock-up prior to installing mock-up on site. All mock-ups must be approved by Construction Manager prior to final installation of architectural concrete paving. Produce a minimum of eight (8) full scale mock-ups 10 feet by 10 feet minimum, to demonstrate the expected range of finish, color, joints and curved formed concrete. Mock-ups shall be produced for the following:
 - 1. Cast-In-Place Colored Concrete

All mock-ups must be approved by Construction Manager prior to final installation of architectural concrete paving.

1. Locate mock-ups as indicated or, if not indicated, as directed by Construction Manager.
2. Demonstrate methods of curing, sealers, finishes, colors as applicable.
3. In presence of Construction Manager, damage part of an exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair and patching defects and surface blemishes to match adjacent undamaged surfaces.
4. Construct mockup of proposed formwork, including corner to demonstrate surface tolerances and standard of workmanship.
5. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove field sample panels when directed.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. General: Comply with Division 03 Section "Cast-In-Place Concrete" for formwork and other form-surfacing material requirements.
- B. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 CONCRETE MATERIALS

- A. General: Comply with Division 03 Section "Cast-In-Place Concrete" for materials and admixtures.
- B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 1. Portland Cement: ASTM C 150, Type I.
- C. Water: ASTM C 94/C 94M and potable.

2.3 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
- C. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or color-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis. Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete consistent with approved mockup.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Grace, Hydrotint, standard liquid pigment
 2. Color:
 - a. Cast-in-place colored concrete shall be Davis Colors "San Diego Buff," or approved equal.

2.4 VAPOR RETARDERS

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for vapor retarders.

2.5 CURING MATERIALS

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for curing materials.

2.6 REPAIR MATERIALS

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for curing materials.

2.7 CONCRETE MIXTURES, GENERAL

- A. Comply with Division 03 Section "Cast-in-Place Concrete" for concrete mixes.
- B. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 - 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Admixtures: Use admixtures according to manufacturer's written instructions.
- F. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mock-up.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
 - 2. Clean equipment used to mix and deliver cast-in-place architectural concrete paving to prevent contamination from other concrete.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for formwork, embedded items, and shoring and reshoring.

- B. All formwork must be approved by the Construction Manager prior to installation of architectural concrete paving.

3.2 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by the Contracting Officer.

3.3 VAPOR RETARDERS

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for vapor retarders.

3.4 STEEL REINFORCEMENT

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for reinforcement.

3.5 JOINTS

- A. General: Comply with Division 32 Section "Concrete Paving" for joint requirements.

3.6 CONCRETE PLACEMENT

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for concrete placement.

3.7 FINISHING SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

- B. Broom Finish: Apply a medium broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with the Contracting Officer before application.

3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- A. Comply with Division 03 Section "Cast-In-Place Concrete" for concrete protection and curing and application of protective coating.

3.9 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.10 CONCRETE SURFACE REPAIRS

- A. Comply with Division 03 Section "Cast-In-Place Concrete" for concrete surface repairs.

3.11 FIELD QUALITY CONTROL

- A. General: Comply with Division 32 Section "Concrete Paving" for field quality-control requirements.

END OF SECTION 033001

SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Expansion and contraction joints within cement concrete pavement.
 - 2. Joints between cement concrete and asphalt pavement.
- B. Related Sections include the following:
 - 1. Division 32 Section "Concrete Paving" for constructing joints in concrete pavement.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- D. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 - 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing of current sealant products within a 36-month period preceding the Notice to Proceed with the Work.
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated, as documented according to ASTM E 548.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 - 2. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (4.4 deg C).
 - 3. When joint substrates are wet or covered with frost.

4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Construction Manager from manufacturer's full range.

2.3 COLD-APPLIED JOINT SEALANTS

Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant for Concrete: ASTM C 920, Type M, Grade P, Class 25, for Use T.

Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

Pecora Corporation; Urexpan NR-200.

2.4 JOINT-SEALANT BACKER MATERIALS

- A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

- C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.
- D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.5 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of backer materials.

2. Do not stretch, twist, puncture, or tear backer materials.
 3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses provided for each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealants from surfaces adjacent to joint.
 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.
- G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 321373

SECTION 321374 – WATER FEATURE CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This specification describes the sealing of joints and cracks with a two-component, non-sag or self-leveling, elastomeric polyurethane sealant, for use in concrete surrounding the Water Play Equipment.

1.3 RELATED SECTIONS

- A. Section 117001 "Water Play Equipment"
- B. Section 033000 "Cast-in-Place Concrete" for concrete paving.
- C. Section 321313 "Concrete Paving"

1.4 REFERENCES

- A. C719-93 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
- B. C793-91(1997) Standard Test Method for Effects of Accelerated Weathering on Elastomeric Joint Sealants.
- C. D412-97a Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
- D. D1475-90 Standard test Method for Density of Paint, Varnish, Lacquer, and Related Products.
- E. D2240-97 Standard Test Method for Rubber Property-Durometer Hardness.
- F. D5893-96 Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.

1.5 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001:2000 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.7 SUBMITTALS

- A. Specification Sheet and sample for the permanent backer rod (1 LF).
- B. Sample for the temporary backer rod (1 LF).
- C. Submit two copies of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS)

1.8 Warranty

- A. Provide a written warranty from the manufacturer against defects of materials for a period of one (1) year, beginning with date of substantial completion of the project.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Sikaflex-2c NS TG, as manufactured by Sika Corporation, 1682 Marion Williamsport Road, Marion, OH 43302.

- B. Sikaflex Primer 429, as manufactured by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071 is considered to conform to the requirements of this specification.

2.2 MATERIALS

- A. Polyurethane sealant: The joint sealant shall be a two-component, non-sag traffic-grade material. It shall be applicable in horizontal, vertical, and overhead joints. The sealant shall be principally a chemical cure to form an elastomeric substance. The color shall be introduced through a "Color-pak" system or be pretinted from the manufacturer.
- B. Primer: The primer shall be a one-component, brush, dauber, spray-applied material. It shall be applicable in a horizontal, vertical, and overhead joints. The primer shall cure under the influence of atmospheric moisture.

2.3 PERFORMANCE CRITERIA

- A. Polyurethane sealant:
 - 1. Properties of the mixed sealant:
 - a. Initial Cure (Tack-Free Time): 8-10 hours
 - b. Consistency: non-sag
 - c. Color: as selected by Construction Manager, to contrast with surrounding colored concrete (more than 300 architectural colors available through color matching system)
 - 2. Properties of the cured polyurethane sealant:
 - 1. Tensile Properties (ASTM D-412) at 14 days Non-sag EZ
 - a. Tensile Strength at break: minimum 220 psi
 - b. Tensile Elongation: minimum 300%
 - c. Modulus of Elasticity - 100% Elongation 140 psi, min.
 - a. Shore A Hardness (ASTM D-2240) at 14 days:
 - 1) Non-sag EZ: 45 +/-5
 - b. Adhesion in Peel (TT-S-00227E, ASTM C-794) at 21 days
 - 1) Concrete: 25 lb. min. 0% Adhesion Loss
 - 3. Service Range: -40⁰ to 170⁰F (-40⁰ to 77⁰C)
 - 4. The sealant shall conform to Federal Specification TT-S-00227E, Type II, Class A.
 - 5. The sealant shall conform to ASTM C-920, Type M, Grade NS, Class 25.
 - 6. The sealant shall be capable of $\pm 25\%$ of the average joint width when tested in accordance to the durability bond test of Federal Specification TT-S-00227E and ASTM C-719.
 - 7. The sealant shall be non-staining.
 - 8. Final Cure: 3 days max.
- B. Primer:
 - 1. Properties of the uncured primer:

- a. Dry time prior to sealant installation: >1 <8 hr.
- b. Consistency: brush-, or spray-applied liquid
- c. Color: clear
- 2. Properties of the cured primer:
 - a. Promotes adhesion to the following substrates:
 - 1) Concrete Block
 - 2) Placed Concrete
 - 3) Precast Concrete
 - 4) Mortar
 - 5) Grout
 - 6) Sikatops
 - 7) Granite
 - 8) Unfinished wood
 - 9) IEFS: Dryvit, Synergy, Sto, etc.
 - b. Service Range: -40F to 170F max.
 - c. The primer shall be capable of being re-applied if necessary.
 - d. The primer shall be acceptable for use in joints which will be subjected to water immersion.
 - e.

2.4 PREFORMED BACKER RODS

- A. Preformed backup rods, as shown on the plans, shall be used to control the depth of the sealant, to achieve the desired shape factor, to support the sealant against indentation and sag, and shall be a non-moisture absorbing resilient material.
- B. Backup materials (backer rods) shall be manufactured from closed cell polyethylene (resilient) foam rubber compatible with the sealant, and recommended for such use by the sealant manufacturer, shall not adhere to the sealant, shall be compressible without extruding the sealant, and shall recover to maintain contact with the joint faces when the joint is open and shall be subject to approval by the Architect.
- C. For 3/8 inch wide joints, use 1/2 inch diameter backer rods and for 3/4 inch wide joints, use 1" diameter backer rods, (unless otherwise shown on the Plans or approved by the Architect) so that the backer rods are always compressed in its installed position between the concrete joint surfaces.

2.5 SAMPLES

- A. Samples of all materials which the Contractor proposes for use and copies of the manufacturer's recommendations for mixing and installation shall be submitted to the Project Engineer for approval at least thirty (30) days prior to use.

2.6 SUBMITTAL REQUIREMENTS

- A. Each lot or batch of sealing material shall be delivered to the job site in the manufacturer's original sealed container. Each container shall be labeled to include the following:

1. Name of Material
 2. Manufacturer's Name
 3. Manufacturer's Lot Number
 4. Production Date
 5. Shelf Life
 6. Mixing Instructions
 7. Storage Instructions
 8. Placement Instructions
- B. Each lot or batch delivered to the job shall also be accompanied by a "Material Safety Data Sheet" (MSDS), and the Manufacturer's Certification stating that the compound meets the requirements of this specification including its compliance with the jet fuel and hydraulic fluids resistance provisions.
- C. When required by the Project Engineer, the Contractor shall provide test report of the sealant properties demonstrating conformance of the sealant to the Contract Specifications

PART 3 - EXECUTION

3.1 SURFACE PERPARATION

- A. Examination
1. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TIME OF APPLICATION

- A. The joints shall be sealed immediately following the concrete curing period or as soon thereafter as weather conditions permit, and before the pavement is used for material storage or opened to traffic, including construction.
- B. The concrete shall be cured and dry (not less than 7 days old unless otherwise ordered by the Project Engineer), and the joint surfaces shall be clean at the time of the sealant application.
- C. Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- D. Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

3.3 EQUIPMENT

- A. All equipment necessary for the proper construction of this work shall be on the project in first class working condition.
- B. The equipment shall be as recommended by the manufacturer of the sealer and approved by the Architect before construction is permitted to start.
- C. Air compressors shall be equipped with suitable traps capable of removing all free water and oil from the compressed air and shall be capable of furnishing air with a pressure greater than 90 psi.

3.4 PREPARATION OF JOINT

- A. Polyurethane sealant:
 - 1. The joint and adjacent substrate must be clean, dry, sound and free of surface contaminants. Remove all traces of the old sealant, dust, laitance, grease, oils, curing compounds, form release agents and foreign particles by mechanical means, i.e. – sandblasting, etc., as approved by the engineer. Blow joint free of dust using compressed air line equipped with an oil trap.
- B. Primer:
 - 1. All substrates must be clean, dry, sound, free of surface contaminants, and free of frost. Remove all traces of the old sealant, dust, laitance, grease, oils, curing compounds, form release agents and foreign particles by mechanical means, i.e. – sandblasting, etc., as approved by the engineer. Blow joint free of dust using compressed air line equipped with an oil trap.

3.5 MIXING AND APPLICATION

- A. Polyurethane sealant:
 - 1. Mixing of the polyurethane sealant: Pour out entire contents of Component B into pail of Component A. Add entire contents of Color-pak into pail and mix with low-speed drill (400-600 rpm) and approved paddle. Mix for 3-5 minutes to achieve a uniform color and consistency. Avoid entrapment of air during mixing.
 - 2. Joints:
 - a. Placement Procedure: Prime all substrates.
 - b. Install approved backer rod or bond breaker tape in all joints subject to thermal movement to prevent three-sided bonding and to set the depth of the sealant at a maximum of 1/2 in., measured at the center point of the joint width. Approval of the backer rod or bond breaker tape shall be made by the Engineer.
 - c. Backer rods shall be installed, using a suitable roller device recommended for such use by the sealant manufacturer, in the bottom of the joint to be filled to control the depth of the sealant, to achieve the desired shape factor, and to support the sealant against indentation and sag
 - d. Joints shall be masked to prevent discoloration or application on unwanted areas, as directed by the Engineer. If masking tape is used, it

- shall not be removed before tooling, yet must be removed before the initial cure of the sealant. Do not apply the masking tape until just prior to the sealant application.
- e. Install sealant into prepared joints when the joint is at mid-point of its expansion and contraction cycle.
3. Non-sag sealant: Load the sealant into a caulking gun. Place the nozzle of the gun, either hand or air or electric powered, into the bottom of the joint and fill entire joint. Keep the tip of the nozzle in the sealant, continue with a steady flow of sealant preceeding the nozzle to avoid air entrapment. Avoid overlapping the sealant to eliminate the entrapment of air. Tool, as required, to properly fill the joint.
4. The sealant shall be applied in a continuous operation, pumped directly from the original container using an approved mechanical device that will force the sealant to the bottom of the joint and completely fill the joint without spilling the material on the surface of the pavement, and shall adhere to the concrete (Portland cement concrete and/or bituminous concrete as the case may be) and shall be free of voids.
5. The gun grade sealant shall be tooled, forcing it onto the backer rod and against the joint faces with an appropriate tool, to produce a slightly concave surface approximately
6. 1/8" below the pavement surface and for self-leveling grade shall be extruded to form a horizontal surface 1/8" below the pavement surface. Tooling shall be accomplished before a skin forms on the surface, usually within 10 minutes of application.
7. Sealant which does not bond to the concrete (Portland cement concrete and/or bituminous concrete as the case may be) surface of the joint walls, contains voids, or fails to set to a tack-free condition will be rejected and replaced by the Contractor at no additional cost to the Owner.
 - a. Adhere to all limitations and cautions for the polyurethane sealant in the manufacturer's printed literature.
8. Cracks:
 - a. Non-sag sealant: For best performance, sealant should be gunned into crack to a minimum of 1/8" in depth. Place the nozzle of the gun, either hand or air or electric powered, into the bottom of the crack and fill entire crack. Keep the tip of the nozzle in the sealant, continue with a steady flow of sealant preceding the nozzle to avoid air entrapment. Avoid overlapping the sealant to eliminate the entrapment of air. Tool as required to properly fill the crack.
 - b. Adhere to all limitations and cautions for the polyurethane sealant as stated in the manufacturers printed literature.
9. Cleaning:
 - a. The uncured polyurethane sealant can be cleaned with an approved solvent. The cured polyurethane sealant can only be removed mechanically
 - b. Leave work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

B. Primer:

1. Shake or stir primer well before using. Apply with a brush, dauber, or spray onto the substrate covering the sides of the joint surfaces.
2. If the Sikaflex sealant cannot be installed within 8 hours of priming, reprime the area is necessary.
3. Cleaning:
 - a. The uncured primer can be cleaned from tools and equipment with an approved solvent. The cured primer can only be removed mechanically.
 - b. Leave work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

3.6 INSTALLATION OF SEALANTS

- A. Joints shall be inspected for proper width, depth, alignment, condition of the concrete and preparation, and shall be approved by the Architect before sealing is allowed.
- B. Sealant shall be installed in accordance with the manufacturer's written recommendations and the following requirements:
 1. The sealant shall be applied in a continuous operation, pumped directly from the original container using an approved mechanical device that will force the sealant to the bottom of the joint and completely fill the joint without spilling the material on the surface of the pavement, and shall adhere to the concrete (Portland cement concrete and/or bituminous concrete as the case may be) and shall be free of voids.
 2. The gun grade sealant shall be tooled, forcing it onto the backer rod and against the joint faces with an appropriate tool, to produce a slightly concave surface approximately
 3. 1/4" below the pavement surface and for self-leveling grade shall be extruded to form a horizontal surface 1/4" below the pavement surface. Tooling shall be accomplished before a skin forms on the surface, usually within 10 minutes of application.
 4. Sealant which does not bond to the concrete (Portland cement concrete and/or bituminous concrete as the case may be) surface of the joint walls, contains voids, or fails to set to a tack-free condition will be rejected and replaced by the Contractor at no additional cost to the Owner.
 5. During the course of the work any batches that do not have good consistency for application shall be replaced.
 6. Excess sealant on the pavement surface shall be immediately removed.
 7. An approved primer shall be used at joints when recommended in writing by the manufacturer.
- C. The Contractor shall have a manufacturer's technical representative on the project at the start of the joint sealing operation to observe the methods and means employed by the Contractor to install the joint sealer. The manufacturer's technical representative(s) shall conduct the demonstration(s), train the Contractor's personnel, and ensure that the installation procedures are in accordance with the manufacturer's directions prior to the start of the sealing operations. The representative(s) shall visit the job site at least two (2) times during the sealing operation and after the sealing is completed, shall

conduct a general inspection of the work and perform more extensive inspections and/or testing on a random basis to reasonably assure that the construction is in accordance with the manufacturer's recommended construction methods and procedures. The manufacturer's representative report outlining the findings shall be submitted to the Architect at the completion of the inspection.

3.7 FIELD TEST

- A. Before sealing the joints, the Contractor shall demonstrate that the equipment and procedures for preparing, mixing, and placing the sealant will produce a satisfactory joint seal. This shall include the preparation of two small batches and performing random pull tests.
- B. END OF SECTION 321374

SECTION 322500 –SITE FURNISHINGS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes descriptions and model numbers, if applicable, of all site furnishings.
- B. Related sections include the following:
 - 1. Division 03 Section 033000 Cast-in-place Concrete for furnishing foundations.

1.2 QUALITY ASSURANCE

- A. Coordination: Coordinate locations with other work to avoid interference and to assure proper operation and servicing of site furnishing units.
- B. Uniformity: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Owner.

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings to show component parts, fabrication, installation, and dimensions for all items in this section, including manufacturer's Instructions for footings and anchorages.

PART 2 – PRODUCTS

2.1 CITY OF PITTSBURGH STANDARDS; approved equals to be accepted only by Owner.

A. BENCHES

- 1. 6' Architectural Iron Company AIC-COP6
- 2. 8' Architectural Iron Company AIC-COP8

B. BICYCLE RACKS

- 1. 3-Rivers Bike Rack
- 2. Dero Hoop Rack Heavy Duty

C. TRASH/RECYCLING RECEPTACLES

- 1. Victor Stanley S-42 Litter Bin with Rain Bonnet (Black)
- 2. Victor Stanley S-42 Recycling Bin (Blue)

D. FENCING

- 1. Omega Architectural Fence

E. DRINKING FOUNTAIN

- 1. MDF Pedestal Drinking Fountain Model 440SM

G. SIGNAGE

1. Park Entry Signage by Pittsburgh Department of City Planning
2. Playground Signage by Pittsburgh Department of City Planning
3. Educational Stormwater Signage

J. PICNIC TABLES

1. City of Pittsburgh Picnic Table
2. City of Pittsburgh ADA Picnic Table

K. GRILLS

1. Playworld Grill ZZXX1451

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which site furnishings are to be installed, and remedy any conditions detrimental to the timely and proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

- A. Furnish setting drawings, diagrams, templates, instructions, and directions for the installation of anchorage devices such as concrete inserts, anchor bolts, and items having integral anchors which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the project site.

3.3 INSTALLATION

- A. Furnishings shall be located where shown on plans, and as shown on detail drawings, unless otherwise directed by Construction Manager.
- B. Review site furnishings locations with Owner prior to installation.
- C. Erect and install site furnishings in accordance with manufacturer's instructions and recommendations. Install furnishings plumb, accurately, and in the correct orientation and relationship with other site furnishings, elements, and paving as shown on the Drawings.
- D. Install all footings and anchorages in strict accordance with manufacturer's instructions and the Drawings.

3.4 PROTECTION

- A. Protect furnishings against damage during remainder of construction period, complying with manufacturer's directions.

END OF SECTION 322000

SECTION 328400 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Piping.
2. Encasement for piping.
3. Manual valves.
4. Pressure-reducing valves.
5. Automatic control valves.
6. Automatic drain valves.
7. Transition fittings.
8. Dielectric fittings.
9. Miscellaneous piping specialties.
10. Sprinklers.
11. Quick couplers.
12. Drip irrigation specialties.
13. Controllers.
14. Boxes for automatic control valves.

1.3 DEFINITIONS

- A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.
- C. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
- D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 PERFORMANCE REQUIREMENTS

- A. Irrigation zone control shall be **automatic operation with controller and automatic control** valves.
- B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.
- C. Delegated Design: Design 100 percent coverage irrigation system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- D. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
 - 1. Irrigation Main Piping: **200 psig**
 - 2. Circuit Piping: **120 psig**

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, [**electrical characteristics**,] and furnished specialties and accessories.
- B. Wiring Diagrams: For power, signal, and control wiring.
- C. Delegated-Design Submittal: For irrigation systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.
- B. Qualification Data: For qualified Installer.
- C. Zoning Chart: Show each irrigation zone and its control valve.
- D. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- E. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A.Operation and Maintenance Data: For **controllers and control valves** to include in operation and maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A.Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.9 QUALITY ASSURANCE

- A.Installer Qualifications: An employer of workers that include a **certified irrigation designer qualified by The Irrigation Association, Professional Class member of the American Society of Irrigation Consultants, or Professional Technical Class member of the American Society of Irrigation Consultants.**
- B.Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.10 DELIVERY, STORAGE, AND HANDLING

- A.Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- B.Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.11 DRIP IRRIGATION SPECIALTIES

The flexible polyethylene tubing shall have factory installed pressure-compensating, inline emitters installed every 18 inches. The flow rate from each installed inline emitter shall be 0.9 gallons per hour when inlet pressure 50 psi.

The inline emitter diaphragm shall have a pressure-regulating diaphragm with a spring action allowing it to self-rinse if there is a plug at the outlet hole. The bend radius shall be 3 inches whether bending the tubing with the natural bend of the coil or against it.

The inline emitter inlet shall be raised of the inside tube wall to minimize dirt intrusion. Air relief to be installed at all high points within each zone.

Use XFS Dripline inline tubing, Part Number XFS-09-18 by Rain Bird Corporation, Azusa, California or approved equal.

For Zone 1 (Terraced Bioswale 1):

Cistern pump to send water to Zone 1 piping for 23 consecutive minutes, four (4) times per week.

Total Drip Zone Flow: 5.31 GPM

Maximum Lateral Length of Tubing: 420 ft

Total Length of Drip-Tube System Tubing Required in Zone: 531 ft

Application Rate: 0.64 in/hr

Control Valve Kit Part Number XCZ-100-PRF, Inlet size=1 in, Outlet Size=1 in, 3 - 15 GPM, 20 - 120 psi or approved equal

Required Number of Stakes: 133

Recommended Number of Flush Points: 1

Header and Footer Pipe Size: Class 315 1/2" PVC

For Zone 2 (Terraced Bioswale 2):

Cistern pump to send water to Zone 2 piping for 23 consecutive minutes, four (4) times per week.

Total Drip Zone Flow: 5.62 GPM

Maximum Lateral Length of Tubing: 420 ft

Total Length of Drip-Tube System Tubing Required in Zone Required: 562 ft

Application Rate: 0.64 in/hr

Control Valve Kit Part Number XCZ-100-PRF, Inlet size=1 in, Outlet Size=1 in, 3 - 15 GPM, 20 - 120 psi or approved equal

Required Number of Stakes: 141

Recommended Number of Flush Points: 1

Header and Footer Pipe Size: Class 315 1/2" PVC

For Zone 3 (Terraced Bioswale 3):

Cistern pump to send water to Zone 3 piping for 23 consecutive minutes, four (4) times per week.

Total Drip Zone Flow: 11.18 GPM

Maximum Lateral Length of Tubing: 420 ft

Total Length of Zone Dripline Required: 1118 ft

Application Rate: 0.64 in/hr

Control Valve Kit Part Number XCZ-100-PRF, Inlet size=1 in, Outlet Size=1 in, 3 - 15 GPM, 20 - 120 psi or approved equal

Required Number of Stakes: 280

Recommended Number of Flush Points: 1

Suggested Header and Footer Pipe Size: Class 200 3/4" PVC

PART 2 - EXECUTION

2.1 EARTHWORK

A.Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

B.Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel or crushed stone, graded from **3/4 to 3 inches**, to **12 inches** below grade. Cover gravel or

crushed stone with sheet of asphalt-saturated felt and backfill remainder with excavated material.

C. Provide minimum cover over top of underground piping according to the following:

1. Irrigation Main Piping: Minimum depth of **12 inches** finished grade.
2. Circuit Piping: **12 inches**.
3. Drain Piping: **12 inches**.
4. Sleeves: **24 inches**.

2.2 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Architect's approval before excavation.

2.3 DRIP IRRIGATION SPECIALTY INSTALLATION

A. Install freestanding emitters on pipe riser to mounting height indicated.

B. Install manifold emitter systems with tubing to emitters. Plug unused manifold outlets. Install emitters on off-ground supports at height indicated.

C. Install multiple-outlet emitter systems with tubing to outlets. Plug unused emitter outlets. Install outlets on off-ground supports at height indicated.

D. Install drip tubes with direct-attached emitters on ground.

E. Install drip tubes with remote-discharge on ground with outlets on off-ground supports at height indicated.

F. Install off-ground supports of length required for indicated mounted height of device.

G. Install application pressure regulators and filter units in piping near device being protected, and in control-valve boxes.

H. Install air relief valves and vacuum relief valves in piping, and in control-valve boxes.

2.4 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

A. Equipment Mounting: Install interior controllers on **concrete bases**.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Equipment Mounting: Install exterior freestanding controllers on precast concrete bases.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- C. Install control cable in same trench as irrigation piping and at least **2 inches** below **or beside** piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

2.5 CONNECTIONS

- A. Comply with requirements for piping specified in Section 221113 "Facility Water Distribution Piping" for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.
- C. Connect wiring between controllers and automatic control valves.

2.6 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
- C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

2.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Any irrigation product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

2.8 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that controllers are installed and connected according to the Contract Documents.
3. Verify that electrical wiring installation complies with manufacturer's submittal.

2.9 ADJUSTING

A. Adjust settings of controllers.

B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.

C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than **1/2 inch** above, finish grade.

2.10 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

2.11 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain **valves and controllers**.

2.12 PIPING SCHEDULE

- A. Install components having pressure rating equal to or greater than system operating pressure.
- B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.

END OF SECTION

DIVISION 32

SECTION 32 84 01 – Irrigation Mechanical System (SKYHARVESTER WATER HARVESTING SYSTEM / PUMP STATION)

PART 1 – GENERAL

1.01 SUMMARY

- A. It is the intention of this specification to describe an automatic water harvesting pump system for an automatic commercial irrigation system application. Design, fabrication, testing, and commissioning shall be the sole responsibility of the system manufacturer. The pump station shall provide non-potable water filtered and treated to the design parameters as noted on the plans to the distribution system while simultaneously maintaining a constant discharge pressure by using a prefabricated pump station with variable frequency drive (VFD) pump(s) for pressure regulation, under varying flow conditions up to the maximum specified capacity.
- B. Contractor is to provide a complete and working pumping system. Furnish all labor, materials, supplies, equipment, tools, transportation, and perform all operations in connection with and reasonably incidental to the complete manufacturing and installation of the pumping system, and guarantee/warranty as shown on the drawings, the installation details, and as specified herein.
- C. The prefabricated pump station shall have a minimum capacity and discharge pressure as described in these specifications and on the plans.
- D. The station shall be completely wired, piped, hydraulically, electrically, and flow tested to full station capacity in automatic mode at factory prior to shipment to job site. Documentation of dynamic test shall be verified by owner/specifying engineer prior to pump station shipment upon request.
- E. Construction shall include a skid assembly to support all components during shipping and to serve as the installation mounting base. All on skid component to be wired at factory. (Except where components need to be removed for shipping purposes)

1.02 REFERENCE STANDARDS:

- 1. ANSI- American National Standards Institute
- 2. ASTM- American Society for Testing and Materials
- 3. NEMA- National Electrical Manufacturers Association
- 4. IEEE- Institute of Electrical and Electronics Engineers
- 5. NEC- National Electrical Code
- 6. UL508 & ULQCZJ- Underwriters Laboratories, Inc.
- 7. Hydraulic Institute

1.03 PROJECT LOCATION

The project is located: **PA**

1.04 CONTRACT DOCUMENTS

- A. The general nature and extent of the work and the appurtenant facilities are shown on the Drawings under the title: **Liberty Green**
- B. Perform work within the Limit of Work line that may be indicated on the Drawings and per the discretion of the Owner.

1.05 DRAWINGS

- A. Water harvesting pump system installing contractor(s) shall be responsible for installation of all equipment indicated on Watertronics drawing number **PRSH11039**.
- B. In the event that discrepancies arise over dimensions, product references, omissions, or written statements, these conflicts shall be immediately brought to the engineer of record/Owner's attention by the Contractor. If available, this may be accomplished with the use of a "Request for Information" (RFI) form. While awaiting direction or clarification from the Owner, the Contractor shall re-direct work as necessary so as not to cause delay to the project.
- C. If discrepancies arise between plans, details, specifications, addenda or any other portion of the Contract Documents, these conflicts shall be immediately brought to the Engineer of record or Owner's attention by the Contractor. If available, this may be accomplished with the use of a "Request for Information" (RFI) form. While awaiting direction or clarification from the Owner, the Contractor shall re-direct work as necessary so as not to cause delay to the project.
- D. Products, materials, labor, etc., installed or performed without proper clarification, or prior to Owner acceptance shall be the Contractor's sole responsibility and shall be removed, repaired, replaced, and/or reinstalled per the Owner's direction at no additional cost to the Owner or its agents.

1.06 CONTRACTOR'S DUTIES

- A. Provide and pay for:
 - 1. Labor, materials, equipment, tools, construction equipment machinery and all other facilities and services necessary for proper execution and completion of the Contract.
 - 2. Water and temporary utilities (if needed) required for proper execution and completion of the Contract excluding any metering and connection fees or charges.
 - a. Subject to the discretion of the Owners Representative (Contractor to verify), utilities that are in place and/or are in use by the Owner at the site (excluding telephone) may be utilized by the Contractor, to the extent available, at no cost.
 - 3. Other facilities and services necessary for proper execution and completion of the Contract to provide a facility capable of operation.

4. Legally required sales, consumer and use taxes.
- B. Permits:
 1. The Owner shall obtain and pay for (if required) the Development Permit, Building permit, Encroachment Permit and Demolition Permit.
 2. The Contractor shall obtain and pay for other permits required by County and other agencies, including but not limited to business licenses, hauling & dumping permits and demolition authorization as applicable.
 3. The provisions of all required permits and licenses, whether obtained by the Owner's Representative or the Contractor, shall become a part of the Contract Documents and shall be adhered to by the Contractor

1.07 CLEANING DURING/AFTER CONSTRUCTION

- A. Execute cleaning operations to keep the work, site, streets and adjacent properties free from accumulations of waste materials, rubbish and windblown debris resulting from construction operations.
 1. The Owner's Representative may, at any time during construction, order general cleanup of the site by the Contractor at no additional cost to the Owner.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish.
- C. Remove hazardous waste materials, debris and rubbish from the site periodically and properly dispose of such materials at legal disposal areas.
 1. Location of legal disposal sites and all costs incurred from waste disposal and transportation shall be the responsibility of the Contractor.
 2. Waste material or debris shall not be buried or burned on the job site.
- B. Clean and construction and other debris from storage tank prior to first time start up. Construction debris, dirty water, or other conditions not designed for are not permitted in the storage tank and may damage, alter, or not allow the system to operate.

1.08 PROJECT COMPLETION

- B. The Contractor shall, at completion of the project, leave all work installed properly operating and in a thoroughly clean condition.
- C. Thoroughly instruct the Owner's Representative and any applicable operation and maintenance personnel in the contents of the "operations and maintenance manual.

PART 2: PRODUCTS

2.1 Manufacturer

- A. The pump station shall be manufactured by **Watertronics, Inc.**, Hartland, Wisconsin, **John VanDerCruyssen (262-269-2440)**. To be considered as equal the following information must be furnished by the contractor or manufacturer's representative a minimum of 10 days prior to bid date for consideration as an equal. Submit information to **GAI Consultants** for approval.

Basis of Design: **Watertronics, SHSTV-1-(10K)-3-230-1-30-50, or approved equal**

1. A complete specification and submittal of all major components for the proposed pump station.
2. A detailed pumping station proposal drawing complete with component location, sizes, dimensions, and description of operation specific to the installation.
3. A complete electrical schematic for all high and low voltage circuits showing all circuit breakers, fuses and wire sizes. All wire numbering and colors must also be designated.
4. Pump station manufacturer's U.L. file number for the electrical controls and pump station.
5. A copy of the manufacturer's certificate of insurance in excess of \$1,000,000.00
6. Product support technicians shall be capable of accessing all information pertaining to the pumping equipment, e.g. electrical schematics, pump curves, program data, bill of materials, etc. The manufacturer shall have no less than two technicians on call seven days a week.
7. The pump station manufacturer shall provide factory authorized or factory direct service personnel for the set, start-up, preventative maintenance and general service of the pump system. A factory authorized or factory direct service technician must be located within one-hundred (100) mile radius of the project site. The pump systems technician must have a minimum of 5 years of experience. The pump station manufacturer shall provide technical phone support twenty-four hours a day seven days a week.

2.2 Control Panel:

- A. The pumping station low voltage electrical controls shall be mounted in a self-containing NEMA enclosure fabricated from not less than 12 gauge steel. Door gasket seals shall be neoprene sponge, sufficient to protect interior components from weather and dust. The electrical panel doors shall be constructed from 12 gauge steel with integral latches.
- B. All internal components of the enclosure shall be mounted on a removable back panel. Mounting screws for components shall not be tapped into the enclosure wall. No pressure gauges, pressure switches, water activated devices, or water lines of any sort shall be installed in any electrical control panel. External components shall be dust proof and rated for environment control panel is installed into.
- C. The control panel assembly shall be designed, built, tested and U.L. listed by the pump station manufacturer. Watertronics U.L. File Number E142155

- D. Control panel shall comply with FCC Part 15 for radiated and conducted electrical emissions. Manufacture to supply certificate of compliance/documentation that control panel passes emissions levels.

2.3 Main Disconnect

- A. A three-pole, main station disconnect shall be contained within the NEMA 4 control enclosure. Disconnect shall be non-fused and isolate all power to the control enclosure.
- B. Disconnect shall have an operating handle mounted in the enclosure door, mechanically interlocked to prevent entry while disconnect is in ON position.

2.4 Variable Frequency Drive

- A. The variable frequency drive shall be IGBT based with selectable carrier frequency up to 15 KHZ. The VFD shall include terminals for incoming power, motor output power and control terminals.
- B. When a submersible pump is utilized, pump station to contain a DV/DT long motor lead filter on downstream side of VFD to maintain sine wave integrity and motor warranty.

2.5 Control Transformer

- A. A control transformer shall provide 120 volt power to the pump station controls. The control transformer shall be protected on primary and secondary sides with appropriately sized fuses. No load other than the pump controls shall be supplied by the control transformer.

2.6 Secondary Control Circuit Breakers

- A. Secondary distribution circuit breakers with appropriate ratings shall supply power to each pump starter coil circuit, the control system and to other circuits as specified.

2.7 Main Panel Power Phase Monitor

- A. The incoming power shall be protected by a phase loss/low voltage system dropout relay to de-energize the pump station control circuit if a phase failure, phase reversal or low voltage condition occurs. If after attempted automatic re-starts the phase failure/low voltage alarm condition remains, the alarm must be manually reset.

2.8 Surge Suppressor / Lightning Arrestor

- A. The main power supply to the pump station shall be equipped with a secondary lightning arrestor having a breakdown current rating of not less than 60,000 Amps at 14,000 Volts discharge. Power supplies 300 Volts and less shall use a 300 Volt arrestor with an 800 Volt spark-over Voltage. Power supplies up to 600 Volts shall use a 600 Volt rated arrestor with a 1,000 Volt spark-over Voltage.

2.9 Corrosion Inhibiting Modules

- A. Corrosion inhibiting modules shall be installed in all electrical enclosures in accordance with the manufacture's recommendations.

2.10 Control Logic

- A. The pump sequence controller shall be an industrial grade PLC with diagnostic LEDs for monitoring of discrete inputs and outputs. Not less than two additional analog inputs and outputs shall be standard for monitoring and control purposes. The PLC shall contain two communication ports for monitoring and programming purposes. The PLC shall contain an EEPROM, battery backed RAM and non-volatile memory for storage of critical configuration data. PLC to contain an RS232 and RS485 com card for communication with external building management system.

2.11 Automatic Pressure Regulation Based On Variable Flow (Single Set Point)

- A. The pump station controls shall be capable of changing the regulated downstream pressure while in operation, based on discharge flow or discrete input. Control logic shall regulate a constant discharge pressure at varying flow rate up to maximum specified demand (GPM). Regulate set point shall be indicated on the plans and in pump station model number.

2.12 User Defined Pressure Set-Point Based on Variable Flow Zones (multi set point)

- A. The operator shall be capable of changing the regulated downstream pressure based on discharge flow or discrete input. The pump station controls shall also be capable of up to six, user adjustable pressure regulation set points based on six discharge flow zones.

2.13 Lead Pump Selection

- A. Lead selection of equal horsepower pumps shall be accomplished by total accumulated pump running time (hours). The pump with the lowest accumulated running time shall be the next pump started in the sequence. Alternating logic for selection of lead pump shall not be accepted. This section only applies to pump stations with multiple pumps of equal size, plumbed in parallel to satisfy demand.

2.14 Alarms

- A. Controls shall shut down the pump station in the event of the following alarm conditions. The controls shall attempt to restart the system after alarm shutdown or loss of power, unless alarm is indicated as a hard shut down. After a number of attempts (3) to re-pressurize the system, the controls will go into hard shut down and remain there until manually reset.
 - 1. Low discharge pressure cutout. Pressure remains 20 PSI below regulate set point for 240 seconds. (time adjustable)

2. High discharge pressure cutout. Pressure remains 11 PSI above regulate set point for 120 seconds (time adjustable)
3. Low water level alarm (soft alarm) re-sets at user defined level or (3) re-try (40sec. time and level adjustable)
4. Low Float level cutout (hard shutdown) instant shut off of pump system. Manual re-set.
5. n/a
6. Automatic Filter alarm. Filter flush to restore to clean screen psi differential within (3) flush attempts. After 3rd, hard shutdown then manual re-set
7. Control Panel power alarm. Loss of control circuit power (instantaneous, auto-reset after 60seconds of power restoration)
8. Pipe fill Alarm. System unable to pressurize @ 1psi/ 10sec. in 900sec. (3) re-try
9. Power Alarm - Phase/ voltage cutout. High or low voltage, loss of phase, or phase reversal. (instantaneous, 3 Re-try)
10. n/a
11. n/a
12. VFD Alarm – VFD Fault internal (instantaneous, 3 Re-try)

2.15 Operator Interface

- A. Operator interface shall be a full color STN display unit mounted in the enclosure door. Operator interface shall be used for logical display of all pump station functions. The operator interface shall be NEMA 4 rated. The operator interface shall be touch sensitive with intuitive on-screen user instruction for ease of operator use. The use of buttons or keys or off-screen user instructions shall not be permitted. The operator interface shall be STN color display type with no less than 640 x 480 pixel resolution, with viewing area measuring not less than 7.5" diagonal. User memory for storing critical pump operation data shall not be less than required for up to 1 year of data.

The operator interface shall allow the user to view and modify all pertinent operation parameters. The operator interface shall incorporate password protection for modification of critical pump station parameters. The operator interface capabilities shall include but are not limited to the following:

1. Overview screen showing pump system configuration. Screen shall show if each individual pump is enabled or disabled, the number of hours on each pump, station full flow and pressure design criteria. Water harvesting specific graphics to show tank level in "inches" and "gallons", and visual tank level gauge. Alternate water sources other than rainwater shall be displayed in total usage,

user re-settable, and real time flow rate (GPM). Total harvested water used and total non-harvested water used shall be displayed.

2. System screen with information on current regulation pressure, setpoint, regulation pressure, System status, restarts remaining, and VFD reference speed. Adjust settings button will allow changing parameters etc. after entering password.
3. Settings menu to allow changes to pressure regulation settings, pipe saver mode, VFD manual mode, analog calibration, flow calibration, program or register settings.
4. Flow screen will display pressure in PSI, flow in GPM and total gallons pumped in thousands of gallons. Separate display for total gallons pumped since last reset. Flow totalizers also included for each alternate water source in addition to harvested water (rainwater) used when flow sensor is used on alternate water source.
5. Alarm status with time stamping, display of pump station conditions at shutdown and restart. Alarms will be displayed in red when activated and a separate listing will be displayed in green when the alarm is reset. Alarms will be logged to a compact flash disk allowing the service technician to upload data to a spreadsheet type program.
6. Full control of and capability of monitoring, adjusting and viewing any options present such as water level control, inlet strainer, wye strainer, or discharge filtration. Adjustment of automatic/manual pressure regulation set points.
7. Graphing capability for up to 1 full year detailing flow rate and pressure. Graphing function shall give option to graph and plot a point every minute. The graph function will be selectable by day, month and year as well as the time of desired graph. All data will be logged to a compact flash disk allowing the service technician to upload data to a spreadsheet type program.
8. Time of use lock-out screen shall allow user to group any or all motors/selected devices to only operate in a desired time frame. Multiple digital time clocks built into the touch screen allow for (3) different user groups.

2.16 Pressure Transducer

- A. A solid state pressure transducer shall provide a noise free, linear output proportional to discharge pressure. Transducer shall be solid-state, strain gauge type with integral voltage regulation and output accuracy not less than 0.25%. Transducer shall be constructed of stainless steel and rated for the pump station discharge pressure. If filtration is also selected a second transducer will be used to monitor downstream pressure differential for filter flush logic.

2.17 Flow Sensor:

- A. A flow sensor shall be installed providing the pump station flow rate and total flow through the pump station operator interface device. The flow sensor shall be a six bladed design, which provides a low impedance signal proportional to the flow. The accuracy shall be plus/minus 2% of actual flow rate between flow velocities of 1-30 ft./sec. A flow meter run shall be included with a minimum of 5 pipe diameters straight run upstream and 2.5 pipe diameters downstream for proper meter accuracy. Flow sensor model must have internal noise filtering feature. A separate flow sensor of the same type and style shall be included with each alternate water source integrated into the pump station control platform.

2.19 Skid Wiring

- A. Skid wiring shall conform to National Electrical Code Standards. All wiring from control panels to on skid motors shall be in metal reinforced, water tight, flexible conduit with copper conductors rated not less than 600 volts and of proper size to carry the full load amperage of the motors without exceeding 70% capacity of the conductor. Flexible conduit runs shall not exceed six feet in length. A grounding cable sized to National Electrical Code requirements shall be included in the flexible conduit. There shall be no splices between the motor starters and the motor connection boxes.
- B. Wiring to flow sensors, and pressure transducer shall be multi-conductor, shielded cable suitable for Class II low voltage controls. Wiring to motor operated valves, (option available for VFD stations), shall be in flexible conduit with TFFN #18 gauge copper conductors rated not less than 600 volts.

2.20 Junction Boxes

- A. All off skid devices requiring control interface shall be terminated in a junction box. This junction box shall be located at the skid edge nearest the installation point of the off skid device. If motors are off skid, there will be a separate high and low voltage junction box. Do not run high and low voltage wire in same conduit from remote components to junction boxes.

2.21 Submersible Pump

- A. Pumps shall be submersible type. Bowl assembly including suction case, intermediate bowls and discharge bowls shall be of cast iron, stainless steel, or composite. The impellers shall be of stainless steel, bronze, or composite and statically balanced. Each pump shaft is to be turned, ground and polished stainless steel having a chromium content of not less than 12%. It shall be supported by bearings above and below each impeller. The size of each shaft shall be appropriate to transmit the horsepower required by the pump.

Pump Design Flow: 60GPM (includes filter flush flow rate and irrigation)
Pump Design TDH (includes pump station losses): 140TDH

2.22 SKID, PIPING, VALVES, GAUGES, & MECHANICAL EQUIPMENT

- A. **Base Construction:** Pump station skid shall be formed from a single sheet of 1/4" steel, continuous welded and smooth ground at all corners resulting in a seamless, one piece structure with rounded edges and corners. Two holes shall be located at each corner of the skid, for the purpose of lifting the pump station. The skid shall be strategically reinforced underneath with structural iron to support pumps, manifolds, control enclosures and periphery. The skid shall be drilled and tapped for mounting of pumps, manifolds, tanks, relief valves and other equipment. All tolerances shall be sufficient to permit direct bolting of pump station components to skid. No slotted holes shall be permitted in the pump station skid and no nuts or bolt heads shall be permitted on the underside of the skid.
- B. **Fabricated Piping:** All fabricated piping shall conform to ASTM specifications A53 for Grade B welded or seamless pipe. Discharge piping shall be schedule 40 steel. All welded flanges shall be forged steel slip-on or weld neck type. All welded fittings shall be seamless, conforming to ASTM Specification A234, with pressure rating not less than 150 psi.
- C. **Drains:** Drains are to be provided from any possible low point in the system and are to be equipped with 3/8 A or 1/4" brass valves.
- D. **Pump Check Valve:** Pump check valve(s) shall be located near discharge of pump and are to hold back entire system pressure. System will not function properly without check valve. Check valve to be rated for min 150psi working pressure and be of the inline silent or poppet type, and rated for the full pump design capacity.
- E. **Isolation Valves:** Any component requiring an isolation valve for service shall contain such. Valves are to be butterfly or ball valve type. Valves are to be rated for a minimum of 150psi.
- F. n/a
- G. n/a
- H. **Pressure Gauge:** A pressure gauge shall be located on the discharge manifold for the purpose of measuring regulated, pressure. Pressure gauge shall be 304 stainless steel case and bezel construction. Gauge shall be 4" diameter, liquid filled. Pressure sensing connection shall be 1/4" NPT lower gauge connection.

2.23 Filtration System

- A. The pump station shall be equipped with a filtration system to assure a clean water supply to the distribution system. The filtration shall consist of individual barrels containing removable filter elements. The number of barrels, the specific filter model number and filter screen micron rating shall be called out on the plans. Each removable filter element shall consist of a coarse screen in series with a fine screen. The fine screen shall be flushed periodically to remove accumulated debris.

Flushing initiation shall be upon pressure differential, timed interval, or total gallons through the filter, whichever occurs first. Flushing control shall be governed by the pump station PLC. Separate flushing controls shall not be accepted.

Flushing action shall be initiated by an electronically actuated butterfly valve or adjustable solenoid. Using a hydraulic diaphragm valve as the filter flush valve is not acceptable.

Operation: Water shall flow into the 316 stainless steel or composite filter body and through the 316 stainless steel filtering screen from the inside out allowing blocked contaminants to accumulate on the inside surface of the filtering screen. Differential pressure across the filtering screen shall be continuously monitored as the filter cake builds on the inside of the filtering screen. The differential pressure across screen shall be monitored using a pressure transducer upstream and downstream of the filter assembly. Using a differential pressure switch is not acceptable. The pump station control logic shall have the capability of graphically tracking the pressure across the filter for troubleshooting purpose locally at the pump station through the touch screen operator interface device and through the remote monitoring and control software. When the differential pressure reaches an adjustable threshold (recommended at 7 psi) a flush cycle shall be initiated by the opening of the electric butterfly valve. The opening of the flush valve drops the pressure inside the drive chamber allowing flow to reverse through the suction scanner nozzles. The suction scanner nozzles transfer this reduced pressure at the nozzle location onto the inside of the filtering screen surface. This reduced pressure on the inside of the filtering screen creates a reversed flow through the filtering screen, pulling the containments off the screen, back through the suction scanner nozzles and out the flush valve. Once the nozzles have traversed and cleaned the entire screen surface, the flush valve shall close stopping the flush cycle.

The drive mechanism of the filter shall not consist of electric motor, or limit switches to return the drive mechanism to its start position. The drive mechanism shall allow the suction scanner nozzles to traverse across the screen and return to their start position, and if required, to continue this cycle indefinitely without interrupting the flush flow. A hydraulic motor directly attached to the suction scanner shall drive the suction scanner.

The filter flush pipe shall extend to skid edge, and be reversible 180deg when a submersible pump is utilized. Flush line to contain a vacuum breaker to eliminate water hammer in flush line and promote draining of flush line. Flush line to also include a pressure gauge for filter diagnostics. Do not plumb filter flush pipe uphill, or under water.

The filter screen element shall be **316 stainless steel**

Filter Screen Size: 100 micron

2.24 Painting

- A. Painting of the entire unit shall consist of a multi-step coating system including metal preparation, a rust prohibitive epoxy prime coat and a two part ultraviolet insensitive polyurethane finish having a total dry film thickness of not less than 5 mils. Each coat will be applied and baked for one half hour at 165 degrees F.

PART 3: EXECUTION

3.1 INSPECTIONS AND REVIEWS

- A. Site Inspections:
 - 1. Verify site conditions and note irregularities affecting work of this section. Report irregularities to the Contracting Officer Representative prior to beginning work.
 - 2. Beginning work of this section implies acceptance of existing conditions.

3.2 EXCAVATION AND BACKFILLING

- B. Contractor to install and maintain safety fencing around all unattended excavation. Place safety signs adjacent to construction area roadway to the satisfaction of the Contracting Officer Representative.

3.3 PUMP STATION OFF LOADING & SETTING

- A. Off-loading & setting of the pump station is the responsibility of the **contractor**, unless specifically called out elsewhere in the specification. **Crane** to off-load and set the pump station on the concrete slab is to be provided by **contractor**.

3.4 SITE PREPARATION DRAWINGS

- A. Site preparation drawings shall be furnished by the manufacturer within two weeks after receipt of order. Drawings shall indicate pump station alignment, discharge piping size, and electrical services required from local contractor. The owner shall return one set of drawings marked approved or corrected within one week of receipt.

3.5 PUMP STATION START UP

- A. Technical start up shall be furnished by the pump station manufacturer or a qualified, Watertronics certified service agency. Location and mounting details shall be furnished by the pump station manufacturer. Electrical connection, by purchaser, shall consist of a single conduit from owners disconnect to the pump station main disconnect. Additional purchaser responsibility shall include confirming correct motor rotation and securing local inspection/approval.

3.6 TECHNICAL START-UP

- A. Pump station technical start-up. Procedures should include:
 - 1. Station start-up and pressurization
 - 2. Pressure, flow, automatic shut-down and programming adjustments
 - 3. Monitoring of irrigation cycle when possible. Technician will instruct operations personnel as to the operation, adjustment and maintenance of the pump station.
 - 4. Monitoring of automatic filter and filter pressure differential adjustments. Manual and automatic filter flush cycle.

3.7 PROJECT RECORD DRAWINGS

- A. The Contractor is responsible for documenting installed system and all changes to the design. Maintain on-site and separate from documents used for construction, one complete set of contract documents as Project Documents. Keep documents current. Do not permanently cover work until as-built information is recorded.
- B. Record pumping system alterations. Record work, which is installed differently than shown on the construction drawings. Record accurate reference dimensions.
- C. Prior to project completion label each sheet of the project drawings (redlines) as "Record Drawing" and turn over to Contracting Officer Representative for delivery to Engineer. Completion of the Record Drawings is a prerequisite for Final Inspection.

3.8 TESTING

- A. The pump station manufacturer shall conduct and document a complete factory dynamic test of the pump station prior to shipment. Pump station shall be tested throughout the entire operating range at the net discharge pressure called for in the technical specifications.
- B. Watertronics Dynamic Pump Test:
 - 1. Station full flow
 - 2. Station discharge pressure
 - 3. Individual pump pressure
 - 4. Individual pump flow
 - 5. Pump RPMs
 - 6. Pump curve (flow vs. TDH)
 - 7. Motor Voltage
 - 8. Motor frequency
 - 9. Motor Phase
 - 10. Motor Full Load Amps
 - 11. Motor amps at service factor (1.15)
 - 12. Motor Efficiency
 - 13. Vertical Motor vibration Standard Testing (V1, V2, H1, H2, A1, PH1, PH2)
 - 14. Power factor
 - 15. The test shall be documented for verification by the consulting engineer or owners' representative prior to delivery upon request.

3.9 WARRANTY

- A. The manufacturer shall warrant the pumping station to be free of defects and product malfunctions for a period of one year from date of startup or fifteen months after shipment, whichever occurs first. Failures caused by, lightning strikes, power surges, vandalism, flooding, operator abuse, or acts of God are excluded from warranty coverage. All warranties implied or otherwise shall not exceed those warranties extended by major or sub-component suppliers.

3.10 MAINTENANCE AND OPERATION INSTRUCTIONS

- B. Pumping System Maintenance:
1. Prior to Final Inspection, provide a one-day training session to operating personnel on proper operation and maintenance of the pumping system. Training session should be for a period of not less than 8-hours and cover aspects of maintaining, operating and repairing the new pumping system.
 2. Unless otherwise noted, provide irrigation operation and maintenance information in a 3-ring binder with table of contents and index sheet. Provide sections that are indexed and labeled. Provide the following information:
 - a. Catalog cut sheets for pumping system.
 - b. Manufacturer's Operation and Maintenance manuals including complete documentation for programming and recommended settings and adjustments.
 - c. Manufacturer's Technical Service Bulletins.
 - d. Manufacturer's Warranty Documentation.
 - e. Manufacturer's guide for troubleshooting operational problems.
 - f. Recommended routine maintenance inspections for weekly, monthly and annual inspections and recommended actions for the inspections and a recommended method for recording the findings of the inspections.
 - g. Predictive schedule for component replacement.
 - h. Listing of technical support contacts.
 3. Operation and maintenance submittal package must be complete prior to being reviewed by the Contracting Officer Representative. Incomplete submittals will be returned without review.

3.11 OPERATION AND MAINTENANCE MANUAL

- A. Operation and maintenance manuals shall be furnished at time of startup and initial training. Owner will also receive training specific to this station as specified.

3.12 CLEANUP

- A. Upon completion of work, Contractor to remove from the site all machinery, tools, excess materials, and rubbish.
- B. Clean all surfaces and touch up scratches on pumping system or piping with factory paint to match original

End of Section

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Seeding.
2. Plugging.
3. Sprigging.
4. Meadow grasses and wildflowers.
5. Erosion-control material(s).

- B. Related Sections:

1. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling.
2. Division 31 Section "Earth Moving" for excavation, filling and backfilling, and rough grading.
3. Division 32 Section "Planting Irrigation " for lawn irrigation.
4. Division 32 Section "Planting".

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.
- E. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- C. Qualification Data: For qualified landscape Installer.
- D. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- E. Material Test Reports: For existing surface soil and imported topsoil.
- F. Planting Schedule: Indicating anticipated planting dates for each type of planting.
- G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
 - 2. Maintenance Proximity: Not more than one hours' normal travel time from Installer's place of business to Project site.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
 - 1. Report suitability of topsoil for lawn growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- D. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

1.7 PROJECT CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
 - 1. Spring Planting: March 15 – May 30.
 - 2. Fall Planting: September 15 – November 30.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.8 MAINTENANCE SERVICE

- A. Initial Lawn Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
 - 1. Seeded Lawns: 90 days from date of substantial Completion.
 - a. When initial maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.
- B. Continuing Maintenance Proposal: From Installer to 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.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Lawn Area Seed Mix:
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. PENNDOT Formula B, or approved equal.
- C. Terraced Bioswale Seed Mix: Proprietary seed mix as follows:
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Detention Basin - Bioswale Seed Mix
- b. Manufacturer: Prairie Nursery, Inc., or approved equal.
- c. Quantity: 1/4lb per 10,000sq/ft, or 10lbs per acre

2.2 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes.
 - 2. Topsoil Source: Import topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes.
 - 3. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - a. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes.

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
 - 2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.
 - 3. Provide lime in form of dolomitic limestone.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.

- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated.
- E. Perlite: Horticultural perlite, soil amendment grade.
- F. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.
- G. Sand: Clean, washed, natural or manufactured, free of toxic materials.
- H. Diatomaceous Earth: Calcined, diatomaceous earth, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 to 60 percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
- C. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
 - 1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. (2.4 kg/cu. m) of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5 PLANTING ACCESSORIES

- A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.6 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.7 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

2.8 PLANTING SOIL MIX

- A. Planting Soil Mix: See section 329300 "Planting".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 LAWN PREPARATION

- A. Limit lawn subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches (150 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
 - 2. Spread planting soil mix to a depth of 6 inches (150 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately 1/2 the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil mix.
 - b. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- E. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

3.5 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate 5 lb / 1000 sq. ft or 220 lbs per acre.
- C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with erosion-control mats where shown, installed and anchored according to manufacturer's written instructions.
- F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

3.6 LAWN MAINTENANCE

- A. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.
 - 1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
- B. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches (100 mm).
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water lawn with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate.
 - 3. Water as needed in warmer months, 2x per week, or more in drought conditions.
 - 4. Utilize pop-up sprayhead or other installed irrigation system to maximize water delivery efficiency.

- C. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
 - 1. Mow bi-weekly during growing season to 3 - 5 inches (higher in summer)
 - 2. A mulching mower is recommended.
 - 3. Push mower or string trimmer may be required on Play Mounds.
 - 4. Exercise caution on sloped lawns, and avoid scraping soil at slope changes.
- D. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
 - a. Only as needed and based on soil tests
 - b. At planting: higher potassium and phosphorus recommended mixed into soil prior to seeding/sodding.
 - c. After lawns are established: mix of nitrogen, potassium and phosphorus based on soil tests.
 - d. Natural fertility is generally adequate so apply only as needed. Use 1lb. of nitrogen per 1,000 square feet in September and November. Do not fertilize past March 15. Use slow release formulas.

3.7 SATISFACTORY LAWNS

- A. Lawn installations shall meet the following criteria as determined by Construction Manager:
 - 1. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm).
- B. Use specified materials to reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.8 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris, created by lawn work, from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

SECTION 329300 - PLANTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Trees.
2. Shrubs.
3. Ornamental Grasses.
4. Perennials.
5. Topsoil.
6. Inorganic Soil Amendments.
7. Organic Soil Amendments.
8. Fertilizer.
9. Planting Soil Mix.
10. Mulch.

- B. Related Sections:

1. Division 31 Section "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
2. Division 31 Section "Earth Moving" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
3. Division 31 Section "Erosion Controls".
4. Division 32 Section "Turf and Grasses" for lawn and meadow planting.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than sizes indicated; wrapped, tied, rigidly supported, and drum laced as recommended by ANSI Z60.1.
- C. Container-Grown Stock: Healthy, vigorous, well-rooted exterior plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of exterior plant required.
- D. Finish Grade: Elevation of finished surface of planting soil.

- E. **Manufactured Topsoil:** Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- F. **Multi-Stem:** Where three or more main stems arise from the ground from a single root crown or at a point right above the root crown.
- G. **Planting Soil:** Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- H. **Plugs:** container-grown stock used for planting (see container-grown stock).
- I. **Subgrade:** Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- J. **Subsoil:** All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- K. **Mycorrhizal Inoculant:** To be used instead of commercial fertilizer, which promotes the growth of weeds. Inoculation with beneficial mycorrhizae greatly improves the survival, growth rate and disease resistance as compared to plants with no or few mycorrhizae. The more severe the site conditions, the more obvious the beneficial effect from mycorrhizae.

1.4 SUBMITTALS

- A. **Product Data:** For each type of product indicated.
- B. **Qualification Data:** For qualified landscape Installer.
- C. **Product Certificates:** For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis for standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- D. **Material Test Reports:** For existing surface soil and imported topsoil.
- E. **Planting Schedule:** Indicating anticipated planting dates for plants.
- F. **Maintenance Instructions:** Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.
- G. **Warranty:** Sample of special warranty.

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** A qualified landscape installer whose work has resulted in successful establishment of exterior plants.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
 1. Report suitability of topsoil for plant growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
 1. Selection of plants purchased under allowances will be made by Construction Manager, who will tag plants at their place of growth before they are prepared for transplanting.
- E. Tree and Shrub Measurements: Measure according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above the ground for trees up to 4-inch caliper size, and 12 inches above the ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.
- F. Observation: Construction Manager may observe trees and shrubs either at place of growth or at site before planting for compliance with requirements for genus, species, variety, size, and quality. Construction Manager retains right to observe trees and shrubs further for size and condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
 1. Notify Construction Manager of sources of planting materials seven days in advance of delivery to site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in shade, protect from weather and mechanical damage, and keep roots moist.
 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 2. Do not remove container-grown stock from containers before time of planting.
 3. Water root systems of plants stored on-site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

- B. Do not prune trees and shrubs before delivery except as approved by Construction Manager. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during delivery. Do not drop plants during delivery and handling.
- C. Handle planting stock by root ball.

1.7 PROJECT CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: March 15 – May 30
 - 2. Fall Planting: September 15 – November 30, or upon dormancy of specified plant material.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed according to manufacturer's written instructions and warranty requirements.
- C. Coordination with Lawns: Plant trees and shrubs after finish grades are established and before planting lawns unless otherwise acceptable to Construction Manager.
 - 1. When planting trees and shrubs after lawns, protect lawn areas and promptly repair damage caused by planting operations.

1.8 WARRANTY

- A. Special Warranty: Installer's standard form in which Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - 2. Warranty Periods from Date of Substantial Completion:
 - a. Trees and Shrubs: One year.
 - b. Ground Cover, Ornamental Grasses, and Herbaceous Plants: One year.
 - 3. Include the following remedial actions as a minimum:
 - a. Remove dead plants immediately. Replace immediately unless required to plant in the succeeding planting season.

- b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
- c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
- d. Provide extended warranty for replaced plant materials; warranty period equal to original warranty period.

1.9 MAINTENANCE SERVICE

- A. Initial Maintenance Service for Trees and Shrubs: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.
 - 1. Maintenance Period: 12 months from date of Substantial Completion.
- B. Initial Maintenance Service for Ground Cover, Ornamental Grasses and Herbaceous Plants: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.
 - 1. Maintenance Period: 12 months from date of Substantial Completion.
- C. Continuing Maintenance Proposal: From Installer to 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.

PART 2 - PRODUCTS

2.1 TREE AND SHRUB MATERIAL

- A. General: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Provide trees and shrubs of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Construction Manager, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1.
- D. Label each tree and shrub with securely attached, waterproof tag bearing legible designation of botanical and common name.

- E. Label at least one tree and one shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.
- F. If formal arrangements or consecutive order of trees or shrubs is shown, select stock for uniform height and spread, and number label to assure symmetry in planting.
- G. All trees and shrubs shall be grown in nurseries north of Maryland.

2.2 SHADE AND FLOWERING TREES

- A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60.1 for type of trees required.
- B. Small Flowering Trees: Branched or pruned naturally according to species and type, with relationship of caliper, height, and branching according to ANSI Z60.1; stem form as follows:
 - 1. Stem Form: Single trunk or Multi-trunk clump. See Drawings.
- C. All shade and flowering trees shall be grown in nurseries north of Maryland.

2.3 DECIDUOUS SHRUBS

- A. Form and Size: Shrubs with not less than the minimum number of canes required by and measured according to ANSI Z60.1 for type, shape, and height of shrub.
 - 1. Shrub sizes indicated are sizes after pruning.
 - 2. Provide balled and burlapped] or container-grown shrubs.
- B. All shrubs shall be grown in nurseries north of Maryland.

2.4 CONIFEROUS EVERGREENS

- A. Form and Size: Normal-quality, well-balanced, coniferous evergreens, of type, height, spread, and shape required, complying with ANSI Z60.1.
- B. Form and Size: Specimen quality as described, symmetrically shaped coniferous evergreens.
 - 1. Shearing Designation: Natural, never sheared (N) or Semi-sheared or lightly sheared (LS)
 - 2. Provide balled and burlapped trees.
- C. All coniferous evergreens shall be grown in nurseries north of Maryland.

2.5 BROADLEAF EVERGREENS

- A. Form and Size: Normal-quality, well-balanced, broadleaf evergreens, of type, height, spread, and shape required, complying with ANSI Z60.1.
- B. Form and Size: Specimen quality as described, symmetrically shaped broadleaf evergreens.
 - 1. Shearing Designation: Natural, never sheared (N), Semi-sheared or lightly sheared (LS)
 - 2. Provide balled and burlapped trees.
- C. All broadleaf evergreens shall be grown in nurseries north of Maryland.

2.6 GROUND COVER PLANTS

- A. Ground Cover: Provide ground cover of species indicated, established and well rooted in pots or similar containers, and complying with ANSI Z60.1.
- B. All ground cover plants grasses shall be grown in nurseries north of Maryland.

2.7 ORNAMENTAL GRASSES

- A. Provide health, 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 no with excessive root growth encircling the container.
- B. All ornamental grasses shall be grown in nurseries north of Maryland.

2.8 PERENNIALS:

- A. Provide healthy, field-grown plants from a commercial nursery, of species and variety shown or listed, complying with requirements in ANSI Z60.1.
- B. All perennials shall be grown in nurseries north of Maryland.

2.9 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1/2 inch or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

- a. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs or marshes.

2.10 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
 2. Provide lime in form of dolomitic limestone.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated
- E. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials.

2.11 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 1. Organic Matter Content: 50 to 60 percent of dry weight.
 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- C. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
- D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.12 FERTILIZER

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.13 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of the following:
 - 1. Type: Shredded hardwood

2.14 EVERGREEN TREE STABILIZATION MATERIALS

- A. Stakes and Guys:
 - 1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
 - 2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes.
 - 3. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, 2-strand, twisted, 0.106 inch in diameter.
 - 4. Hose Chafing Guards: Reinforced rubber or plastic hose at least 1/2 inch in diameter, black, cut to lengths required to protect tree trunks from damage.
 - 5. Guy Cables: 5-strand, 3/16-inch- diameter, galvanized-steel cable, with zinc-coated compression springs, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
 - 6. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

2.15 PLANTING SOIL MIX

- A. Planting Soil Mix: Mix topsoil with the above soil amendments and fertilizers as required to produce satisfactory planting soil based on tests of imported and existing soils.

2.16 AMENDED SOIL PLANTING MIX

- A. Terraced Bioswales: See Civil specifications for planting soil in these areas.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing plants from damage caused by planting operations.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Construction Manager's acceptance of layout before planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Construction Manager. Stake locations of individual trees and shrubs and outline areas for multiple plantings.
- E. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 PLANTING BED ESTABLISHMENT

- A. Loosen subgrade of planting beds to a minimum depth of 8 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply fertilizer directly to subgrade before loosening.
 - 2. Thoroughly blend planting soil mix off-site before spreading.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
 - 3. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

- a. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil mix.
- B. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Before planting, restore planting beds if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Pits and Trenches: Excavate circular pits with sides sloped inward. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.
 - 1. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
 - 2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
- B. Subsoil removed from excavations may be used as backfill but only as amended per recommendations from soil testing.
- C. Obstructions: Notify Construction Manager if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations. This includes unsatisfactory soils which may inhibit plant growth.
- D. Drainage: Notify Construction Manager if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, PERENNIAL, AND ORNAMENTAL GRASS PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1.
- B. Set balled and burlapped stock plumb and in center of pit or trench with top of root ball 1 inch above finish grades.
 - 1. Remove burlap and wire baskets from tops of root balls and partially from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 2. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no

more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

- C. Set container-grown stock plumb and in center of pit or trench with top of root ball flush with adjacent finish grades.
 - 1. Carefully remove root ball from container without damaging root ball or plant.
 - 2. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.
- D. Organic Mulching: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of planting pit or trench. Do not place mulch within 3 inches of trunks or stems.

3.6 TREE AND SHRUB PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.

3.7 MULCHING AT TREES

- A. Mulch backfilled surfaces of planting beds and other areas indicated. Provide mulch ring around trees in lawn areas.
 - 1. Organic Mulch: Apply 3-inch average thickness of organic mulch, and finish level with adjacent finish grades. Do not place mulch against plant stems.

3.8 PLANT MAINTENANCE

- A. Tree and Shrub Maintenance: Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, adjusting and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings. See supplemental Landscape Maintenance Narrative for further guidance.
- B. Ground Cover and Plant Maintenance: Maintain and establish plantings by watering, weeding, fertilizing, mulching, and other operations as required to establish healthy, viable plantings.

3.9 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

- B. Protect plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

3.10 DISPOSAL

- A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 329300

SECTION 329600

TREE TRANSPLANTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes requirements for transplanting the existing street trees on the perimeter of the site, to be delivered to City of Pittsburgh in coordination with City Forester.
 - 1. Delivery address: 6250 Station Ave., Pittsburgh, PA 15206
- B. Related Sections:
 - 1. Division 31 Section 312000 "Earthwork" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
 - 2. Division 32 Section 329200 "Planting" for planting soil, mulch.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: Statement of qualifications including not less than five years experience in tree transplantation in the State of Pennsylvania.
- C. Planting Schedule: Indicating anticipated planting dates for transplanting trees including:
 - 1. Time of year for transplanting.
 - 2. Transplanting methods.
 - 3. Follow-up care and maintenance.
- D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

1.3 QUALITY ASSURANCE

- A. Coordinate with City Forester: Lisa Ceoffe, lisa.ceoffe@pittsburghpa.gov

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune the tree before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide

protective covering of exterior plants during delivery. Do not drop exterior plants during delivery and handling.

- B. Handle planting stock by root ball.
- C. Deliver tree after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set the tree in shade, protect from weather and mechanical damage, and keep roots moist.

1.5 SEQUENCING AND SCHEDULING

- A. Proceed and coordinate work as the site becomes available, consistent with seasonal limitations for transplanting.
- B. Owner's representative will select and tag at the site, the tree material to be transplanted to the project site.
- C. Transplant the tree during cool weather. Avoid moving the tree on very hot, dry, or windy days.

1.6 FINAL ACCEPTANCE

- A. Work under this Section will be accepted by Architect upon satisfactory completion of all work including maintenance, but exclusive of replacement of tree materials under warranty period. Upon Final Acceptance, Owner will assume responsibility of maintenance of the work.

1.7 WARRANTY

- A. Special Warranty: Installer's standard form in which Installer agrees to repair or replace the trees and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including tree falling or blowing over.

1.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area

is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TREE MATERIAL

- A. General: Trees to be transplanted shall be as shown on the plans

2.2 Burlap for Root Ball

- A. Burlap shall be a natural fabric. No nylon burlap shall be permitted.

2.3 Cord or Rope

- A. Cord or rope shall be sisal twine. Nylon rope shall not be permitted.

2.4 Mycorrhizal Fungi Inoculant

- A. Shall be applied by means of a three ounce (3 oz.) premeasured dry formulation packet, such as Mycor Tree Saver Transplant®, as manufactured by Plant Health Care, Inc., Pittsburgh, PA; Rhizanova Tree Transplant, as manufactured by Becker Underwood, Inc., Ames, IA; or approved equal. Packets shall contain, as a minimum: one thousand (1000) live spores of Vesicular- Arbuscular fungi, including: *Entrophosphora columbiana*, *Glomus clarum*, *Glomus etunicatum*, and *Glomus sp.*; seventeen million five hundred thousand (17,500,000) live spores of Ectomycorrhizal fungi (*Pisolithus tinctorius*); Biostimulant ingredients including *Yucca schidigera* extract; soluble sea kelp extract derived from *Ascophyllum nodosum*; humic acids; and acrylamide copolymer gel as a water absorbent medium. Mycorrhizal fungi inoculant shall be added to the top six to eight inches (6-8") of backfill soil in each planting pit and thoroughly mixed to distribute the inoculant. The material shall be applied according to the following chart:

<u>Size of rootball or container</u>	<u>Ounces per plant</u>
20" B&B	6
24" B&B	9
30" B&B	9
36" B&B	12
42" B&B	12
48" B&B	15

60" B&B	18

72" B&B	21

96" B&B	27

2.5 Fertilizer Tablets

- A. Shall be Healthy Start Macro Tablets®, as manufactured by Plant Health Care, Inc., Pittsburgh, PA, or approved equal. The tablets shall have a nutrient analysis of 12-8-8 and contain a minimum twelve percent (12%) humic acid by weight, as well as biostimulants derived from sea kelp, amino acids, and a wetting agent derived from Yucca schidigera. Tablets shall contain a minimum 650,000 each of the following beneficial bacteria: nitrogen fixing, phosphorus solubilizing, and growth promoting. Twenty one gram (21 gm.) twenty four month (24 mo.) release tablets shall be added to the top four inches (4") of backfilled soil in the rates indicated on the following chart:

<u>Size of rootball or container</u>	<u>Tablets per plant</u>

20-24" B&B	5

30-36" B&B	6

42-48" B&B	8

54-60" B&B	12

2.6 Water Retention Additive

- A. Water Retention Additives shall be a granular polyacrylamide polymer of a potassium base and not a sodium base that slowly releases moisture into the root zone such as Terra Sorb, as manufactured by Plant Health Care, Inc., 440 William Pitt Way, Pittsburgh, Pa., or approved equal. It shall be applied at the time of planting during a dry planting as defined by Parks and Recreation. When planting trees, each tree shall receive three (3) ounces or amount specified by product instructions. Half should be added at a depth of 8-10 inches and the other half just below the finished surface. When planting shrubs, perennials or annuals apply as per product instructions.

PART 3 - EXECUTION

3.1 PREPARATION

- A. All precautions customary in good trade practice shall be taken in preparing plants for moving, and workmanship that fails to meet the highest standards will be rejected. All plants shall be dug immediately before moving unless otherwise directed. All plants shall be dug to retain as many fibrous roots as possible. Balled and burlapped plants shall have a solid ball of earth of minimum specified size according to the American Standard for Nursery Stock securely held in place by burlap and sisal twine. Root balls under

fourteen inches (14") in diameter may be laced with two (2) ply sisal and root balls fourteen inches (14") and over shall be laced with three (3) ply sisal. Root balls that are fourteen inches (14") in diameter and over require Drum Lacing and shall be inspected by the certified Arborist before moving. Loose, broken, and wire caged balls will be rejected. All rejected material shall be immediately removed from the site and replaced with acceptable material at no additional cost.

- B. Bare root plants shall conform to the same standards for balled and burlapped plant material and shall be adequately protected from drying out and immediately heeled in moist soil until planting.

3.2 TIME OF PLANTING AND TRANSPLANTING

- A. Unless otherwise directed deciduous material shall be transplanted from March 1st to May 1st and from October 15th to December 1st.

3.3 EXCAVATION OF PLANTING PITS

- A. Sizes of planting pits shall be as shown on the plans. The Contractor shall set aside the excavated soil and backfill with the unamended native soil.
- B. Where excavation is done by backhoe (or any comparable machine) extreme care shall be taken not to excavate too deeply. This will insure the least amount of settling, which is important to achieve a proper planting grade. If planting pits are dug before plant material is on site, the pits shall only be excavated to two-thirds (2/3) the depth of a standard pit, the final depth to be adjusted at the time of planting. If any backfilling is required, the soil under the root ball is to be compacted sufficiently to ensure no further settling or sinking.

3.4 PLANTS

- A. No transplanting shall be done except in the presence of the certified Arborist. While plants with exposed roots are being distributed in planting beds or are awaiting planting after distribution, the Contractor shall protect the roots from drying out and the means employed shall be satisfactory to the certified Arborist. In general, all plants shall stand, after settlement, at the same level at which they have grown. Care shall be exercised in setting the plants plumb with the "good face" to the outside. All ropes, stones, etc., shall be removed from the pit before backfilling. Soil for backfilling shall be loose and friable.
- B. Balled and burlapped plants shall be handled so that the ball will not be loosened or broken. After the soil has been thoroughly firmed under and around the lower half of the ball, the burlap shall be cut away from upper half of the ball and the remaining burlap adjusted to prevent the formation of air pockets. Soil shall be firmed at six (6") to eight inch (8") intervals and thoroughly settled with water the same day of planting.
- C. Bare root plants shall be placed in the proper position in the center of the pit after the soil in the bottom of the pit has been firmed. Roots shall be arranged in their natural position and loose friable topsoil worked in among them, firmed at intervals and thoroughly settled with water. Care shall be taken to avoid bruising or breaking the roots when

tamping the soil. All large and fleshy roots which are bruised or broken shall be pruned with a clean cut before planting

3.5 FINISHING SURFACE AFTER BACKFILLING

- A. The Contractor shall cultivate and rake over finished planting areas and shall leave them in an orderly condition. On level ground or slight slopes a shallow basin a little larger than the diameter of the plant pit shall be left around each plant as shown on the plans or as directed by the Architect. On steep slopes the soil on the lower side of the plant shall be graded in such a manner that it will catch and hold water, as shown on the plans or as directed by the Architect. The transplanted plants shall be watered with a minimum of twenty (20) gallons each, water the mycorrhizal powder added to the water as per manufacturer's directions. Mycorrhizal powder may also be added to the backfill soil, as per manufacturer's directions.
- B. After the shallow tree basins and plant saucers and shrub beds have been prepared, they shall be mulched, three to four inches (3-4") in depth, inside and along the outside edge of the basins/saucers. Mulch shall consist of shredded bark not exceeding three inches (3") in length and one inch (1") in width. Mulch contaminated with leaves, twigs, and/or debris shall not be acceptable. Only mulch derived from tree material, not from wood waste products like sawdust, shall be acceptable. Mulch for tree pits and shrub and/ or perennial beds shall be included in the bid price. After placing mulch on tree pits, the tree irrigation bags shall be installed and filled as per manufacturer's recommendations. Tree irrigation bags shall be included in the unit prices bid for the various Contract Items.

3.6 TREE PRUNING

- A. Each plant shall be pruned to preserve its' natural character and in a manner appropriate to its' particular requirements. Dead, broken, or badly bruised crossing and rubbing branches shall be removed with a clean cut. In general, at least one-fourth (1/4) of the wood of deciduous plants shall be removed by thinning or shortening branches. Double leaders and multiple branched crotches shall be corrected.
- B. No leaders shall be cut. All pruning shall be done with sharp tools in accordance with instructions of the certified Arborist.

3.7 STAKING

- A. All staking shall be done immediately after planting and all stakes and wire maintained. Plants shall stand plumb after staking. Stakes shall be of white cedar with bark attached. They may have a maximum allowable deflection of ten percent (10%).
- B. Stakes shall be placed outside of the root ball and shall be driven thirty-six inches (36") into the ground for all trees under three and one-half inches (3-1/2") in caliper and shall be driven forty-eight inches (48") into the ground for all larger trees. Stakes shall be fastened to the tree with double #12 gauge, annealed, galvanized, steel wire run through a suitable length of new reinforced one-half inch (1/2") rubber hose. Stakes shall be set

parallel to the contours, curbs, or walks unless otherwise directed by the certified Arborist. Trees shall be staked as follows:

1. Major trees less than three and one-half inches (3 1/2") in caliper shall have two (2) stakes eight feet (8') long with a minimum stake diameter of three inches (3").
2. Major trees four (4") in caliper shall have three (3) stakes ten feet (10') long with a minimum stake diameter of three inches (3").

3.8 SPRAYING WITH ANTI-DESICCANT

- A. The Contractor shall spray all Plant Material with an anti-desiccant, using an approved power sprayer to apply an adequate film over trunks, branches, twigs, and/or foliage, as directed by the Architect. The anti-desiccant shall be an emulsion which will provide a protective film over plant surfaces, permeable enough to permit transpiration. The anti-desiccant shall be Hydrotec-100, by Botanical Security Products Co., New York, NY; or Wilt Pruf, NCF, as manufactured by Nursery Specialties Products, Greenwich, CT; or approved equal. Anti-desiccants shall be delivered in containers of the manufacturer, shall be mixed according to directions, and applied to plant material within forty-eight (48) hours of each day's planting that is completed.

3.9 WATERING

- A. At the time of planting, the soil around each plant shall be thoroughly saturated with water and shall be thoroughly watered as seasonable conditions require throughout the entire maintenance period.

3.10 TREE IRRIGATION BAGS

- A. When planting trees, the Contractor shall provide irrigation bags and fill them so as to provide a minimum one inch (1") rainfall equivalent per week after the initial planting saturation. The irrigation bags shall be one hundred percent (100%) reinforced UV stable polyethylene, at least ten (10) mils. thick with a polyester scrim lining, such as TreeGator, as manufactured by Spectrum Products, Raleigh, NC, or approved equal. The irrigation bags shall have a minimum twenty gallon (20 gal.) capacity, and the Contractor shall fill the bags to capacity at least once per week during the contract period. The bags shall be installed with two (2) holes open to provide a drip time of six to ten hours (6- 10 hrs.).

3.11 PLANT MAINTENANCE

- A. The Contractor shall maintain all transplanted areas within the limits of this contract in accordance with the plans and specifications and directions of the Architect until one year after the final inspection and until final acceptance and completion of all planting items of the contract.
- B. The Contractor shall submit for approval a proposed maintenance schedule specifying men, materials, and equipment required to comply with maintenance provisions. The

proposed schedule shall commence three (3) weeks from the date of final inspection. The Contractor shall supply a receipt for work order forms.

- C. Maintenance shall include watering, weeding, cultivating, control of insects, fungus, and other diseases by means of spraying with an approved insecticide or fungicide; pruning; adjustments and replacement of stakes, anchors and wires; repair of minor washouts and gullies up to twelve inches (12") in depth; and other horticultural operations necessary for the proper growth of all plants and for keeping the entire area within the contract limits neat in appearance. Where applicable, and as directed by the Architect, the Contractor shall trim or shear all deciduous or evergreen hedges or massed shrub beds during June 1-15, July 15-30, and September 1-15.
- D. The maintenance period shall extend from May 1st to October 15th and maintenance shall be repeated at least every three (3) weeks. Dead, dying, or undesirable plants shall be removed during this period and noted on the Contractor's work order form. Under no conditions shall weeds be allowed to attain more than six inches (6") of growth. The cost of maintenance shall be included in the unit price bid of the contract.
- E. At the expiration of the guarantee period, unless specifically directed by the Architect, the Contractor shall leave the entire area cultivated and weed free and shall remove all stakes, burlap, and wires. All saucers in seeded or sodded areas shall be leveled and seeded with the same mixture as specified within the appropriate contract item of seed or sod.

3.12 REPLACEMENT

- A. The Contractor shall replace, in accordance with the contract plans and specifications, the tree material that is dead or, in the opinion of the Architect, in an unhealthy or unsightly condition, and/or have lost its natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or other causes, including vandalism, prior to final acceptance, in the next planting season. There shall be a one (1) year guarantee on plant material commencing after the final acceptance and the completion of the whole work of this contract. When instructed by the Architect, the tree material that has died after final acceptance shall be replaced in the next appropriate planting season even when the next planting season falls outside the one year period. Tree material that dies within the one (1) year guarantee period shall be replaced as many times as necessary. The cost of replacements(s) shall be included in the unit price bid of the contract.
- B. Where dead plant material has been identified, whether due to natural causes or vandalism, the Contractor shall remove the dead material, including stakes, and wire (if applicable) within three (3) weeks of notification

3.13 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Clean all areas as required for complete and acceptable inspection.

END OF SECTION

SECTION 331114

SECTION 33 11 14 - DRINKING FOUNTAIN

PART 1 - GENERAL

1.1 Submittals:

A. Review Submittals:

1. Product Data: Manufacturer's standard data sheets describing components including materials, dimensions, relationship to adjacent construction, and attachments.

PART 2 - PRODUCTS

2.1 Manufacturers:

- A. Contract Documents are based on products by MDF 400 Series Drinking Fountain.
- B. Substitutions: Or approved equal.

2.2 Components:

A. Drinking Fountain:

1. Model: MDF 400 series.
2. Description: Receptor Bowl is 18 gauge electro-polished stainless steel bowl. Bowl overlaps pedestal, preventing build-up of residue in visual drinking area. Optional SS Bowl Strainer recommended for areas with sand.

Bubbler head is stainless steel anti-squirt head (weighing a pound and a half) mounted with lock nut and washer to prevent tampering. Lock nut pin holds bubbler in locked position to prevent twisting or turning. The MDF bubbler head's unique design features a constant steady stream trajectory and a built in natural shield from contamination.

Control Valve is 304 stainless steel with circumference exceeding 8.6". Mushroom style push bar overlaps and prevents sand and other objects from sticking push bar in the ON position. Stainless steel housing standard on both standard and stainless steel pedestals.

Lead free water supply is maintenance-free reinforced nylobraid tubing and fittings, NSF-61 certified. This tubing is not plastic. Supplied with a ½" MIP threaded inlet with a stainless steel strainer. Union fittings at every connection. Supply line stops above grade.

Color by owner.

PART 3 - EXECUTION

3.1 Installation:

- A. Install components in accordance with manufacturer's instructions and approved product data submittals.
- B. Set plumb, level, and rigid.

END OF SECTION

SECTION 331115

SECTION 33 11 15 - GROUND HYDRANTS

PART 1 - GENERAL

1.1 Submittals:

- A. Review Submittals:
 - 1. Product Data: Manufacturer's standard data sheets describing components including materials, dimensions, relationship to adjacent construction, and attachments.

PART 2 - PRODUCTS

2.1 Manufacturers:

- A. Contract Documents are based on products by Jay R. Smith Mfg. Co.
- B. Substitutions: Under provisions of Division 01.

2.2 Components:

- A. Hydrant:
 - 1. Model: No. 5810 series.
 - 2. Description: Bronze non-freeze ground hydrant with "T" handle key, and bronze hydrant box

PART 3 - EXECUTION

3.1 Installation:

- A. Install components in accordance with manufacturer's instructions and approved product data submittals.
- B. Set plumb, level, and rigid.

END OF SECTION

DIVISION 33

SECTION 33 30 00 –SANITARY SEWERAGE UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, equipment, and appurtenances and materials necessary for the satisfactory installation of sanitary pipes and structures, in accordance with the Construction Drawings.

1.2 RELATED SECTIONS

- A. Section 03 20 00 – Site Concrete Reinforcement
- B. Section 03 30 00 – Cast-in-Place Concrete
- C. Section 31 05 16 – Aggregates for Earthwork
- D. Section 31 23 17 – Trenching
- E. Section 31 23 19 – Dewatering
- F. Section 31 23 20 – Sheeting, Bracing, and Shoring
- G. Section 31 25 00 – Erosion and Sediment Controls
- H. Section 33 05 25 – Trenchless Utility Installation

1.3 SUBMITTALS

- A. Comply with the contract provisions for submittals.
- B. Certificates
 - 1. Submit materials certificates for material covered by this section and shop drawings as specified signed by material supplier and Contractor, certifying that materials comply with, or exceed, the requirements of this Section.
- C. Shop Drawings
 - 1. Manholes
 - a. Submit detailed shop drawings of manhole sections, precast manhole bases, manhole steps, manhole frames and covers (with inscription), and manufacturers' descriptive literature for the pipe to manhole flexible connections (if used).
- D. Submit results for the tests performed on the sanitary sewer system.

1.4 PROJECT RECORD DOCUMENTS

- A. Provide pre-construction video inspection of existing public sanitary pipes in the area of proposed tie-ins per PWSA requirements.

- B. Accurately record actual locations of pipe runs, manholes, connections, cleanouts, Wye Pipes, laterals, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions and location of uncharted utilities.

1.5 REFERENCES

- A. The Pittsburgh Water and Sewer Authority (PWSA) and Pennsylvania Department of Environmental Protection (PADEP) construction and testing requirements.
- B. American Society for Testing and Materials (ASTM)
 - 1. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections
 - 2. C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
 - 3. C990, Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
 - 4. C1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test
 - 5. D3034, Specification for Type PMS Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
 - 6. D3212, Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 - 7. F477, Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - 8. F789, Specifications for Type PS46 Poly (Vinyl Chloride) (PVC Plastic Gravity Sewer Pipe and Fittings.
 - 9. F1417, Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
- C. Federal Specifications (FS)
 - 1. HH-P-117, Packing, Jute, Twisted
 - 2. QQ-C-40(2), Caulking, Lead Wool and Lead Pig
- D. Uni-Bell PVC Pipe Association
 - 1. Uni-B-6, Recommended Practice Low Pressure Air Testing of Installed Sewer Pipe
- E. Pennsylvania Department of Transportation (PennDOT)
 - 1. Publication 34 (Bulletin 14), Aggregate Producers, latest edition
 - 2. Publication 35 (Bulletin 15), Approved Construction Materials, latest edition
 - 3. Publication 72, Standards for Roadway Construction, Series RC-0 to RC-100, latest edition and subsequent supplements

4. Publication 408, Specifications, latest edition and subsequent supplements.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Pipe bedding, unless otherwise indicated, shall be AASHTO No. 67 Aggregate.
 1. Supplier shall be listed in PennDOT Bulletin 14.
- B. Sanitary sewer piping and fittings shall be of size and type indicated on the drawings and shall conform to the following:
 1. The product supplied under this specification shall be SDR-35 Polyvinyl Chloride (PVC) pipe conforming to ASTM D3034
 2. Flexible Elastomeric Seals: ASTM D3212
 - a. Seal Material: ASTM F477
 3. Pipe shall be continuously labeled with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification.
 4. Vitrified Clay Pipe in accordance with ASTM C700 – C425
- C. Sanitary and Drop Manholes
 1. Sanitary Manholes shall conform to PennDOT Publications 72 and 408 and PWSA requirements.
 2. Pre-cast manhole and manhole components shall be supplied by a manufacturer listed in PennDOT Bulletin 15 and conform to ASTM C478.
 - a. Eccentric cone top sections; minimum 30" access opening unless otherwise indicated.
 - b. Precast riser sections of length to suit.
 - c. Precast bases shall be of a design compatible with the precast riser sections.
 - d. Joints shall have O-ring gaskets or two (2) Rings of Kent-Seal No. 2 flexible sealant conforming to ASTM C361 and C443.
 3. Concrete and masonry materials for construction of manholes shall conform to Section 03 30 00 – Cast-in-Place Concrete and PennDOT Publications 72 and 408.
 - a. Cast-in-place manholes and manhole components shall be manufactured of PennDOT Class A concrete (design compressive strength 3000 psi).
 - b. Pre-cast manhole components shall be manufactured of PennDOT Class AA concrete (modified design compressive strength 4000 psi).

4. Flexible sealing compound shall be packaged in extruded preformed shape, sized to completely fill the joint between precast sections, and form permanently flexible watertight seal. The sealing compound shall be non-shrink and meet ASTM C990.
5. Iron castings for manholes shall conform to ASTM A48, Class 30 or better; and shall be free of bubbles, sand, air holes, and other imperfections.
 - a. Iron castings shall comply with requirements of PennDOT Publications 72 and 408 and PWSA.
 - b. Bearing surfaces between cast iron frames and covers shall be machined, fitted together and match marked to prevent rocking. The cover shall fit firmly on the frame without movement when subject to traffic. The frame and cover shall be rated for HS25 loading with 30% impact.
 - c. Cover shall have a studded pattern on the cover and shall have the inscription "PWSA Sewer". The studs and the lettering shall be raised 5/16 inch. Lettering shall 2" high shall be stamped or cast into all covers so that they may be plainly visible.
 - d. Frame to include 4 holes for anchoring frame to manhole core or as indicated on Construction Drawings.
 - e. Cover shall be minimum 24 inches in diameter and contain 2 non-penetrating pick holes. Covers with vent holes are unacceptable.
 - f. Manhole frames and covers must be watertight. Recommended type: Neenah Foundry Catalog No. R-1753, R-1751-A with self-sealing system; or approved equal.
 - g. Manhole frames and covers are to be painted black.
6. Manhole steps
 - a. Cast-in-Place - Polypropylene coated steel reinforcing bars cast in place during manhole fabrication. Steel shall be a deformed reinforcing bar 3/8 inch, Grade 60, meeting the minimum requirements of ASTM A-615. Steps shall have a flat serrated tread with end lugs to prevent feet from slipping off and be of a size and shape as detailed on the Construction Drawings.
 - b. Pre-manufactured – Type must comply with the requirements of PennDOT Publications 72 and 408 and be approved by PWSA.
7. Reinforcing shall conform to the Construction Drawings, PennDOT Publications 72 and 408, and Section 03 21 13 Galvanized Reinforcing Steel.
 - a. Reinforcing steel shall be deformed bars, ASTM A-615, Grade 40 unless otherwise noted.
8. Resilient Connectors: Flexible, watertight connectors used for connecting pipe to manholes shall conform to ASTM C923. Acceptable manufacturers are listed below:
 - a. Fernco, Inc.

300 S. Dayton St.
Davison, MI 48423

- b. A-Lok Products, Inc.
P.O. Box 1647
Tullytown, PA 19007
- c. Press Seal Gasket Corporation
3414 North Wells St.
Fort Wayne, IN 46808

D. Magnetically Detectable Utility Marking Tape

- 1. Tape shall be 3 inches wide minimum by 5 mil thick minimum (i.e. 1 mil continuous aluminum foil layer between 2-2 mil clear film) material, each side reverse printed with the message repeated every ± 24 inches.
- 2. Tape color shall be in accordance with AWWA color code requirements for sanitary sewer systems.

E. Temporary Sanitary 6" Flexible HDPE Gravity Pipe

- 1. Virgin material for pipe and fitting production shall be high-density polyethylene conforming with the minimum requirements of cell classification 424420C for 6 inch diameter, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%.

2.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Pre-Cast Concrete Units:

- 1. Transport units to the site after fabrication and curing. Protect until required for installation.
- 2. Handle to avoid damage to surfaces, edges and corners to avoid creation of stresses within the units. Remove damaged materials from the job site.

B. Delivery and Handling:

- 1. Do not place materials on private property without written permission of the property owner.
- 2. Proper implements, tools and facilities shall be provided and used for unloading and distributing materials along the line of the work. Unload and store pipe with minimum handling. Pipe and accessories shall be handled so as to insure delivery to the installed location in sound undamaged condition. Pipe shall be carried into position and not dragged. Any pipe or fitting damaged in transportation or handling shall be rejected and immediately removed from the job site.
- 3. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. Slings, hooks, or pipe tongs shall be padded, and the padding shall be used to prevent damage to the exterior surface or internal lining of the pipe, fitting, or related product.
- 4. All pipe, fittings, and accessories shall be loaded and unloaded by lifting with lift hoists or skidding in order to avoid shock or damage. Under no circumstances shall this material be dropped. Pipe handled on skidways shall not be rolled or skidded

against other pipe.

C. Storage:

1. Pipe may be strung along alignment where approved by the Owner.
2. Materials shall be kept safe from damage. Store materials on site in enclosures or under protective covering as per manufacturer's recommendations. Do not store materials directly on the ground.
3. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign mater at all times.
4. When possible, pipe shall be stored in unit packages on flat surfaces to avoid bending. When unit packages are stacked, care shall be exercised to ensure that the weight of the upper units does not cause deformation to pipe in lower units. Unit packages shall be supported by racks or dunnage to prevent damage or bending of the pipe. When unit packages are stacked, care shall be exercised to ensure that the height of the stack does not result in instability that could cause stack collapse, pipe damage, or personal injury. Do not stack pipe higher than recommended by the pipe manufacturer.
5. The Contractor shall be responsible for the safe storage of all material intended for the work. He shall take all necessary precautions to prevent damage to materials, equipment and work.
6. Any pipe joint compound, cementitious liquid or bulk materials shall be stored in their manufacturer's original containers and shall be kept free from moisture and protected from damage.
7. Rubber gaskets, gasket lubricants and other appurtenances shall be protected from excessive exposure to heat, direct sunlight, ozone (from electric motors and equipment), oil, grease, or other contaminants. Gaskets shall be stored in a cool location, out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.
8. All pipe, fittings, pre-cast manhole components, etc. shall be stored in such a manner as to protect them from snow, mud, ice, and water intrusion.

2.3 QUALITY ASSURANCE

- A. The manufacturer of any of the materials incorporated in the sanitary sewer system shall upon the request of the Engineer, Contractor, Owner, or local authority furnish certified evidence that all material tests and inspections have been performed and that the product has been manufactured in compliance with the applicable specifications.

PART – 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions. Verify that trenching and manholes in the area of the sanitary sewer installation have been completed to the finished sub-grade elevations. Report any discrepancies to the Owners Representative.

1. Any discrepancies discovered must be resolved to the satisfaction of the Owner's Representative prior to beginning sanitary sewer installation.

B. Verify that all bench marks and elevation reference data are in place.

3.2 JOB CONDITIONS

A. The Contractor shall provide the services of a competent Civil Engineer or Land Surveyor to establish all lines, levels, grades, bench marks and measurements required to complete the Work. At no cost to the Owner, the Contractor shall be responsible to resolve any discrepancies which may arise due to errors resulting from said services, as provided by the Contractor's consultant.

1. Stake location of manholes and have site utilities marked in the field prior to actual trenching. Determine if there are any utility conflicts and bring them to the attention of the Owner and to the attention of the owner of the utility.

a. Resolve any utility conflicts prior to actual construction.

3.3 PIPE INSTALLATION

A. Install sanitary sewers pipe, of materials and sizes and to locations and details indicated on the drawings.

B. Normally, the width of the trench shall be eight (8) inches plus the outside diameter of the pipe. The width shall permit the pipe to be laid and joined properly and to allow the backfill to be placed in accordance with the specifications. When required, trenches shall be wider to permit the placement of timber supports, sheeting, bracing, and appurtenances as required by the safety requirements of the agency having jurisdiction.

C. When trench has been excavated to required depth, the bottom shall be tested to determine its suitability for pipe support. The trench shall be approved by the engineer/inspector and modified as directed if required.

1. Remove any loose earth, trash or debris. Hand trim bottom elevation for accurate installation of pipe.
2. Where bottom of trench cannot be made suitable to support pipe, provide concrete cradles. Deposit concrete the full width of trench, 4" deep minimum, to bottom of pipe. Reinforce continuously with two (2) No. 4 reinforcing bars. Before concrete is set, embed pipe evenly, deposit remainder of concrete to centerline of pipe and tamp in a manner to avoid disturbing pipe.

D. Place six (6) inches of AASHTO No. 67 Aggregate for pipe bedding (pipe cushion). The bottom shall then be smoothed, leveled and tamped. Bell holes shall be provided so the so that the pipe will have smooth and uniform invert throughout its length. After the pipe has been installed and approved, the trench shall then be backfilled with bedding material to six (6) inches over pipe. Hand work material around pipe haunches and pipe to preclude misalignment and grade changes. Place and compact material to 95% of dry weight density. Pipe that is damaged or moved out of alignment shall be replaced and/or re-aligned by the Contractor at his expense.

E. Lower pipe into trench using handling equipment designed for the purpose to assure safety of personnel and to avoid damage to pipe. Do not drop pipe.

- F. Lay pipe proceeding from downstream to upstream with the bell or groove pointing upstream. Maintain no less than three batter boards or their equivalent between sequential manholes during pipe laying operations; or use laser alignment instruments.
- G. Lay each section of pipe to form a close concentric joint with the adjoining section and to avoid offsets in the flow line.
- H. Each section of pipe shall be inspected before being lowered into the trench. Defective, damaged or unsound pipe shall be rejected and removed from the site
- I. As pipe laying progresses, clear pipe interior of dirt, joint compound or other superfluous materials. During work stoppage periods provide effective plugs or covers for open ends of pipe to prevent foreign matter from entering.
- J. Assemble joints in accordance with recommendations of the manufacturer.
 - 1. General - Clean and inspect each section of pipe before joining. Assemble to provide tight, flexible joints that permit movement caused by expansion, contraction, and ground movement. If unusual joining resistance is encountered or if the pipe cannot be fully inserted into the bell, disassemble joint, inspect for damage, re-clean joint components, and reassemble joint.
 - a. Clean joint contact surfaces immediately prior to jointing. Use lubricants, primers or adhesives as recommended by joint manufacturer.
 - 2. Push-on Joints: Clean the inside of the bell and the outside of the spigot. Insert rubber gasket into the bell recess. Apply a thin film of gasket lubricant to either the inside of the gasket or the spigot end of the pipe, or both. Insert the spigot end of the pipe into the socket using care to keep the joint from contacting the ground. Complete the joint by forcing the plain end to the bottom of the socket. Mark pipe that is not furnished with a depth mark before assembly to assure that the spigot is fully inserted.
 - 3. Mechanical Joints: Wash the socket and plain end. Apply a thin film of soapy water. Slip the gland and gasket over the plain end of the pipe. Apply soapy water to gasket. Insert the plain end of the pipe into the socket and seat the gasket evenly in the socket. Slide the gland into position; insert bolts, and finger-tighten nuts. Bring bolts to uniform tightness. Tighten bolts 180-degrees apart alternately.
 - 4. Reinforced Concrete Joint: Wipe clean end of the pipe and inside of rubber gasket. Equalize gasket circumferential tension. Apply joint lubricant. Align pipe with previously laid sections. Insert pipe into coupling, bell or groove and force into place to the bottom of the socket. After joint assembly, check rubber ring location with a suitable gage.
 - 5. Solvent Cemented Joints: Chamfer and de-burr pipe. Clean socket and plain end. Measure and mark the socket depth on the outside of the pipe. Apply primer to inside socket surface using a scrubbing motion to ensure penetration. Repeated applications may be necessary. Soften surface of male end of pipe to depth of fitting socket by applying a liberal brush coat of primer. Do not pour primer on. Assure entire surface is well softened. Repeat application of primer to inside socket surface, then apply cement to pipe while surfaces are still wet with primer. Apply cement uniformly taking care to keep excess cement out of socket. With truss pipe, seal truss section to avoid false air leaks. Seal ends of pipe in manholes. Immediately after applying the last coat of cement to the pipe, and while both the

inside socket surface and outside pipe surface are soft and wet, forcefully seat the pipe into the socket. Turn the pipe $\frac{1}{4}$ turn during assembly to distribute cement evenly. Assembly should be completed within 20 seconds after the last application of cement. Insert pipe with a steady, even motion. Do not use hammer blows. Hold joint in place until cement has set. Wipe excess cement from the pipe.

6. Coupled Joints: Assemble in accordance with the manufacturer's recommendations. Disassemble and remake improperly assembled joints using a new gasket.
- K. Check each pipe installed as to line and grade in place. Correct deviation from line and grade immediately. A deviation from the designed grade as shown on the Construction Drawings, or deflection of pipe joints, will be cause for rejection.
- L. Keep trenches and excavations free of water during construction. Keep manholes and newly installed sewer pipes free of water during construction, until system is sealed. Provide suitable dewatering, as required.
- M. Connect sanitary sewer pipe to manhole/drainage structure openings. Provide lean concrete support for pipe at manholes as required. Provide minor adjustments in openings as required to provide proper fit and maintain slope of pipe lines.
- N. Sanitary sewer trenches excavations shall not be backfilled until all test and inspections covering the installation of the sanitary sewer have been performed and approved.
- O. Backfill sanitary sewer trenches as described in the Construction Drawings.
 1. Under paved areas, backfill shall consist of AASHTO 67 stone, placed and compacted in 12" lifts.
 2. Under unpaved areas, place an additional two feet of Type 1 backfill material (PennDOT No. 67 aggregate or approved equal) in 4" lifts and compact to 95% of dry weight density. The remainder of the trench shall be backfilled as described in Section 31 23 17 – Trenching.
- P. Prepare the existing grade where surface anchored temporary force main piping and gravity sewer will be placed. This area shall be clear of rocks and debris.
 1. Pipe shall be anchored every fifty feet with sandbags to prevent movement under pressure.
 2. As pipe laying progresses, keep pipe interior clear of dirt, joint compound or other superfluous materials. During work stoppage periods provide effective plugs or covers for open ends of pipe to prevent foreign matter from entering.
 3. Pipe shall be protected with orange construction fence or other barrier that will prevent equipment from traversing the pipe.

3.4 PIPE SEPARATION

- A. Storm Sewer and other utilities: 18" minimum vertical separation
- B. Conform to applicable DEP regulations regarding required minimum vertical and horizontal separation between sanitary sewers and water mains, storm sewers, and other utilities.
 1. If the required separation cannot be maintained, concrete encase sanitary sewer for

10' outside each edge of encroaching utility.

3.5 WYE BRANCHES AND TEES

- A. Install wye branches or pipe tees at locations designated on the Construction Drawings concurrent with pipe laying operations. Use standard fittings of the same material and joint type as the pipeline into which they are installed.
- B. For taps into an existing pipeline, use a saddle wye or tee with stainless steel clamps or core drill pipe and install watertight resilient boot. Mount saddles with solvent cement or gasket and secure with metal bands. Layout holes with a template and cut holes with a mechanical hole cutter.

3.6 CONNECTION TO EXISTING MANHOLES

- A. During construction of new connections to existing manholes, it shall be the sole responsibility of the Contractor to maintain continued sanitary sewer service to all buildings and users upstream. The contractor shall provide, install, and maintain all pumping, conveyance system, dams, weirs, etc. required to maintain the continuous flow of sewage. All temporary measures required to meet this requirement shall be subject to the review of the Owner's Representative.
 - 1. Perform the Work in an expeditious manner and keep downtime to an absolute minimum.
- B. Core existing structure, install pipe at the design invert. Install an elastomeric gasket around the pipe, and grout the interstitial space between the pipe and the core.
 - 1. Fill the annular space with a suitable non-shrink grout material.
- C. The bench of the manhole shall be cleaned and reshaped to provide a smooth flowline for all pipes connected to the manhole.
- D. Connections and alterations to existing manholes shall be constructed so that finished work conforms as nearly as practicable to the applicable requirements specified for new manholes, including concrete and masonry work, cutting and shaping.
- E. Include the cost of work involved with connections to existing manholes in the cost of the applicable payment items to be installed. No separate payment shall be made for this work.

3.7 SEWER AND MANHOLE SUPPORTS, CONCRETE CRADLES

- A. Reinforced concrete as detailed on the drawings. The concrete shall not restrict access for future maintenance of the joints within the piping system.

3.8 SANITARY MANHOLE INSTALLATION

- A. Install sanitary manholes to location and depth as shown on the Construction Drawings.
- B. Provide cast-in-place concrete or precast concrete bases as specified on the Construction Drawings.
 - 1. Place precast units on a crushed stone subbase placed and compacted in 6" layers to 95% of dry weight density, as shown on the Construction Drawings.

2. Construct cast-in-place units on undisturbed earth as shown on the Construction Drawings.
 - a. Cast-in-place bases may be constructed with a special form for a joint to match the manhole cylinder sections.
3. Install precast bases as shown on the Construction Drawings.
 - a. Provide a sealed, flexible, resilient connection between pipe and precast base section.
- C. Form flow channels in manhole bases as shown on the Construction Drawings and per PennDOT Publication 72.
 1. Slope channels uniformly from influent invert to effluent invert.
 2. Construct bends of the largest possible radius.
 3. Where changes in flow direction are required, begin flow channel curve where influent pipe penetrates manhole wall, and end curve where effluent pipe penetrates manhole wall; straight flow channel sections are not acceptable.
 4. Form channel sides and invert smoothly and uniformly; free of cracks, holes or protrusions.
- D. Pre-cast reinforced concrete rings shall be installed true and plumb. Use precast manhole rings to achieve elevation shown for frame and cover. Adjust the length of the rings so that the eccentric conical top section will be at the required elevation. Cutting the conical top section is not acceptable. Do not adjust elevation more than one foot with pre-cast rings. Seal joints between rings and adjacent components with preformed joint sealant compound and rubber gaskets.
 1. Place joint sealant compound on lower section to be squeezed by the weight of the upper section.
 2. Place rubber gasket in groove formed in spigot end. Equalize gasket tension.
- E. Pre-cast reinforced concrete manhole risers and tops. Install as specified for precast reinforced concrete rings.
- F. Set cast iron frames and covers in full bed of stiff mortar or bituminous mastic jointing compound at final elevations so as to prevent rocking.
 1. Install cover flush with pavement. Frames and covers shall not move when subject to vehicular traffic. Install a concrete collar as specified in PennDOT Publication 72 around the frame to protect the frame from moving until the adjacent pavement is placed.
 2. In unpaved areas, the rim elevation shall be 2 inches above the adjacent finish grade.
 3. Anchor frame to manhole with anchor bolts.
 4. Where manhole cover elevations are not specifically indicated on the Construction Drawings, set covers at final ground elevation. Invert elevations that differ more than 1/4 inch from the elevations shown on the Construction Drawings shall be

grounds for rejection, unless prior approval with Owner's Representatives is obtained.

- G. The wall that supports access rungs or ladder shall be 90 degrees vertical from the floor of structure to manhole cover.
- H. Install steps and ladders per the manufacturer's recommendations. Steps and ladders shall not move or flex when used. All loose steps and ladders shall be replaced by the Contractor.
- I. Where new manholes are to be constructed on existing pipelines, carefully excavate around existing pipeline for placement of the new manhole base. Take measures necessary to control flow through the existing pipeline and to prevent leakage into the new base. After completion of the manhole, carefully remove the top portion of the existing pipeline.

3.9 SANITARY DROP MANHOLE INSTALLATION

- A. Construct sanitary drop connections in accordance with applicable requirements of this section, including but not limited to Paragraph 3.3 for Pipe Installation and Paragraph 3.8 for Sanitary Manhole Installation.
- B. Provide dewatering and erosion control in accordance with Section 31 23 19 and Section 31 25 00 respectively.
- C. Install sheeting, shoring, and bracing in accordance with Section 31 23 20.

3.10 CLEANOUTS

A. Underneath Paved Areas

- 1. Four inches in diameter and consisting of a PVC SDR-35 45 degree fitting on end of run, or combination Y fitting and 1/8 bend in the run with PVC SDR-35 pipe extension, water tight plug, and cast frame and cover flush with finished grade.
 - a. The top of the cleanout assembly shall be 2 inches below the bottom of the cover to prevent loads being transferred from the frame and cover to the piping.
 - b. Encase frame and lid within PennDOT Class A concrete to the dimensions shown on the Construction Drawings.
 - c. Tack coat around frame

B. Underneath Unpaved Areas

- 1. Four inches in diameter and consisting of a PVC SDR-35 45 degree fitting on end of run, or combination Y fitting and 1/8 bend in the run with PVC Schedule 40 pipe extension, and water tight plug or cap.
- 2. Place 4" PennDOT No. 67 aggregate around riser pipe to bottom of topsoil layer.

3.11 TOLERANCES

- A. Sanitary sewer pipe shall be installed to the slope gradient shown on the drawings with a maximum variation of 1/8" (0.125") in ten feet (10'-0").

3.12 FIELD QUALITY CONTROL

- A. Inspect and obtain the Owner's Representative's approval. Thoroughly flush out before inspection. Lamp test between structures and show full bore indicating sewer is true to line and grade. Lip at joints on the inside of gravity sewer lines are not acceptable.
- B. After joints have been inspected and approved, pipe trench shall be filled with pipe bedding material to a 1' minimum above top of pipe. Before remainder of trench is backfilled, the storm sewer shall be checked for displacement and alignment.
 - 1. All inspections shall be conducted under the supervision of the Engineer, and all governmental agencies having jurisdiction and evidence of compliance shall be forwarded to Owners Representative prior to acceptance.
- C. Pipe bedding, backfilling and compaction operations shall be observed by the Owners Representative. Field density and moisture tests shall be performed by the Contractor's Agent.
 - 1. The Contractor shall re-compact, over excavate, backfill, moisture control or otherwise modify in place any material that does not meet compaction tests to the satisfaction of the Engineer.

3.13 TESTING OF SANITARY SEWERS

- A. Gravity Sewers (Select one of the following):
 - 1. Air Test: PVC Pipe, Uni-Bell B-6. The line shall be pressurized to 4 psi and allowed to stabilize. After pressure stabilization, the pressure shall be dropped to 3.5 Psi greater than the average back-pressure of any groundwater above the sewer. The minimum test time shall be as specified in Uni-Bell B-6.
 - 2. Exfiltration Test:
 - a. Subject pipe to hydrostatic pressure produced by head of water at depth of 3 feet above invert of sewer at upper manhole under test. In areas where ground water exists, head of water shall be 3 feet above existing water table. Maintain head of water for one hour for full absorption by pipe body before testing. During one hour test period, measured maximum allowable rate of exfiltration for any section of sewer shall be 3.0 gallons per hour per 100 feet.
 - b. If measurements indicate exfiltration is greater than maximum allowable leakage, take additional measurements until leaks are located. Repair and retest.

3.14 TESTING OF MANHOLES

- A. Contractor shall perform vacuum tests on all manholes per ASTM C1244.
 - 1. Test proposed process manholes immediately after assembly and prior to backfilling.
 - 2. Lift holes shall be plugged with an approved non-shrink grout.
 - 3. No grout to be placed in the horizontal joints before testing.

4. Pipes entering the manhole shall be plugged, taking care to securely brace the plugs from being drawn into the manhole.
5. The test head shall be placed at the inside of the top section or in the slab frame as required, and the seal inflated in accordance with the manufacturer's recommendation.
6. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The test duration shall be 60 seconds.
7. If the manhole fails the initial test, necessary repairs to the outside of the manhole shall be made with a non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained.

3.15 PROJECT CONDITIONS

- A. During periods when work is progressing on adjusting manholes or structures cover elevations, the Contractor shall install a temporary cover above the bench of the structure or manhole. The temporary cover shall be installed above the high flow elevation within the structure, and shall prevent debris from entering the wastewater stream.
- B. The Contractor shall comply with all OSHA confined space requirements when working within existing structures.

3.16 RESTORATION

- A. At completion of work, remove all waste materials and debris resulting from operations and leave everything in a complete and satisfactory condition as approved by the Engineer.

3.16 ABANDONMENT OF EXISTING LATERALS

- A. Abandon existing sewer laterals per PWSA requirements and specifications. Grout existing lateral. Use a PWSA approved balloon to prevent concrete from entering main. No material is permitted to enter the main.

END OF SECTION

DIVISION 33

SECTION 33 41 00 – STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, equipment and appurtenances, and materials necessary for the installation of storm manholes, inlet boxes, storm sewers, outlet structures, and/or endwalls in accordance with the Contract Specifications and Drawings or as directed by the Owner/Owner's Representative.

1.2 RELATED SECTIONS

- A. Section 03 21 13 – Galvanized Reinforcing Steel
- B. Section 03 30 00 – Cast-in-Place Concrete
- C. Section 31 05 16 – Aggregates for Earthwork
- D. Section 31 23 17 – Trenching
- E. Section 31 23 20 – Sheeting, Bracing, and Shoring
- F. Section 33 01 30 – Rehabilitation of Sewer Utilities

1.3 SUBMITTALS

- A. Comply with the contract provisions for submittals.
- B. Certificates
 - 1. Submit materials certificates for material covered by this section and shop drawings as specified signed by material supplier and Contractor, certifying that materials comply with, or exceed, the requirements of this Section.
- C. Shop Drawings
 - 1. Manholes
 - a. Submit detailed shop drawings of manhole sections, precast manhole bases, manhole steps, manhole frames and covers (with inscription), and manufacturers' descriptive literature for the pipe to manhole flexible connections (if used).
 - 2. Precast Sump/Diversion Structures
 - a. Submit detailed shop drawings of pre-manufactured Sump/Diversion Structures
- D. Submit results for the tests performed on the storm sewer system.

1.4 REFERENCES

- A. AASHTO M36 – Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
- B. AASHTO M170 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- C. AASHTO M198 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
- D. AASHTO M252 – Standard Specification for Corrugated Polyethylene Drainage Pipe
- E. AASHTO M294 – Specifications for Corrugated Polyethylene Pipe (300-mm to 1500-mm Diameter)
- F. AASHTO T180 - Moisture - Density Relations of Soils Using a 10lb. (4.54 kg) Rammer and an 18in. (457 mm) Drop
- G. ASTM A796 – Standard Practice for Structural Design of Corrugated Steel Pipe, Pipe-Arches, and Arches for Storm and Sanitary Sewers and Other Buried Applications
- H. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- I. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
- J. ASTM D698 - Test Methods for Moisture - Density Relations of Soils and Soil - Aggregate Mixtures, Using 5.5 lb (2.49 kg) Rammer and 12 inch (304.8 mm) Drop
- K. ASTM D1056 - Standard Specification for Flexible Cellular Materials — Sponge or Expanded Rubber
- L. ASTM D1557 - Test Methods for Moisture - Density Relations of Soils and Soil - Aggregate Mixtures Using 10 lb. (4.54 kg) Rammer and 18 inch (457 mm) Drop
- M. ASTM D2922 - Test Methods for Density of Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
- N. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil - Aggregate Mixtures
- O. ASTM D3350 – Standard Specification for Polyethylene Plastic Pipe and Fittings
- P. Pennsylvania Department of Transportation (PennDOT) Publication 34 (Bulletin 14), Aggregate Producers, latest edition and subsequent supplements
- Q. PennDOT, Publication 35 (Bulletin 15), Approved Construction Materials, latest edition and subsequent supplements
- R. PennDOT, Publication 72, Standards for Roadway Construction, Series RC-0 to RC-100, latest edition and subsequent supplements
- S. PennDOT Publication 408, Specifications, latest edition and subsequent supplements

1.5 REGULATORY REQUIREMENTS

- A. The specifications indicated are the minimum requirements to be applied to the Work. In instances where Federal, State, and Local codes and/or ordinances conflict with these specifications, the more stringent requirement shall apply.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Pipe bedding, unless otherwise indicated, shall be AASHTO No. 67 Aggregate.
1. Supplier shall be listed in PennDOT Bulletin 14.
- B. Storm drainage piping and fittings shall be of size and type indicated on the drawings and shall conform to the following:
1. Smooth Interior Corrugated High Density Polyethylene Pipe.
 - a. The product supplied under this specification shall be high density polyethylene corrugated exterior/smooth interior pipe. 12"- to 36"-diameter pipes shall conform to AASHTO M294 Type S. 42"- to 48"-diameter pipes shall have minimum pipe stiffness of 20 psi and 17 psi, respectively, at 5% deflection; and shall meet all other requirements of AASHTO M294.
 2. Corrugated metal pipe products shall conform to the latest edition of PennDOT Publication 408, Sections 601 and 602, ASTM A796, and AASHTO M36.
 3. Reinforced concrete pipe shall conform to the requirements of AASHTO M-170 and ASTM C76 for the specified diameters called for on the Contract Drawings.
 4. Coupling Bands and Fittings
 - a. Coupling bands shall cover at least one full corrugation on each section of pipe. When gasketed coupling bands are required, the gasket shall be made of closed-cell synthetic expanded rubber meeting the requirements of ASTM D1056, Type 2. Gaskets shall be installed on the coupling band by the pipe manufacturer. All coupling bands shall meet or exceed the soil-tightness requirement of the AASHTO Standard Specification for Highway Bridges, Section 23, Paragraph 23.3.1.5.4 (e).
 - b. Pipe fittings shall conform to AASHTO M252 or AASHTO M294. Fittings approved by the Engineer are also acceptable.
- C. Drainage Structures shall be of size and type indicated on the drawings. Pre-cast structures must conform to PennDOT Publications 72 and 408.
1. Pre-cast drainage structures components shall be supplied by a manufacturer listed in PennDOT Bulletin 15.
 2. Concrete and masonry materials for construction of manholes, inlets and other structures shall conform to Section 03 30 00 – Cast-in-Place Concrete and PennDOT Publications 72 and 408.

- a. Cast-in-place drainage structures and components shall be manufactured of PennDOT Class A concrete (design compressive strength 3000 psi).
- b. Pre-cast drainage structures and components shall be manufactured of PennDOT Class AA concrete (modified design compressive strength 4000 psi).
3. Flexible sealing compound shall be packaged in extruded preformed shape, sized to completely fill the joint between precast sections, and form permanently flexible watertight seal. The sealing compound shall be non-shrink and meet AASHTO M198B.
4. Iron castings for manholes shall conform to ASTM A48, Class 30.
 - a. Bearing surfaces between cast iron frames and covers shall be machined, fitted together and match marked to prevent rocking. System identifying letter 2" high shall be stamped or cast into all covers so that they may be plainly visible. Manhole frames and lids shall be painted black.
 - b. Castings shall be manufactured by *East Jordan Iron Works, Inc., Neenah Foundry Company*, or approved equivalent.
 - c. Structural Steel Grates shall be manufactured by a supplier listed in PennDOT Bulletin 15 and shall be certified as "bicycle safe". Inlet frames and grates shall be painted black.
5. Manhole steps shall conform to the Construction Drawings and PennDOT Publication 72.
6. Reinforcing shall conform to the Construction Drawings, PennDOT Publications 72 and 408, and Section 03 21 13 Galvanizing Reinforcing Steel.
- D. Resilient Connectors: Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C923.
- E. Concrete Encasement (If required)
 1. The Contractor shall construct pipe encasement concrete of PennDOT Class C concrete.
- F. Rehabilitation of Existing Brick Sewer
 1. For this ALMONO Hazelwood project, where indicated, internal liner for the existing brick sewer shall be a fiber reinforced polymer-based trenchless technology providing structural rehabilitation. The system shall be the Tyfo® Fibrwrap® product as manufactured by the Fyfe Company, or equivalent as approved by the Engineer.

2.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Pre-Cast Concrete Units:
 1. Transport units to the site after fabrication and curing. Protect until required for installation.
 2. Handle to avoid damage to surfaces, edges and corners to avoid creation of stresses within the units. Remove damaged materials from the job site.

B. Delivery and Handling:

1. Do not place materials on private property without written permission of the property owner.
2. Proper implements, tools and facilities shall be provided and used for unloading and distributing materials along the line of the work. Unload and store pipe with minimum handling. Pipe and accessories shall be handled so as to insure delivery to the installed location in sound undamaged condition. Pipe shall be carried into position and not dragged. Any pipe or fitting damaged in transportation or handling shall be rejected and immediately removed from the job site.
3. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. Slings, hooks, or pipe tongs shall be padded, and the padding shall be used to prevent damage to the exterior surface or internal lining of the pipe, fitting, or related product.
4. All pipe, fittings, and accessories shall be loaded and unloaded by lifting with lift hoists or skidding in order to avoid shock or damage. Under no circumstances shall this material be dropped. Pipe handled on skidways shall not be rolled or skidded against other pipe.

C. Storage:

1. Pipe may be strung along alignment where approved by the Owner.
2. Materials shall be kept safe from damage. Store materials on site in enclosures or under protective covering as per manufacturer's recommendations. Do not store materials directly on the ground.
3. The interior of all pipe, fittings, and other appurtenances shall be kept free from dirt or foreign mater at all times.
4. When possible, pipe shall be stored in unit packages on flat surfaces to avoid bending. When unit packages are stacked, care shall be exercised to ensure that the weight of the upper units does not cause deformation to pipe in lower units. Unit packages shall be supported by racks or dunnage to prevent damage or bending of the pipe. When unit packages are stacked, care shall be exercised to ensure that the height of the stack does not result in instability that could cause stack collapse, pipe damage, or personal injury. Do not stack pipe higher than recommended by the pipe manufacturer.
5. The Contractor shall be responsible for the safe storage of all material intended for the work. He shall take all necessary precautions to prevent damage to materials, equipment and work.
6. Any pipe joint compound, cementitious liquid or bulk materials shall be stored in their manufacturer's original containers and shall be kept free from moisture and protected from damage.
7. Rubber gaskets, gasket lubricants and other appurtenances shall be protected from excessive exposure to heat, direct sunlight, ozone (from electric motors and equipment), oil, grease, or other contaminants. Gaskets shall be stored in a cool location, out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis. Rubber gaskets that

are not to be installed immediately shall be stored in a cool and dark place.

8. All pipe, fittings, pre-cast drainage structure components, etc. shall be stored in such a manner as to protect them from snow, mud, ice, and water intrusion.

2.3 QUALITY ASSURANCE

- A. The manufacturer of any of the materials incorporated in the Storm Drainage System shall upon the request of the Engineer, Contractor, or Owner furnish certified evidence that all material tests and inspections have been performed and that the product has been manufactured in compliance with the applicable specifications.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions. Verify that trenching and drainage structures in the area of the storm drainage system installation have been completed to the finished sub-grade elevations. Report any discrepancies to the Owners Representative.
 1. Any discrepancies discovered must be resolved to the satisfaction of the Owner's Representative prior to beginning storm draining system installation.
- B. Verify that all bench marks and elevation reference data are in place.

3.2 JOB CONDITIONS

- A. The Contractor shall provide the services of a competent Civil Engineer or Land Surveyor to establish all lines, levels, grades, bench marks and measurements required to complete the Work. At no cost to the Owner, the Contractor shall be responsible to resolve any discrepancies which may arise due to errors resulting from said services, as provided by the Contractor's consultant.

3.3 INSTALLATION

- A. Install storm sewers piping, of materials and sizes and to locations and details indicated on the drawings.
 1. Normally, the width of the trench shall be twelve (12) inches plus the outside diameter of the pipe. The width shall permit the pipe to be laid and joined properly and to allow the backfill to be placed in accordance with the specifications. When required, trenches shall be wider to permit the placement of timber supports, sheeting, bracing, and appurtenances as required by the safety requirements of the agency having jurisdiction.
 2. When trench has been excavated to required depth, the bottom shall be tested to determine its suitability for pipe support. The trench shall be approved by the engineer/inspector and modified as directed if required.
 - a. Remove any loose earth, trash or debris. Hand trim bottom elevation for accurate installation of pipe.
 - b. Where bottom of trench cannot be made suitable to support pipe, provide concrete cradles. Deposit concrete the full width of trench, 4" deep minimum, to bottom of pipe. Reinforce continuously with two (2) No. 4 reinforcing bars.

Before concrete is set, embed pipe evenly, deposit remainder of concrete to centerline of pipe and tamp in a manner to avoid disturbing pipe.

3. Place six (6) inches of AASHTO No. 67 Aggregate for pipe bedding (pipe cushion). The bottom shall then be smoothed, leveled and tamped. Bell holes shall be provided so the so that the pipe will have smooth and uniform invert throughout its length. After the pipe has been installed and approved, the trench shall then be backfilled with bedding material to twelve (12) inches over pipe. Hand work material around pipe haunches and pipe to preclude misalignment and grade changes. Place and compact material in 4" layers. Pipe that is damaged or moved out of alignment shall be replaced and/or re-aligned by the Contractor at his expense.
 - a. Pipe bedding for underground detention piping shall be ten (10) inches of PennDOT No. 2B washed crushed limestone, placed and compacted in 4" layers. Underground detention piping excavation area shall be backfilled with minimally compacted bedding material twelve (12) inches over pipe.
4. Lay pipe to slope grade as shown on the drawings. Grade piping by measuring with rod from overhead grade line or centerline batter boards.
5. Lay pipe, embed it firmly to required line and grade with bells or groove end up—grade. Fit ends together and seal joints water tight.
 - a. Maximum embedment particle size shall not exceed $\frac{3}{4}$ in for angular rock or $1\frac{1}{2}$ in. for round rock. Embedment shall be selected and placed to prevent gouges, crimping, or puncture of pipes or joints.
 - b. Polyvinylchloride plastic pipe (PVC) and Polyethylene (HDPE) plastic pipe shall be placed in strict accordance to manufacturer's directions.
 - i. The type of pipe embedment should be selected so as to prevent a vertical cross-section deflection greater than 5% of the unloaded inside diameter
6. As pipe laying progresses, clear pipe interior of dirt, joint compound or other superfluous materials. During work stoppage periods provide effective plugs or covers for open ends of pipe to prevent foreign matter from entering.
 - a. Clean joint contact surfaces immediately prior to jointing. Use lubricants, primers or adhesives as recommended by joint manufacturer.
7. Each section of pipe shall be inspected before being lowered into the trench. Defective, damaged or unsound pipe shall be rejected and removed from the site
8. Connect storm sewer piping to manhole/drainage structure openings. Provide lean concrete support for piping at manholes as required. Provide minor adjustments in openings as required to provide proper fit and maintain slope of pipe lines.
9. Storm sewer trenches excavations shall not be backfilled until all test and inspections covering the installation of the storm drainage system have been performed and approved.
10. Backfill storm sewer trenches as described in the Construction Drawings.
 - a. Under paved areas, backfill shall consist of PennDOT No. 2A stone, placed and compacted in 4" lifts.

- b. Under unpaved areas, backfill shall be as described in Section 31 23 17 – Trenching.
 - B. Install storm drainage structures to locations, elevations, sizes, and types indicated on the Construction Drawings.
 - 1. General
 - a. Provide poured concrete foundations for drainage structures or install precast concrete bases where approved by the Engineer. Unless otherwise noted, drainage structure subbases shall be a minimum of 12" PennDOT No. 2A stone placed and compacted in 4" lifts.
 - i. Additionally, endwalls shall be installed on a 1" mortar leveling bed as necessary.
 - b. All piping entering or leaving drainage structures shall be adequately supported by poured-in-place concrete fill from pipe center to undisturbed ground.
 - c. Invert channels shall be smooth and semicircular in shape conforming to inside of adjacent sewer section. Make changes in direction of flow with a smooth curve of as large a radius as size of structure will permit. Make changes in size and grade of channels gradually and evenly. Construct invert channels per PennDOT Publication 72.
 - 2. Manholes and other circular structures
 - a. Set cast iron frames and covers in full bed of stiff mortar or bituminous mastic jointing compound at final elevations so as to prevent rocking.
 - i. Install cover flush with pavement. Frames and covers shall not move when subject to vehicular traffic. Install a concrete collar as specified in PennDOT Publication 72 around the frame to protect the frame from moving until the adjacent pavement is placed.
 - ii. In unpaved areas, the rim elevation shall be 2 inches above the adjacent finish grade.
 - b. Pre-cast reinforced concrete rings shall be installed true and plumb. The joints between rings and between rings and the base and top shall be sealed with a preform flexible gasket material specifically manufactured for this type of application. Adjust the length of the rings so that the eccentric conical top section will be at the required elevation. Cutting the conical top section is not acceptable.
 - c. Pre-cast reinforced concrete manhole risers and tops. Install as specified for precast reinforced concrete rings.
 - d. The wall that supports access rungs or ladder shall be 90 degrees vertical from the floor of structure to manhole cover.
 - 3. Inlets
 - a. Provide a top slab to support the inlet top units if a standard inlet box is not used.

- i. Provide opening to accommodate the standard top component.
 - b. Chamfer exposed edges ($\frac{1}{2}$ " x $\frac{1}{2}$ "), except as noted.
 - c. Locate spacer bars flush with top of grate and finished grade.
 - d. Provide angles embedded in the concrete as a bearing for the grate for all top units which seat the grate directly in the unit,
 - e. No more than one grade adjustment ring is allowed per inlet. Grade adjustment rings shall be flush with inlet top and not allow excessive movement or rocking.
 - i. Set pre-cast concrete grade adjustment rings and top units on non-shrink grout pads to provide full bearing on the supporting surface.
 - f. Keyed joints may be constructed upwards or downwards. Clean joints and keys thoroughly before placing next segment. Place mortar or caulking compound between joints.
 - g. Pre-cast concrete components shall be installed true and plumb.
4. Endwalls and Headwalls
- a. All exposed edges and joints shall be rounded with a $\frac{1}{4}$ " radius edging tool. Seal all exposed joints with bituminous joint sealer. Provide a broom or belt finish.
 - b. Ends of endwalls and headwalls shall be fitted with a $\frac{3}{8}$ " diameter minimum welded steel rod grating. Rods shall be placed at 6" c.c. maximum in two (2) directions. Weld rod at all intersections. Grate shall be removable for access and cleaning.
 - c. All concrete work shall be as specified in PennDOT Publication 72, Section 03 20 00 – Site Concrete Reinforcement, and Section 03 30 00 Cast-In Place Concrete.

C. Yard Drains and Trench Drains

- 1. Pre-manufactured yard drains and trench drains shall be installed per manufacturer's recommendations.

D. Water Quality Units

- 1. Pre-cast water quality units shall be installed per manufacturer's recommendations.
- 2. Each water quality unit shall be placed on a compacted subbase (12" min. depth) of PennDOT No. 2B stone.
- 3. Backfill between dual water quality units with Type 1 material granular backfill to twelve (12) inches over the intermediate pipe between the units.

3.4 TOLERANCES

- A. Storm sewer pipe shall be installed to the slope gradient shown on the drawings with a maximum variation of $\frac{1}{8}$ " (0.125") in ten feet (10'-0").

3.5 FIELD QUALITY CONTROL

- A. Contractor to contact PWSA prior to construction and have a PWSA inspector on-site as often as PWSA requires.
- B. After joints have been inspected and approved, pipe trench shall be filled with pipe bedding material to a 1' minimum above top of pipe. Before remainder of trench is backfilled, the storm sewer shall be checked for displacement and alignment.
 - 1. All inspections shall be conducted under the supervision of the Engineer, and all governmental agencies having jurisdiction and evidence of compliance shall be forwarded to Owners Representative prior to acceptance.
- C. Pipe bedding, backfilling and compaction operations shall be observed by the Owners Representative. Field density and moisture tests shall be performed by the Contractor's Agent.
 - 1. The Contractor shall re-compact, over excavate, backfill, moisture control or otherwise modify in place any material that does not meet compaction tests to the satisfaction of the Engineer.

3.6 RESTORATION

- A. Any damage done by the contractor to existing pipe lines, underground structures, utilities, etc., shall be repaired by him at his expense in a manner acceptable to the owner of the damaged property. The contractor shall report any existing damage to the Owner's Representative prior to beginning the Work.
- B. The contractor shall restore any pavement or public right-of-way that is disturbed by the Work to equivalent or better than original condition. All pavement restoration or work in public right of way shall be performed to the full satisfaction of the governmental agencies having jurisdiction thereover.
- C. At completion of work, remove all waste materials and debris resulting from operations and leave everything in a complete and satisfactory condition as approved by the Engineer.

END OF SECTION

DIVISION 33

SECTION 33 44 19 - UTILITY STORM WATER TREATMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope

The Contractor shall furnish all labor, equipment and materials necessary to install the stormwater treatment device(s) (SWTD) and appurtenances specified in the Drawings and these specifications.

B. Related Sections

Section 31 23 19: Dewatering

Section 31 23 20: Sheeting and Shoring

Section 31 22 00: Grading

1.2 QUALITY ASSURANCES

A. Inspection

All components shall be subject to inspection by the Engineer at the place of manufacture and/or installation. All components are subject to be rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair. Final acceptance of the component is contingent upon the discretion of the Engineer.

B. Warranty

The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall be notified of repair/replacement issues in writing within the referenced warranty period. The manufacturer shall, upon its determination of repair, correct or replace any manufacturer originated defects identified by written notice within the referenced warranty period. The use of SWTD components shall be limited to the application for

C. Manufacturer's Performance Certificate

The SWTD manufacturer shall submit to the Engineer of Record a "Manufacturer's Performance Certification" certifying that each SWTD is capable of achieving the specified removal efficiencies as listed in these specifications. The certification shall be supported by independent third-party research.

1.3 SUBMITTALS

A. Shop Drawings

The contractor shall prepare and submit shop drawings in accordance with Section **01 33 00** of the contract documents. The shop drawings shall detail horizontal and vertical dimensioning, reinforcement and joint type and locations.

PART 2 – PRODUCTS

2.1 MATERIALS AND DESIGN

A. Precast Concrete Components

Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:

- 1 Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
- 2 Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
- 3 Cement shall conform to ASTM C 150;
- 4 Aggregates shall conform to ASTM C 33;
- 5 Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185 or A 497, respectively;
- 6 Joints shall be sealed with preformed joint sealing compound conforming to
- 7 ASTM C 990 and
- 8 Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.

B. Internal Components and Appurtenances

Internal Components and appurtenances shall conform to the following:

- a. Screen and support structure shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01; Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320; Fiberglass components shall conform to the National Bureau of Standards PS-15 and coated with an isophalic polyester gelcoat and Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.

- b. Hatch systems shall be designed to withstand AASHTO H-20 loadings.

Hatch systems not subject to direct traffic shall be manufactured of Grade 5086 aluminum. Hatch systems subject to direct traffic loads shall be manufactured of steel conforming to ASTM A36-93a, supplied with a hot-dip galvanized finish conforming to ASTM A 123 and access doors bolted to the frame.

2.2 PERFORMANCE

A. Removal Efficiencies

- 1 The SWTD shall be capable of achieving an 80 percent average annual reduction in the total suspended solid load.
- 2 The SWTD shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to [4.7 millimeters (mm) or 2.4 millimeters (mm)] regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to the device's rated-treatment capacity. The SWTD shall be designed to retain all previously captured pollutants addressed by this subsection under all flow conditions.
- 3 The SWTD shall be capable of capturing and retaining total petroleum hydrocarbons. The SWTD shall be capable of achieving a removal efficiency of 92 and 78 percent when the device is operating at 25 and 50 percent of its rated-treatment capacity. These removal efficiencies shall be based on independent third-party research for influent oil concentrations representative of storm water runoff (20 ± 5 mg/L). The SWTD shall be greater than 99 percent effective in controlling dry-weather accidental oil spills.
- 4 The SWTD shall be capable of utilizing sorbent media to enhance removal and retention

B. Hydraulic Capacity

- 1 The SWTD shall provide a rated-treatment capacity, which is consistent with governing water treatment regulations. At its rated-treatment capacity, the device shall be capable of achieving greater than 65 percent removal of particles typically found in roadside sediments. This removal efficiency shall be supported by independent third-party research utilizing samples consistent with the NURP gradation or finer.
- 2 The SWTD shall maintain the peak conveyance capacity of the drainage network as defined by the Engineer.

C. Storage Capacity

- 1 The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be in accordance with the volume listed in Table 1. The boundaries of the sump chamber shall be limited to that which does not degrade the SWTD's treatment efficiency as captured pollutants accumulate. The sump chamber shall be separate from the treatment processing portion(s) of the SWTD to minimize the probability of fine particle re-suspension. In order to not restrict the Owner's ability to maintain the SWTD, the minimum dimension providing access from the ground

surface to the sump chamber shall be 20 inches in diameter.

- 2 The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills. The minimum storage capacity provided by the SWTD shall be in accordance with the volume listed in Table 1 below.

TABLE 1

CDS Model	Treatment Capacity (cfs)/(L/s)	Minimum Sump Storage Capacity (yd ³)/(m ³)	Minimum Oil Storage Capacity (gal)/(L)
CDS2015-G	0.7 (19.8)	0.5 (0.4)	70 (265)
CDS2015-4	0.7 (19.8)	0.5 (1.4)	70 (265)
CDS2015	0.7 (19.8)	1.3 (1.0)	92 (348)
CDS2020	1.1 (31.2)	1.3 (1.0)	131 (496)
CDS2025	1.6 (45.3)	1.3 (1.0)	143 (541)
CDS3020	2.0 (56.6)	2.1 (1.6)	146 (552)
CDS3030	3.0 (85.0)	2.1 (1.6)	205 (776)
CDS3035	3.8 (106.2)	2.1 (1.6)	234 (885)
CDS4030	4.5 (127.4)	5.6 (4.3)	407 (1540)
CDS4040	6.0 (169.9)	5.6 (4.3)	492 (1862)
CDS4045	7.5 (212.4)	5.6 (4.3)	534 (2012)
CDS2020-D	1.1 (31.2)	1.3 (1.0)	131 (495)
CDS3020-D	2.0 (56.6)	2.1 (1.6)	146 (552)
CDS3030-D	3.0 (85.0)	2.1 (1.6)	205 (776)
CDS3035-D	3.8 (106.2)	2.1 (1.6)	234 (885)
CDS4030-D	4.5 (127.4)	4.3 (3.3)	328 (1241)
CDS4040-D	6.0 (169.9)	4.3 (3.3)	396 (1499)
CDS4045-D	7.5 (212.4)	4.3 (3.3)	430 (1627)
CDS5640-D	9.0 (254.9)	5.6 (4.3)	490 (1854)
CDS5653-D	14.0 (396.5)	5.6 (4.3)	599 (2267)
CDS5668-D	19.0 (538.1)	5.6 (4.3)	733 (2774)
CDS5678-D	25.0 (708.0)	5.6 (4.3)	814 (3081)
CDS3030-DV	3.0 (85.0)	2.1 (1.6)	205 (776)
CDS5042-DV	9.0 (254.9)	1.9 (1.5)	294 (1112)
CDS5050-DV	11.0 (311.5)	1.9 (1.5)	367 (1389)
CDS7070-DV	26.0 (736.3)	3.3 (2.5)	914 (3459)
CDS10060-DV	30.0 (849.6)	5.0 (3.8)	792 (2997)
CDS10080-DV	50.0 (1416.0)	5.0 (3.8)	1057 (4000)
CDS100100-DV	64.0 (1812.5)	5.0 (3.8)	1320 (4996)

- D. The sizing criteria for treatment systems must conform to the recommended loading rate and 3rd party testing data requirements as mentioned below:
- 1 CDS Screening Systems – designed for full treatment of the runoff rate at a loading rate not to exceed the critical flow in the inlet, in order to achieve
 - 2 80% TSS removal efficiency. (80% TSS removal based on an average particles size of 63 micron)
 - 3 Vortex separation systems – designed for full treatment of the runoff rate at a loading rate not to exceeding 24 gpm/ft², in order to achieve 80% TSS removal efficiency. The hydraulic capacity should not exceed a loading rate of 100 gpm/ft² to prevent scouring of previously captured particles. 80% TSS removal based on an average particles size of 63 micron)
 - 4 Gravity systems – designed for full treatment of the runoff rate at a loading rate not to exceeding 10 gpm/ft², in order to achieve 80% TSS removal efficiency. The gravity units will not exceed luminal flow condition parameters in the treatment unit but will provide a bypass system to prevent turbulence from accruing in the system. (See “Stokes Law” for gravity settling requirements of particles. 80% TSS removal based on an average particles size of 63 micron)

Additionally, the performance of the unit must be evaluated by a third party and verified in a program that allows a more-or-less direct comparison to other technologies. Performance should be third party verified, and removal efficiencies across the spectrum of particle sizes reported, at a range of hydraulic loading rates varying over a range of at least 25 to 125% of the manufacturer’s advertised ‘water treatment’ loading rate.

2.3 MANUFACTURER

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the Drawings, the SWTD(s) shall be a CDS[®] device manufactured by:

**Contech Engineered Solutions
9025 Centre Pointe Dr., Suite 400
West Chester, OH 45069 (800) 338-1122**

PART 3 – EXECUTION

3.1 HANDLING AND STORAGE

The contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be borne by the contractor.

3.2 INSTALLATION

- A. The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on- site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.
- B. The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner which leaves no sharp points or edges.

END OF SECTION

DIVISION 33

SECTION 33 44 20 – Steel Reinforced Polyethylene (SRPE) Cistern Tank

PART 1 - GENERAL

- 1.1 This item shall govern the furnishing and installation of Steel Reinforced Polyethylene (SRPE) Tanks for rainwater harvesting and other underground water storage for nominal diameters 30" (750mm) through 120" (3000mm).
- 1.2 Contractor shall furnish all labor, materials, equipment and incidentals necessary to install the SRPE system, appurtenances and incidentals in accordance with the Drawings and as specified herein.
- 1.3 A stormwater treatment device upstream of the SRPE system is recommended as the appropriate means of pretreating for the purpose of extending the maintenance interval on the SRPE system and reducing the life cycle cost. Both engineered solutions shall be provided by a single supplier/manufacturer.
- 1.4 Applicable provisions of any Division shall govern work in this section.
- 1.5 Related Standards
 - 1.5.1 ASTM F2562 "Standard Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage"
 - 1.5.2 AASHTO Designation MP-20 Section
 - 1.5.3 ASTM D3350 "Standard Specification for Polyethylene Plastics Pipe and Fittings Materials"
 - 1.5.4 ASTM D2321 "Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications"
- 1.6 Site layout drawings, product specifications, materials, hydraulic storage data and supported calculations of proposed alternatives shall be submitted to the Engineer of Record (EOR) for review at a minimum of 10 working days prior to bid closing.
- 1.7 The SRPE system proposal shall be sized in accordance to the design provided and approved by the Engineer of Record (EOR). Any Contractor deviating from the design shown on the plans, to include: material, footprint, etc., shall provide to the Engineer of Record (EOR) a summary report on stage-storage curves, design calculations, stormwater management modeling in PondPack or HydroCAD and engineering drawings.
- 1.8 Shop drawings shall be annotated to indicate all materials to be furnished and installed under this section, and all applicable standards for materials, required tests of materials and design assumptions for structural analysis:
- 1.9 Before installation of the SRPE system, Contractor shall obtain the written approval of the Engineer of Record (EOR) for the stormwater system and the installation drawings.

Part 2 – MATERIALS

- 2.1 SRPE shall be manufactured in accordance with the applicable requirements of ASTM F2562 “Standard Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for NonPressure Drainage and Sewerage”.
- 2.2 Virgin high density polyethylene stress-rated resins are used to manufacture SRPE Tank and complimentary fabricated fittings. Resins shall conform to the minimum requirements of cell classification 345464C as defined and described in the latest version of ASTM D3350 “Standard Specification for Polyethylene Plastics Pipe and Fittings Materials”.
- 2.3 The manufacturer of the SRPE system shall be one that has regularly been engaged in the engineering design and production of these systems for at least eight (8) years and which has a history of successful production, acceptable to the Engineer of Record (EOR). In accordance with the Drawings, the SRPE system shall be supplied by:

Contech Engineered Solutions
9025 Centre Pointe Drive
West Chester, OH, 45069
Tel: 1 800 338 1122
Or approved equal.
- 2.4 Sampling, testing, and inspection of PE resin, metal sheets and coils used for manufacturing the SRPE system shall be in accordance with to the above applicable referenced specifications. All fabrication of the product shall occur within the United States.

PART 3 – PERFORMANCE

- 3.1 All tanks must be leak tested and results documented using a positive pressure air test prior to shipment from the manufacturing location. Testing documentation shall include test air pressure, and hold time. A copy of the leak test report must be provided to the Engineer of Record as requested.
- 3.2 Bulkheads shall be constructed of material in conformance with Section 2.2 and designed for H-20/HS-25 final live loading conditions.
- 3.3 All SRPE system inlets shall be equipped with an inlet calming device that they may introduce water to the tank with little to no turbulence.
- 3.4 The SRPE system shall provide a minimum of one 36 inch diameter access riser.
- 3.5 SRPE tank spacing and stone base thickness cannot be altered with consultation from Contech Engineered Solutions, LLC.
- 3.6 The SRPE system shall be designed for a minimum HS-20/HS-25 final live loading conditions.

The SRPE system shall meet HS-20/HS-25 loading requirements with a minimum cover measured from the top of tank to the bottom of flexible pavement as shown in Table 1.

Table 1: Dimensions and Cover limitations

Nominal Tank diam.	Outside Diameter	Unit Weight*	Minimum Wall Thickness (t ₁)		Minimum Cover**		Maximum Cover**	
inch	in. [mm]	lbs./ft	in.	[mm]	ft.	[m]	ft.	[m]
30	30.9 [785]	15.5	.082	[2.08]	1	[.305]	8	[15.2]
36	37.1 [942]	20.8	.082	[2.08]	1	[.305]	8	[15.2]
42	43.2 [1097]	26.5	.082	[2.08]	1	[.305]	8	[15.2]
48	49.5 [1257]	29.1	.130	[3.30]	1	[.305]	8	[15.2]
54	55.5 [1410]	34.7	.130	[3.30]	1	[.305]	8	[15.2]
60	61.4 [1560]	41.6	.130	[3.30]	1	[.305]	8	[15.2]
66	67.8 [1722]	56.9	.220	[5.58]	1.5	[.457]	8	[15.2]
72	74.1 [1882]	65.6	.220	[5.58]	1.5	[.457]	8	[15.2]
84	85.9 [2182]	76.3	.220	[5.58]	2	[.610]	8	[15.2]
96	97.8 [2484]	87.0	.220	[5.58]	2	[.610]	8	[15.2]
108	111.3 [2827]	99.7	.220	[5.58]	2.5	[.762]	8	[15.2]
120	121.9 [3097]	109.0	.220	[5.58]	3	[.914]	8	[15.2]
* Approximate weights. Actual weight will vary with length. **measured from top of tank to bottom of flexible pavement or top of rigid pavement								

PART 4 – EXECUTION

- 4.1 The SRPE system installation shall be in accordance with ASTM D2321 “Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications” along with Table 1 and product-specific recommendations contained in Contech SRPE Tank Installation Guide, available from local Contech representative or from www.conteches.com.
- 4.2 The contractor shall follow Occupational Safety and Health Association (OSHA) guidelines for safe practices in executing the installation process in accordance with the manufacturer/supplier installation recommendations.
- 4.3 Supplier will conduct an on-site preconstruction meeting with the contractor prior to the scheduled delivery date of the SRPE system.

END SECTION

SECTION 334421

SECTION 33 44 21 - Aluminized Type II Corrugated Metal Pipe (CMP) Underground Tank

1.0 GENERAL

- 1.1 This item shall govern the furnishing and installation of Underground Detention and Infiltration Systems for all types, sizes and designations as shown on the plans.
- 1.2 Contractor shall furnish all labor, materials, equipment and incidentals necessary to install the CMP System, appurtenances and incidentals in accordance with the Drawings and as specified herein.
- 1.3 A stormwater treatment device upstream of the CMP System is recommended as the appropriate means of pretreating for the purpose of extending the maintenance interval on the CMP System and reducing the life cycle cost. Both engineered solutions shall be provided by a single supplier/manufacturer. Filtration by wrapping a system with geotextile is not an acceptable means of pretreatment.
- 1.4 Applicable provisions of any Division shall govern work in this section.
- 1.5 American Association of State Highway and Transportation Officials (AASHTO)
 - 1.5.1 AASTHO Design Section 12 – Soil-Corrugated Metal Structure Interaction Systems
 - 1.5.2 AASHTO Construction Section 26 – Metal Culverts
 - 1.5.3 AASHTO M36 – Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
 - 1.5.4 AASHTO M274 – Standard Specification for Steel Sheet, Aluminum-Coated (Type 2), for Corrugated Steel Pipe
- 1.6 American Society for Testing and Materials (ASTM)
 - 1.6.1 ASTM A760: Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
 - 1.6.2 ASTM A929: Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe
 - 1.6.3 ASTM A798: Standard Practice for Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications

- 1.6.4 ASTM A998: Standard Practice for Structural Design of Reinforcements for fittings in Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
- 1.7 Site layout drawings, product specifications, materials, corrugation, gage, hydraulic storage data and supported calculations of proposed alternatives shall be submitted to the EOR for review at a minimum of 10 working days prior to bid closing.
- 1.8 Shop drawings shall be annotated to indicate all materials to be furnished and installed under this section, and all applicable standards for materials, required tests of materials and design assumptions for structural analysis:
 - 1.8.1 Before installation of the CMP System, Contractor shall obtain the written approval of the EOR for the stormwater system and the installation drawings.
- 1.9 All proposed alternatives to the CMP System shall conform to applicable above referenced AASHTO and ASTM specifications. NCSPA provides design service life guidance for certain products up to 100 years in recommended environments.

2.0 MATERIALS

- 2.1 Aluminized Type II material shall conform to the applicable requirements of AASHTO M274 or ASTM A929. CMP shall be manufactured in accordance with the applicable requirements of AASHTO M36 or ASTM A760.
- 2.2 The pipe sizes, gauges and corrugations shall be as shown on the project plans.
- 2.3 Soil tight, gravity flow, non-pressure, drainage pipe joints shall conform to AASHTO M36 and ASTM A760. Minimum joint spacing shall be 10 ft.
- 2.4 Overlapping of adjacent pipes are not permitted and appropriate banding must be utilized in order to properly secure individual pipes in place.
- 2.5 Integral End Sections: Each barrel of the CMP System shall either be connected to a fitting composing a manifold for hydraulic distribution or have an integrated bulkhead to resist loading at the end/start of the barrel, end cap sections shall not be permitted.
- 2.6 Material selected shall be flame resistant and capable of retaining 80% of strength when subjected to a temperature of 400 degrees Fahrenheit for one hour.
- 2.7 All fittings shall be manufactured prior to arriving on the jobsite to ensure structural integrity. Fitting reinforcement shall be in accordance with ASTM A998 and reinforcing details. Bulkhead design and fabrication does not vary with differing coatings on the steel components.

- 2.8 The manufacturer of the CMP System shall be one that has regularly been engaged in the engineering design and production of these systems for at least fifteen (15) years and which has a history of successful production, acceptable to the EOR. In accordance with the Drawings, the CMP System shall be supplied by:

Contech Engineered Solutions
9025 Centre Pointe Drive
West Chester, OH, 45069
Tel: 1 800 338 1122
Or approved equal.

- 2.9 Sampling, testing, and inspection of metal sheets and coils used for manufacturing the CMP System shall be in accordance with to the above applicable referenced specifications. All fabrication of the product shall occur within the United States.

3.0 EXECUTION

- 3.1 The CMP System installation shall be in accordance with AASHTO Standard Specifications for Highways Bridges, Section 26, Division II or ASTM A798 and in conformance with the project plans and specifications.
- 3.2 The CMP System shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. Handling & assembly shall be in accordance with National Corrugated Steel Pipe Association's (NCSPA) recommendations.
- 3.3 For temporary construction vehicle loads, an extra amount of compacted cover may be required over the top of the pipe. The Height-of-Cover shall meet the minimum requirements shown in the table below. The use of heavy construction equipment necessitates greater protection for the pipe than finished grade cover minimums for normal highway traffic.

Minimum Cover (ft) Requirements

Pipe Span (inches)	Axle Loads (kips)			
	18 - 50	50 - 75	75 - 110	110 - 150
12 - 42	2.0	2.5	3.0	3.0
48 - 72	3.0	3.0	3.5	4.0
78 - 120	3.0	3.5	4.0	4.0
126 - 144	3.5	4.0	4.5	4.5

- 3.4 Minimum cover may vary, depending on local conditions. The contractor must provide the additional cover required to avoid damage to the pipe. Minimum cover is measured from the top of the pipe to the top of the maintained construction roadway surface.
- 3.5 Refer to the Contech's Corrugated Metal Pipe Detention Design Guide for additional guidance regarding installation, inspection and maintenance.
- 3.6 The contractor shall follow Occupational Safety and Health Association (OSHA) guidelines for safe practices in executing the installation process in accordance with the manufacturer/supplier installation recommendations.
- 3.7 Backfill material shall be placed in 8 inch loose lifts and compacted to 90% AASHTO T99 standard proctor density.
- 3.8 Supplier will conduct an on-site preconstruction meeting with the contractor prior to the scheduled delivery date of the CMP System.

END OF SECTION

Outline Specification Addenda

Prepared for River Roots site of the Liberty Green project.

River Roots Outline Specification references Exhibit II: Technical Specifications (TS), with the additions or alterations to sections as noted.

Division 01 General Requirements

Section 011000 Summary	refer to TS
Section 013300 Submittal Procedures	refer to TS
Section 014000 Quality Requirements	refer to TS
Section 014200 References	refer to TS
Section 015000 Temporary Facilities and Controls	refer to TS
Section 016000 Product Requirements	refer to TS
Section 017300 Execution	refer to TS
Section 017329 Cutting and Patching	refer to TS
Section 017419 Construction Waste Management and Disposal	refer to TS
Section 017700 Closeout Procedures	refer to TS
Section 017839 Project Record Documents	refer to TS

Division 03 Concrete

Section 033000 Cast-in-Place Concrete	refer to TS

Division 06 Wood, Plastics, and Composites

Section 061500 Wood Decking	refer to TS

Division 26 Electrical

Section 265600 Exterior Lighting	refer to TS

Division 31 Earthwork

Section 311000 Site Clearing	refer to TS
Section 312000 Earth Moving	refer to TS
Section 316000 Structural Soils	refer to TS
Section 313600 Gabion Baskets	new to set

Division 32 Exterior Improvements

Section 321313 Concrete Paving	refer to TS
Section 321316 Reinforced Turf	new to set
Section 321373 Concrete Paving Joint Sealants	refer to TS
Section 322501 Artist's Enhancements	new to set
Section 329200 Turf and Grasses	refer to TS
Section 329300 Plants	refer to TS

Division 33 Utilities

Section 033001 Delivery Pipes	new to set
Section 033002 Liner Anchor System	new to set
Section 033003 Nonwoven Geotextile	new to set
Section 033004 AASHTO #57 Gravel Base	new to set
Section 033005 Catch Basin Modifications	new to set
Section 033006 EPDM Liner	new to set
Section 033007 Overflow Riser	new to set

Section 033008 Sandy Planting Medium	new to set
Section 033009 Stormwater Storage Tank	new to set
Section 033010 Underdrain and Flow Control Vault	new to set
Section 033011 Stone Spillway at Pipe Outfalls	new to set

SECTION 313600 – GABION BASKETS

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Gabion baskets for the retaining wall at the lower site
- B. Related Sections include the following:
 - 1. Section 312000 "Earth Moving."
 - 2. Section 033003, "Nonwoven Geotextile Fabric"
 - 3. Section 322501 "Artist Enhancements"

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Mockup: Coordinate gabion basket fill pattern with Artist and Architect. Create a Mockup 2 courses high, showing pattern of face material and placement of Artist's Enhancements (Water Creatures). To be approved by the Architect and Artist.

1. PART 2 – PRODUCTS

2.1. Gabion Baskets

- A. Factory fabricated so that sides, ends, lid and internal diaphragms readily assemble at site into rectangular baskets of sizes as indicated.
- B. When length exceeds horizontal width, provide diaphragms of same mesh as gabion walls to divide basket into equal cells of length not in excess of horizontal width.
- C. Rigid wire mesh, galvanized steel, 4ga, 3inch by 3 inch grid, in basket sizes as drawn

2.2. Accessories

- A. Geotextile filter fabric
- B. Drainage pipe, and gravel

2.3. Stone fill

- A. Hard, durable, abrasion resistant such that it will not disintegrate from action of wetting and drying, wave action, freezing and thawing cycles
- B. Face material (visible surfaces): Salvaged material from the DPW yards, see Section 322501 Artists Enhancements for Gabion Fill salvaged material specifications and alternates.
- C. Nonvisible fill: limestone, size range 4" to 6", homogeneous size, must be able to be retained within wire mesh grid.

2. PART 3 – EXECUTION

3.1 PREPARATION

- A. Verification of Conditions
 - 1. Verify that surfaces are ready to receive the work.
 - 2. Verify field measurements are as shown on drawings.

2.3 PROCEDURE

A. Installation

1. Install gabions to lines and grades as indicated. Follow manufacturer's instructions in assembling baskets.

B. Placing Gabions

1. Wherever possible, place baskets in position prior to filling with stones.
2. Join adjacent baskets together at corners as recommended by manufacturer, so that joints are as strong as mesh.
3. On exposed faces of gabions, place stones by hand with flattest surfaces bearing against face mesh to produce satisfactory alignment and appearance.
4. For wire mesh gabions, fill gabion cells in lifts not exceeding 8".

END OF SECTION 313600

SECTION 321316 – REINFORCED TURF

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Reinforced turf at the lower basin to prevent scouring in the event of an overflow and to support recreational use of the grassed area.
- B. Related Sections include the following:
 - 1. Section 329200 "Turf and Grasses."
 - 2. Section 312000 "Earth Moving."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
 - 1. Turf reinforcement: Submit product data to Architect

1. PART 2 – PRODUCTS

- 2.1. Grasspave turf reinforcement or equal. Invisible Structures, 1600 Jackson Street, Suite 310, Golden, CO 50401, Invisiblestructures.com
- 2.2. Components include: Grasspave units, subbase as required to pin and support grasspave, any soil amendments and fertilizers as recommended by the manufacturer.

2. PART 3 – EXECUTION

3.1 PREPARATION

- A. Verification of Conditions
 - 1. Verify that surfaces are ready to receive the work.
 - 2. Verify field measurements are as shown on drawings.

2.3 PROCEDURE

- A. Prepare subgrade per Section 312000 Earth Moving
- B. Follow manufacturer installation guidelines.
 - 1. The geotextile shall be handled in such a manner as to ensure that it is not damaged in any way. Should the contractor damage the geotextile to the extent that it is no longer usable as determined by these specifications or by the engineer, the contractor shall replace the geotextile at his own cost.
 - 2. The geotextile shall be installed to the lines and grades as shown on the contract drawings and as described herein.
 - 3. The geotextile shall be rolled down the slope in such a manner as to continuously keep the geotextile in tension by self weight. The geotextile shall be securely anchored in an anchor trench where applicable, or by other approved or specified methods.

4. In the presence of wind, all geotextiles shall be weighted by sandbags or approved equivalent. Such anchors shall be installed during placement and shall remain in place until replaced with cover material.
5. The contractor shall take necessary precautions to prevent damage to adjacent or underlying materials during placement of the geotextile. Should damage to such material occur due to the fault of the contractor, the latter shall repair the damaged materials at his own cost and to the satisfaction of the Engineer.
6. During placement of the geotextile, care shall be taken not to entrap soil, stones or excessive moisture that could hamper subsequent seaming of the geotextile as judged by the engineer.
7. The geotextile shall not be exposed to precipitation prior to being installed and shall not be exposed to direct Sun light for more than 15 days after installation.
8. The geotextile shall be seamed using heat seaming or stitching methods as recommended by the manufacturer and approved by the engineer. Sewn seams shall be made using polymeric thread with chemical resistance equal to or exceeding that of the geotextile. All sewn seams shall be continuous. Seams shall be oriented down slopes perpendicular to grading contours unless otherwise specified. For heat seaming, fusion welding techniques recommended by the manufacturer shall be used.
9. The contractor shall not use heavy equipment to traffic above the geotextile without approved protection.
10. The geotextile shall be covered as soon as possible after installation and approval. Installed geotextile shall not be left exposed for more than 15 days.

END OF SECTION 310519

SECTION 322501 – ARTIST ENHANCEMENTS

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Artist enhancements for elements at the Well: River Roots site, including Water Creatures, Sound Sculptures, the Rill/Tile Splash Block/Water Patio, Engraved Stone Seating, and Salvaged Materials
- B. Related Sections include the following:
 - 1. Section 033000 "Cast in Place Concrete."
 - 2. Section 313600 "Gabion Walls."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Artist Enhancement Construction Management Plan: Contractor's plan for coordination between artist-provided material and other trades.
- C. Shop Drawings: as noted below
- D. Mock-ups: as noted below

1. PART 2 – PRODUCTS

- 2.1. The following Artist Enhancements will be integrated into the construction, and included in any warranty or maintenance plans:

- A. Water Creatures (PROVIDED BY OTHERS)
 - 1. Water Creatures are molded concrete elements of different sizes, installed throughout the site, 77 total with 45 pieces stored by Owner as backstock.
 - 2. Life span: The elements are intended to be permanently installed but may be removed if damaged or vandalized.
 - 3. Locations:
 - a. Planting areas: attached to natural stone boulder elements with epoxy and rebar, locations by artist (number 25). Rebar to be provided by artist and will not be precast into the pieces.
 - b. Planting areas: ground mounted on cast-in-place footers with epoxy and rebar (number 25). Rebar to be provided by artist and will not be precast into the pieces.
 - c. Gabion baskets: placed within basket fill (number 25).
 - d. Water Patio: ground mounted on cast-in-place footers with epoxy and rebar (number 2). Rebar to be provided by artist and will not be precast into the pieces, basins include decorative river rock surround
 - 4. Fabrication: Fabricated by Artist, supplied by Artist

5. Installation: by contractor
 6. Owner Maintenance: The Artist does not anticipate long term maintenance beyond site maintenance (trimming of vegetation, removal of broken pieces (except in gabion baskets) and refreshing of stone fill at the water patio if needed
 7. Shop Drawings & Submittals:
 - a. Submit product information for epoxy or adhesive for each location type
 - b. Mockup of mounted elements for Artist approval
 - c. Mockup and coordination with Artist and Architect for gabion basket material placement and Water Creature placement
- B. Sound Sculptures (PROVIDED BY OTHERS)
1. Sound Sculptures are corten steel assemblies with rods that move in the wind or with water to make a sound, 4 total
 2. Life Span: The elements are intended to be permanently installed, but may be removed by the Owner if damaged or vandalized
 3. Locations:
 - a. Planting areas: attached to cast-in-place concrete footers, attached with bolts and epoxy. Contractor and Artist to coordinate best method of attachment after pieces have been fabricated.
 4. Fabrication: Fabricated by Artist, supplied by Artist
 5. Installation: by contractor
 6. Owner Maintenance: The Artist does not anticipate long term maintenance beyond site maintenance (trimming of vegetation). Removal of pieces may be required if vandalized.
 7. Shop Drawings & Submittals:
 - a. Submit product information for appropriate epoxy, adhesive, or mechanical connection
 - b. Mockup of mounted elements for Artist approval
- C. Decorative Tiles (PROVIDED BY OTHERS)
1. Decorative Tiles are custom shaped and embellished tiles at The Water Patio. Th
 2. Life Span: The elements are intended to be permanently installed, but may be removed by the Owner if damaged or vandalized
 3. Locations:
 - a. The Water Patio: attached to concrete foundations with adhesive as specified by the Artist. Contractor to review adhesive to ensure warranty inclusion.
 4. Fabrication: Fabricated by Artist, supplied by Artist
 5. Installation: by contractor
 6. Owner Maintenance: The Artist does not anticipate long term maintenance but tiles may eventually crack or need to be repaired. Backstock will be provided for Owner to replace tiles.
 7. Shop Drawings & Submittals:
 - a. Submit product information for adhesive

- b. Submit as-built drawing of tile areas prior to artist fabrication.
- D. The Rill/Tile Splash Block/Water Patio (PROVIDED BY CONTRACTOR)
- 1. The Rill is a concrete and corten steel channel assembly, integrated with the stair structure. It conveys water from a pump to the Tile Splash Block/Water Patio and the lower bioswale area.
 - 2. The Tile Splash Block/Water Patio is a concrete and corten steel assembly that spreads and conveys the water from the Rill to the lowest bioswale
 - 3. Life Span: The elements are intended to be permanently installed.
 - 4. Locations & Elements:
 - a. The Rill: Concrete formwork needed for depressed basins and channels, and corten steel channels, fins, and spreaders that deliver water down the stair and to the Tile Splash Block. Metal channels to be mechanically connected to the concrete, per the drawings.
 - b. The Tile Splash Block: Concrete formwork to accept Artist Tiles.
 - c. The Water Patio: Concrete formwork needed for depressed basins and channels, and corten steel channels, fins, and spreaders that deliver water down to the lowest bioswale. Metal channels to be mechanically connected to the concrete.
 - 5. Fabrication:
 - a. Steel and concrete assemblies: Fabricated by Contractor per the drawings
 - 6. Installation: by Contractor
 - 7. Owner Maintenance: The Rill and Water Patio may need to be cleared of leaves and debris during the fall season.
 - 8. Shop Drawings & Submittals:
 - a. Shop drawings: Submit shop drawings for formwork and for channel fabrication and mechanical connection.
 - b. Samples: Submit finished sample assembly for approval finish, eased edges, welds, and general appearance.
 - c. Product information: for appropriate epoxy.
- E. Engraved Stone Seating (PROVIDED BY CONTRACTOR)
- 1. The Engraved Stone Seating consists of natural stone elements in the Elder Circle. Size and location per the drawings. Stones are engraved with 4" high (max) words as specified by the Artist.
 - 2. Life Span: The elements are intended to be permanently installed.
 - 3. Locations & Elements:
 - a. Lower site: at the Elder Circle (final location of individual stones coordinated on site)
 - 4. Fabrication: Fabricated by Contractor per the Artist specifications. Words supplied by Artist in pdf files.
 - 5. Installation: by Contractor. Artist will be on-site to coordinate final placement.
 - 6. Owner Maintenance: No maintenance is anticipated
 - 7. Shop Drawings & Submittals:

- a. Natural Stone: submit samples and photos of natural stone, coordinate possible site visit with Architect and Artist for stone selection
 - b. Submit shop drawings for engraving
- F. Salvaged Material (PROVIDED BY CONTRACTOR)
- 1. Salvaged material includes stair treads, stone seating, bioswale stones, Belgian block edging, gabion fill. Material may be procured from the Department of Public Works (DPW) stockyards and should be coordinated with DPW.
 - 2. Life Span: The elements are intended to be permanently installed.
 - 3. Locations & Elements:
 - a. Stair treads: alternating granite or sandstone treads at stairs, see request sheet for size and location in DPW yards, reference Sheet HP01. Alternative material: Granite treads, size as shown, machine tooled or rock face finish on vertical surfaces.
 - b. Stone Seating: granite, sandstone, or limestone in sizes and shapes as noted in drawings.
 - c. Bioswale stones, smaller with no artist enhancements: salvaged material may be used in part or in whole, see request sheet for size and location in DPW yards Sheet HP02. Alternative material: granite, sandstone, or limestone in sizes and shapes as noted in drawings.
 - d. Bioswale stones, larger with artist enhancements: granite, sandstone, or limestone in sizes and shapes as noted in drawings.
 - e. Gabion fill: salvaged material may be used in part or in whole, see request sheet for size and location in DPW yards reference Sheet HP03. Alternative material: combination of salvaged bricks or cobbles, or rectangular limestone or granite. Material to be homogenous, to be laid in baskets by consistent color and size. Acceptable size range: 4"x5" to 6"x8" face dimensions.
 - 4. Fabrication: fabrication may be required based on material (e.g. treads may need to be cut to a standard length). Contractor should notify Owner of possible fabrication scope when material availability is confirmed.
 - 5. Installation: by Contractor
 - 6. Owner Maintenance: Not applicable
 - 7. Shop Drawings & Submittals:
 - a. Contractor shall submit confirmation of materials and create a fabrication plan for review by Architect.
 - b. Contractor shall submit alternative materials if salvaged material is not available or of insufficient quality or quantity.

END OF SECTION 322501

SECTION 033001 – DELIVERY PIPES

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Placement and Installation of 8" Sch 80 PVC connecting pipe between Inlet #2 and River Roots (RR) Basin 1.
 - 2. Placement and Installation of 6" Sch 80 PVC connecting pipes between RR Basin 1, 2, 3, 4 and 5.
 - 3. Passing pipe through EPDM Liners and installing no-seep collars.
- B. Related Sections include the following:
 - 1. Section 033007 "Overflow Riser."
 - 2. Section 033010 "Underdrain and Flow Control Vault."
 - 3. Section 033005 "Catch Basin Modifications."
 - 4. Section 313600 "Gabion Baskets."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Shop drawings.

2. PART 2 – PRODUCTS

- 2.1. All PVC pipes and fittings shall meet the requirements of ASTM D1785 and ASTM D2665 and shall be either Schedule 40 or Schedule 80 as shown in the Plans.
- 2.2. 8" FILTRIFIC® RC8 Liner Connection Stainless Steel Clamp or approved equivalent. Available from www.filtrific.com.
- 2.3. 6" FILTRIFIC® RC6 Liner Connection Stainless Steel Clamp or approved equivalent. Available from www.filtrific.com.

3. PART 3 – EXECUTION

3.1 PREPARATION

- A. The following shall be completed prior to making the connections between Basins:
 - 1. Excavation of all RR Basins
 - 2. Installation of EPDM Liners. NOTE: At locations between RR Basins it will be necessary to install the Stone Anchoring Trench (anchoring the EPDM Liner) AFTER the Delivery Pipes are installed.
 - 3. Installation of Storm Chamber and Riser
 - 4. Assembly and placement of Flow Control Vaults
 - 5. Assembly and placement of Overflow Risers
 - 6. NOTE: At lower RR Basins, placement of Delivery Pipe shall be done in conjunction with construction of the Gabion Baskets (see Section 313600).

2.3 PROCEDURE

SECTION 033001 – DELIVERY PIPES

A. Installing Pipes

1. All Delivery Pipes shall be solvent welded at all connections with couplings or fittings.
2. All Delivery Pipes shall be laid at a 3% slope and all inverts (inlet and outlet) shall be confirmed to correspond with the Plans.
3. Place appropriate bedding beneath Delivery Pipes where feasible.
4. Cut and place all Delivery Pipes at their intended locations and confirm proper lengths. NOTE: The Delivery Pipe connecting Inlet #2 and RR Basin #1 will be 8" Sch 80 PVC. Delivery Pipes connecting all other RR Basins will be 6" Sch 80 PVC.
5. Cut minimal holes in the EPDM Liner at locations where Delivery Pipes must protrude, and feed Delivery Pipes through the Liner.
6. Install No Seep Collars (FILTRIFIC® RCX Liner Connection Stainless Steel Clamp) per manufacturer's instructions at all Liner protrusions.
7. Make all connections with Inlet #1, Vaults and Overflows as shown in the Plans and solvent weld.

END OF SECTION 033001

SECTION 033002 – LINER ANCHOR SYSTEM

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Installation of Anchor System for EPDM Liner at locations where Liner attaches to concrete.
- B. Related Sections include the following:
 - 1. Section 033006 "EPDM Liner."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Shop drawings.

2. PART 2 – PRODUCTS

- 2.1. 1-1/2" x 1/4" Stainless Steel or Aluminum Termination Bar.
- 2.2. 2" x 1/4" Neoprene Gasket.
- 2.3. 3/8" x 3-1/2" Stainless Steel Wedge Type Anchor Bolt, Nut, Washer

3. PART 3 – EXECUTION

3.1. INSTALLATION

- A. Identify location where Anchor System is to be installed, and confirm that the area adjacent to the existing manhole (or concrete wall) is excavated to the proper elevation.
- B. Use a 3/8" masonry or concrete bit to drill 4-inch holes 12 inches O.C. and at the specified elevation.
- C. Prepare Termination Bar and Neoprene Gaskets by pre-drilling 5/8" holes to match the holes drilling into the concrete.
- D. Use an adhesive to temporarily hold one the Neoprene Gasket to the concrete wall, making an effort to line up the pre-drilled holes.
- E. Drape the EPDM Liner over the concrete wall and press the Liner down so that it sits against the ground or the wall. At some locations it may be necessary to neatly fold the liner so that it sits flat.
- F. Remove the nut and washer from the Wedge Anchors and press the Anchors into each hole, piercing the liner. It may be necessary to pre-punch the Liner in order to insert the Anchor.
- G. Place the second length of Neoprene Gasket over the Anchors.
- H. Place the Termination Bar over the Anchors – bending the Bar as necessary.
- I. Place washers and thread nuts to Anchors and tighten.
- J. Trim the excess EPDM Liner to two inches above the Termination Bar

END OF SECTION 033002

SECTION 033002 – LINER ANCHOR SYSTEM

SECTION 033003 – NON-WOVEN GEOTEXTILE FABRIC

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
1. Material specifications for Non-Woven Geotextile Fabric for drainage applications. Drainage application is defined as a soil to geotextile system that allows for long-term, adequate liquid flow normal to the geotextile with limited soil loss across the plane of the geotextile.
 2. Installation instructions.
- B. Related Sections include the following:
1. Section 033004 "AASHTO #57 Gravel Base"
 2. Section 033009 "Stormwater Storage Tank"
 3. Section 033010 "Underdrain and Flow Control Vault"
 4. Section 033001 "Delivery Pipes."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. The Contractor shall furnish two labeled samples of the Geotextiles intended for use in the work for approval. The label shall include the manufacturer's product name, the type of fabric, and the weight of grade of the material. Geotextiles used in the work shall conform to the approved samples.
- C. Shop drawings.

2. PART 2 – PRODUCTS

- 2.1. Geotextiles shall be as manufactured by Advanced Drainage Systems, Inc., Hillard, OH, Carthage Mills, Cincinnati, OH, or by Mirafi, Inc., Charlotte, NC, or approved equal.
- 2.2. Fibers used in the manufacture of drainage geotextiles, and the threads used in joining geotextiles by sewing, shall consist of long-chain, synthetic polymers, composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. They shall be formed into a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages. The geotextile shall have no tears or defects which adversely alter its physical properties. Geotextiles used in drainage applications shall be Class 2 Type A and shall conform to the following AASHTO-M-288 properties for drainage geotextiles:

Property	ASTM Test	<i>In situ Soil requirements-% passing through a Standard No. 200 US sieve</i>					
		Less than 15%		15% to 50%		Greater than 50%	
Structure		Woven	Non-Woven	Woven	Non-Woven	Woven	Non-Woven
Elongation	ASTM D4595	<50%	>=50%	<50%	>=50%	<50%	>=50%
Grab Strength	ASTM	1100N	700N	1100N	700N	1100N	700N

SECTION 033003 – NON-WOVEN GEOTEXTILE FABRIC

(Min.)	D4632	(247 LBF)	(157 LBF)	(247 LBF)	(157 LBF)	(247 LBF)	(157 LBF)
Tear Strength (Min.)	ASTM D4533	400N (90 LBF)	250N (56 LBF)	400N (90 LBF)	250N (56 LBF)	400N (90 LBF)	250N (56 LBF)
Puncture Strength (Min.)	ASTM D4833	400N (90 LBF)	250N (56 LBF)	400N (90 LBF)	250N (56 LBF)	400N (90 LBF)	250N (56 LBF)
Permittivity (Min.)	ASTM D4491	0.51/sec.		0.21 / sec.		0.11 / sec.	
Apparent Opening Size (Max.)	ASTM D4751	0.43 mm (0.01645 inch) Std No. 40 sieve		0.25 mm (0.0098 inch) Std. No. 60 sieve		0.22 mm (0.0083 inch) Std. No. 70 sieve	

3. PART 3 – EXECUTION

3.1 PREPARATION

- A. Gravel sub-base shall be placed and graded prior to installation of Geotextile.
- B. All Flow Control Vaults and the Stormwater Storage Tank shall be installed prior to installation of Geotextile.
- C. Each geotextile roll shall be wrapped with a material that will protect the geotextile, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants. The protective wrapping shall be maintained during periods of shipment and storage. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, and any environmental condition that may damage the physical property values of the geotextile.
- D. Prior to installation of Geotextile, the ground shall be prepared by removing stumps and other organic material, along with any large boulders and sharp objects which may tear or damage the fabric.

3.2 INSTALLATION

- A. Install Geotextile at elevations and alignments as indicated on the drawings or as directed by the **Construction Manager**, and extending a minimum of one foot beyond the gravel sub-base. The drainage Geotextile shall be placed loosely with no wrinkles or folds. Care will be taken to place the geotextile in intimate contact with the soil or gravel so that no void spaces occur between the geotextile and other media. Where the geotextile is to be installed in a trench, the geotextile shall be overlapped at the top of the trench, twelve inches or the full width of the trench, whichever is less.
- B. If the geotextile is damaged during installation, the rupture shall be removed and the damaged area shall be covered with a patch of new fabric which will overlap the undamaged fabric approximately six inches in all directions.
- C. At some locations it will be necessary to accommodate the protrusion of a Vault, Pipe or other item through the Geotextile Fabric. At these locations, Contractor shall minimally cut the Geotextile and place it over the installed item. A one-foot-wide strip of Geotextile shall be used to wrap the item and the placed Fabric so as to create a barrier for the passage of fines.

SECTION 033003 – NON-WOVEN GEOTEXTILE FABRIC

- D. After placement, the entire perimeter of the Geotextile shall be tucked under the edge of gravel sub-base to prevent movement and to limit the intrusion of fines.
- E. Sandy Planting Medium shall be placed over the Geotextile as soon after installation as possible.

END OF SECTION 033003

SECTION 033004 – AASHTO NO. 57 WASHED GRAVEL WITH NO FINES

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Material specifications for “Washed Gravel Subbase” or AASHTO #57 Washed Gravel with No Fines.
- B. Related Sections include the following:
 - 1. Section 033006 “EPDM Liner”
 - 2. Section 033003 “Non-Woven Geotextile Fabric.”
 - 3. Section 033008 “Sandy Planting Medium.”
 - 4. Section 033001 “Delivery Pipes.”
 - 5. Section 033010 “Underdrain and Flow Control Vault”
 - 6. Section 033009 “Stormwater Storage Tank”

1.3. SUBMITTALS

- B. Representative sample of the material to the Construction Manager for approval, in writing. One three-pound bag shall be submitted for approval, with a sieve analysis and name of supplier attached. All samples shall be clearly labeled with Contract No. and name of supplier.

2. PART 2 – PRODUCTS

- 2.1. The material shall be AASHTO #57 found in Table C of Section 703 of the PA DOT Publication 408, 2016. The material shall be crushed stone that is washed and sorted between ½” and 1-½” to provide in-place voids of at least 30%. The material shall be washed prior to delivery such that there are no fines present.
 - A. The quality of the stone particles shall meet the requirements of Type A Coarse Aggregate.

2. PART 3 – EXECUTION

3.1 PREPARATION

- A. Gravel shall be place over installed EPDM geomembrane after inspection by and approval from the Construction Manager.
- B. There shall be minimal fines present in the lined basins at time of gravel placement.
- C. NOTE: At some locations it will be necessary to first install a system component prior to placing the gravel. See Section 033001 Delivery Pipes, Section 033010 Underdrain and Flow Control Vault, Section 033009 Stormwater Storage Tank and Plans.

3.2 INSTALLATION

- A. Gravel shall be placed over the geomembrane in a manner that does not puncture or compromise the membrane. Excavators or other equipment may not drive over the membrane at any time during installation.

SECTION 033004 – AASHTO NO. 57 WASHED GRAVEL WITH NO FINES

- B. Gravel shall be placed and hand-spread until the thicknesses and extents shown in the Plans are met.
- C. No equipment or vehicles shall enter the gravel areas at any time during or after installation.
- D. Contractor shall place Non-Woven Geotextile Fabric over the gravel beds immediately after placement and spreading is complete.
 - 1. If possible, Contractor shall place Sandy Planting Medium over the Geotextile Fabric on the same day as gravel placement, in order to prevent the intrusion of fines.
 - 2. If it is not possible to place the Sandy Planting Medium on the same day, Contractor shall assure that the edges of all Non-Woven Geotextile are tucked in behind the gravel in order to minimize intrusion of fines.

END OF SECTION 033004

SECTION 033005 - CATCH BASINS MODIFICATIONS

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Removal and reinstallation of existing “hood.”
 - 2. Addition of elbow, riser and trash screen to existing outlet.
 - 3. Core cutting new inlet/outlet and pipe connections.
 - 4. Trenching and new pipe connections.
 - 5. Products ordered in advance.
- B. Related Sections include the following:
 - 1. Section 033001 “Delivery Pipes.”

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. City of Pittsburgh approvals for ROW utility work.
- C. Shop drawings.

1.4. PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

2. PART 2 – PRODUCTS

- 2.1. All PVC pipes and fittings shall meet the requirements of ASTM D1785 and ASTM D2665 and shall be either Schedule 40 or Schedule 80 as shown in the Plans.
- 2.2. KOR-N-SEAL I EX Series Connector: S406-11AW and KOR-N-SEAL I EX Series Connector: S406-12W or approved equivalent. Available from www.trelleborg.com.
- 2.3. FloGard Catch Basin Insert Model FGP-2448F8 (12” deep) for Inlet #1
- 2.4. FloGard Catch Basin Insert Model FGP-2448 (20” deep) for Inlet #2

3. PART 3 – EXECUTION

3.1 PREPARATION

- A. All City of Pittsburgh approvals (including DPW and PWSA) shall be in place prior to commencement of any work within the ROW.
- B. All traffic control measures shall be in place prior to commencement of any work within the ROW.

3.2 EXCAVATIONS

- A. Contractor shall saw cut the asphalt to create a one-foot wide trench connecting Inlet #1 and Inlet #2 as shown in the Plans.
- B. Contractor shall excavate the trench to a depth of approximately three feet or as necessary to install connecting pipe.
- C. Contractor shall remove the sidewalk panel adjacent to Inlet #2.

SECTION 033005 - CATCH BASINS MODIFICATIONS

- D. Contractor shall saw cut and excavate adjacent to the exterior wall of Inlet #1 (east side) and Inlet #2 (west and north sides) as needed for installation of new pipe connection to catch basin.
- E. Excavate a trench for installation of the pipe connecting Inlet #2 and the River Roots (RR) Basin #1

3.3 INSTALLATIONS / MODIFICATIONS

A. New Pipe Connections

- 1. Contractor shall core drill at Inlets #1 and #2 at locations such that the final invert elevations of the installed pipe is as shown in the Plans.
- 2. Install KOR-N-SEAL connector products (or approved equal) per manufacturer's instructions.
- 3. Place appropriate bedding at bottom of trenches and install connecting pipes at the prescribed slopes and invert elevations as shown in the Plans. NOTE: IT IS CRUCIAL THAT THE NEW INVERT ELEVATIONS AND PIPE SLOPES ARE CORRECT.
- 4. Backfill ROW trench in preparation for repaving. Repaving shall be performed to the standards issued by the City of Pittsburgh DPW.

B. Existing Outlet Modifications

- 1. Both existing outlets are on the south sides of Inlets #1 and #2.
- 2. Remove existing Hood and set aside for re-installation over the new outlets. Note: At Inlet #1 the Hood will not be reinstalled and should be made available to PWSA for their reuse.
- 3. Inspect existing outlet pipes. City records show that these outlet pipes are 15" diameter, but this has not been verified. If these pipes are not 15" diameter then measure and inform the **Owner's Representative or Construction Manager**.
- 4. Once proper sizing is confirmed, use appropriate Sch 40 PVC fittings and pipe to build the new outflow risers as shown in the Plans.
 - a. Drill a one-inch hole near the base of the 90° elbow.
 - b. Place the elbow over the existing outflow pipe. It may be necessary to configure a coupling internal to the existing pipe if the existing pipe does not extend into the catch basin. Solvent weld elbow to pipe such that the elbow points vertically as shown in the Plans.
 - c. Cut Sch 40 PVC riser pipe to proper length such that the rim elevation of the pipe is as shown in the Plans. Do not solvent weld the riser to the elbow.
- 5. Cut a six-inch diameter hole (orifice) in 8" PVC end cap such that the bottom of the hole (invert) will line up with the 8" pipe invert when assembled. Press fit cap over new outlet pipe at Inlet #2 – do not solvent weld the cap to the pipe.
- 6. Install Hood (previously removed from existing outlet) over new outlet pipe at Inlet #2 (north side). No hood shall be reinstalled at Inlet #1.
- 7. Place Catch Basin Inserts per manufacturer's instructions.
- 8. Cover Inlets with existing grates and backfill excavated areas in preparation for repaving.

3.4 REPAVING

SECTION 033005 - CATCH BASINS MODIFICATIONS

- A. Contractor shall be responsible for restoring the areas affected by the installations including proper use of subbase material and asphalt (in the street) and reconstructing the concrete sidewalk panel.

END OF SECTION 033005

SECTION 033006 – EPDM LINER AND INSTALLATION

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Installation of Ethylene Propylene Diene Monomer (EPDM) Geomembrane
 - 2. Use of Anchor Trenches.
 - 3. Products ordered in advance.
- B. Related Sections include the following:
 - 1. Section 033001 "Delivery Pipes."
 - 2. Section 033002 "Liner Anchor System"
 - 3. Section 033004 "AASHTO #57 Washed Gravel"

1.3. SUBMITTALS

- A. Shop drawings.
- B. The Contractor prior to the start of work shall submit to the **Construction Manager** for approval product data and samples of the geomembrane.
 - 1. Test Reports: Certified material test reports showing that the geomembrane meet the specified requirements shall be submitted for each shipment and identified with specific lots prior to installing materials. Material test reports shall meet the requirements of ASTM and GRI test method GRI GM 21.
- C. Product Data: For all other manufactured material and products indicated, including seam sealants and other adhesives or tapes.

1.4. PROJECT CONDITIONS

- A. Basins and work area shall be free of standing water and/or saturated/unstable soils at time of installation.

2. PART 2 – PRODUCTS

2.1. High quality, Ethylene Propylene Diene Monomer (EPDM) geomembrane manufactured by Firestone (GeoGard™) or a pre-approved alternative.

- A. Thickness shall not be less than 45 mil (minimum average) and shall comply with ASTM 5199.
- B. The Density shall not be less than 1200 kg/m³ (75 lb/ft³) and in compliant with ASTM 1505.
- C. Tear resistance shall not less than 40 N (9.0 lb), and shall be in compliant with ASTM D1004.
- D. Puncture Resistance shall not be less than 133 N (30 lb) and shall be in compliant with ASTM D4833.
- E. The EPDM Geomembrane shall be strong enough to resist both rot and insects.

2.2. Seam sealants, adhesives, tapes and patching strips compatible with the geomembrane as specified by the manufacturer.

SECTION 033006 – EPDM LINER AND INSTALLATION

- 2.3. #3 Extreme Angle Master Flash Pipe Boot available from www.midmichiganmetalsales.com or approved equivalent.
- 2.4. FILTRIFIC Liner Connection Stainless Steel Clamp Model RC6 available from www.filtrific.com/liner-connection-kits.htm or approved equivalent.

3. PART 3 – DELIVERY, STORAGE AND HANDLING

- 3.1. Deliver materials to site in manufacturer's original, unopened packaging, with labels clearly identifying product name and manufacturer.
- 3.2. Store materials in clean, dry area in accordance with manufacturer's instructions.
- 3.3. Protect materials during handling and installation to prevent damage.

4. PART 4 – EXECUTION

4.1 PREPARATION

- A. Prior to the installation of the EPDM Geomembrane, the Contractor shall excavate the areas (Basins) and prepare the grade to the satisfaction of the **Construction Manager**.
- B. Contractor shall remove any sharp foreign objects, sharp stones, and stones larger than approximately ¾-inch diameter from all areas to be covered by the geomembrane to the satisfaction of the **Construction Manager**.
- C. In some cases it will be necessary to place Delivery Pipes between Basins prior to anchoring the geomembrane. See Section 033001 Delivery Pipes and Plans.

4.2 INSTALLATION

- A. The EPDM Geomembrane shall be placed in one piece directly over the full extent of the Basin and extending beyond the Basin edge as needed for trench anchoring. If necessary, Contractor may use overlapping EPDM Geomembrane panels seamed by means consistent with and with products recommended by the membrane manufacturer.
- B. Anchor Trenches – The Contractor shall excavate a 1-foot deep anchor trench at locations shown in the Plans.
 1. An anchor trench in the shape of a “U” shall be used as a perimeter termination.
 2. The trench is excavated and the membrane is loosely laid in it.
 3. The trench is then backfilled and compacted with the excavated material.
- C. At locations where the geomembrane is to be anchored to a manhole or wall, refer to Section 033002 Liner Anchor System.
- D. At locations where the Delivery Pipe is to protrude through the liner, see Section 4.3 below.
- E. Construction Manager shall inspect all geomembrane installations prior to placement of gravel fill or any other material. Except for the portion of the geomembrane buried within the Anchor Trenches, the entire membrane shall be exposed for the inspection.
- F. No equipment, materials or machinery shall be placed on or be transported over exposed EPDM Geomembrane.
- G. Care shall be taken in the placement of backfill under other items so as to prevent dislocation of the EPDM Geomembrane. If the EPDM Geomembrane is ruptured during installation, the rupture shall be covered with a patch of new EPDM Geomembrane that will overlap the undamaged area by at least six inches in all directions. No additional payment will be made for the repair.

SECTION 033006 – EPDM LINER AND INSTALLATION

4.3 PIPE PROTRUSIONS THROUGH LINER

- A. NOTE: Construction Manager will approve alternative methods and products for sealing protrusions using EPDM flashing and proper adhesives. Contractor must show shop drawings for approval.
- B. NOTE: Some pipe will need to be placed prior to placing the liner. Contractor may cut the Delivery Pipe and re-couple to simplify installation.
- B. Identify locations in the liner where protrusions will occur. Cut a circular hole approximately 4 inches in diameter.
- C. Place liner over the pipe.
- D. Cut Pipe Boot as necessary and place over the pipe (on the interior side of the liner). Boot should fit tightly around pipe. Adhere the Pipe Boot to the liner using a compatible adhesive - per manufacturer's instructions.
- E. Place Stainless Steel Clamp over Pipe Boot and secure to pipe. Do not over-tighten.

END OF SECTION 033006

SECTION 033007 – OVERFLOW RISER

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Assembly and installation of Overflow Risers within River Roots (RR) Basins 1, 2 and 3.
 - 2. Products ordered in advance.
- B. Related Sections include the following:
 - 1. Section 033010 "Underdrain and Flow Control Vault."
 - 2. Section 033001 "Delivery Pipes."
 - 3. Section 033009 "Stormwater Storage Tank."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Shop drawings.

2. PART 2 – PRODUCTS

- 2.1. All PVC pipes and fittings shall meet the requirements of ASTM D1785 and ASTM D2665 and shall be either Schedule 40 or Schedule 80 as shown in the Plans.
- 2.2. 6" Shielded Fernco Collar – Stainless steel or approved equivalent.
- 2.3. 6" Galvanized Steel Overflow Riser shall meet the requirements of ASTM A53.
- 2.4. 6" ZURN Z193 Vandal Proof Hooded Vent Cap available from www.pipebootexpress.com/z193-vandal-proof-hooded-vent-cap.html
- 2.5. Concrete Support Pad 12"x12"x2"

3. PART 3 – EXECUTION

3.1 PREPARATION

- A. Overflow Risers are to be assembled and installed at Basins 1, 2 and 3 in conjunction with the piped network connecting the RR Basins.
- B. All excavations and placement of EPDM liners, non-woven geotextile fabric and AASHTO #57 gravel shall be performed prior to installation of piped network and Overflow Risers. At RR Basin #2, Stormwater Storage Tank (Storm Chamber) and Vault shall be installed prior to installation of piped network and Overflow Risers.

3.2 ASSEMBLY / INSTALLATION

- A. Join the 6x6x6 Sch 40 PVC Hub at the locations shown in the Plans such that the tee points vertically upward and both ends welded to the 6" Sch 80 PVC Delivery Pipe.
- B. Weld a short length of 6" Sch 80 PVC pipe to the top (tee) opening.
- C. Attach the 6" Shielded Fernco Collar to the short stub of pipe.

SECTION 033007 – OVERFLOW RISER

- D. Attach a length of 6" Galvanized Steel Overflow Riser to the Fernco Collar. NOTE: IT IS CRUCIAL THAT THE FINAL RIM ELEVATION OF THE OVERFLOW RISER IS AS SHOWN IN THE PLANS. The Hooded Vent Cap does not alter the rim elevation of the riser.
- E. Attach the Hooded Vent Cap to the top of the riser and secure to the pipe per manufacturer's instructions.
- F. Place Sandy Planting Medium over the geotextile fabric to create a mound beneath the Overflow Riser. This can be done when placing the planting medium over all.
- G. Place 12"x12"x2" Concrete Support Pad beneath the Hub to prevent settling and/or movement from abuse. It is important that the mound supporting the Pad is sufficiently compacted and stable.

END OF SECTION 033007

SECTION 033008 – SANDY PLANTING MEDIUM

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Material specifications for “Sandy Planting Medium.”
 - 2. Testing requirements for “Sandy Planting Medium.”
- B. Related Sections include the following:
 - 1. Section 033002 “Non-Woven Geotextile Fabric.”

1.3. SUBMITTALS

- A. Prior to the procurement of planting medium, the following information and samples are required for review and approval for each source:
 - 1. A sample of the proposed material, taken with a **representative of the Owner**, indicating the method of sampling and location of the sample.
 - 2. The Contractor shall submit to the Project Manager the name and location of the borrow (source) or stockpile sites(s) and the estimated quantity of material available. The Contractor shall provide a notarized letter from the owner(s) of the proposed borrow site and/or stockpile sites(s) indicating ownership of the proposed site(s) and a commitment to supply a specified minimum quantity of material for this project. Additionally, the supplier shall provide a certificate of clean fill and/or source materials for planting medium, signed by a PA licensed PE/RLA or RA. To avoid delays in planting and seeding, the Contractor shall begin to secure and test planting medium at least one month in advance of the material actually being needed on site. This will allow sufficient time to blend the specified soil mix and make all the necessary adjustments in the mixing process.
 - 3. Results of the organic content analyses conducted in accordance with the above referenced standard, *Recommended Soil Testing Procedures for The Northeastern United States, 3rd Edition, Northeast Regional Publication, Agricultural Experiment Station, University of Delaware. Bulletin #493, revised October 2009.*
 - 4. Results of the USDA soil texture gradation (sand, silt and clay) analyses and sand sieve analyses, with full reporting of all information in USDA sieve sizes, in accordance with the *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0 November 2004.*
 - 5. Results of the pH tests conducted in accordance with the above referenced standard, *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0 November 2004.*
 - 6. Results of the soluble salts test conducted in accordance with the above referenced standard, *Recommended Soil Testing Procedures for The Northeastern United States,*

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3rd Edition, Northeast Regional Publication, Agricultural Experiment Station, University of Delaware. Bulletin #493, revised October 2009.

7. Results of the nutrient analyses test conducted in accordance with the above referenced standard, *Recommended Soil Testing Procedures for The Northeastern United States, 3rd Edition, Northeast Regional Publication, Agricultural Experiment Station, University of Delaware. Bulletin #493, revised October 2009.*
8. Results of the inorganic nitrogen and total Kjeldahl nitrogen tests conducted in accordance with the above referenced standard, *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0 November 2004.*
9. Results of the acid-producing (iron sulfide) test conducted in accordance with the methodologies utilized by the *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0 November 2004.*

2. PART 2 – PRODUCTS

2.1. Planting Medium shall be a loamy sand (75-85% sand) as classified by the U.S. Department of Agriculture (USDA). Based on test results, a determination will be made to ensure that the sand fraction analysis results are capable of supporting proposed vegetation. Planting Medium shall be free of refuse, hard clods, woody vegetation, stiff clay, construction debris (of any kind), boulders, stones larger than 1-1/2 inches, chemicals, or other deleterious material toxic to any vegetation used on this project.

- A. Planting Medium shall have a minimum organic content of 3.0 percent and a maximum of 6.0 percent. If the source soil requires amendment to meet the planting medium organic content requirement, leaf compost will be the only approved admixture. No soil mixing shall be permitted during or after planting medium placement. Planting Medium shall be tested for compliance with Contract specifications and submitted for approval prior to delivery to the site.
- B. The organic content of soils shall be determined by a laboratory using the loss on ignition method as described in the *Recommended Soil Testing Procedures for The Northeastern United States, 3rd Edition, Northeast Regional Publication, Agricultural Experiment Station, University of Delaware, Bulletin #493, Revised October 2009.*
- C. The gradation of planting medium shall be determined by a laboratory using the methods of the *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0, November 2004.* The gradation of the planting medium as determined by USDA classifications shall be within the following ranges:

Ranges:	0-08%	gravel
	75-85%	sand
	10-15%	silt
	5- 15%	clay
Classification/sieve size:	2" to 2.0 mm	gravel
	2.0 mm to 0.05 mm	sand
	0.05 mm to 0.002 mm	silt

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<0.002 mm clay

- D. The pH value of planting medium shall be 6.0-7.0 as determined by an approved laboratory using soil pH (Water (1:1. V:V)) procedures as described in the *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0, November 2004*. Amendment of soil to lower pH to meet Contract requirements is not permitted.
- E. The soluble salt value of the planting medium shall be (0-0.4 mmhos/cm) as determined by an approved laboratory using the soluble salt (1:2(V:V)) procedures as described in the *Recommended Soil Testing Procedures for The Northeastern United States, 3rd Edition, Northeast Regional Publication, Agricultural Experiment Station, University of Delaware, Bulletin #493, revised October 2009*.
- F. The value for Kjeldahl Nitrogen shall be within the range of 0.06% to 0.25% (with nitrate (NO-3) form of nitrogen not to exceed 20 ppm) as determined by an approved laboratory using the *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0, November 2004*.
- G. The value for Macro (P, K) and Micro Nutrients (Mg, Ca, Mn, Zn, Cu and B) shall be determined by an approved laboratory using the procedures as described in the "Recommended Soil Testing Procedures for The Northeastern United States, 3rd Edition, Northeast Regional Publication, Agricultural Experiment Station, University of Delaware, Bulletin #493, revised October 2009.
- | | |
|-----------|--|
| P | Acceptable range is 80 lbs/acre to 100 lbs/acre |
| K | Acceptable range is 100 lbs/acre to 300 lbs/acre |
| Ca | Acceptable range is 900 lbs/acre to 2,800 lbs/acre |
| Mg | Acceptable range is 300 lbs/acre to 600 lbs/acre |
| K+Ca+Mg | not greater than 3,700 lbs/acre |
| Mn | Acceptable range is 2 ppm to 20 ppm |
| B | Acceptable range is 0.8 ppm to 3 ppm |
| Cu | Acceptable range is 0.1 ppm to 4.0 ppm |
| Z | Acceptable range is 1 ppm to 12 ppm |
| % Organic | 3.0% to 6% (loss on ignition) |
- H. An acid-producing soil test is required to determine the potential for decreases in soil pH after oxidation. The pH value of the solution shall be greater than 4.5 as determined by the *USDA Soil Survey Laboratory Methods Manual, Soil Survey Investigations Report No. 42 Version 4.0, November 2004*.
- I. Planting Medium shall not contain any traces of hydrocarbons, petroleum products, chemically prohibited substances or any other elements considered to be toxic to any vegetation used on this Project.
- J. The planting medium shall not smell of petroleum or give off other unnatural or toxic odors. Regardless of prior acceptance of sample material, should the planting medium actually delivered to the site seem suspicious in any way, the Construction Manager shall

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reject that material. Should the Contractor strongly disagree with the **Construction Manager's** determination, the Contractor may appeal (see Part 4 below).

3. PART 3 – EXECUTION

3.1 PREPARATION

- A. Prior to procurement of planting medium and starting delivery of soil, all approvals for those items required in Section entitled "SUBMITTALS" must have been given in writing to and accepted by the **Construction Manager**.
- B. Prior to the placement of planting medium, the subgrade must be accepted by the **Construction Manager**.
- C. The material delivered to the site shall be visually and continuously inspected by **Construction Manager** during construction to ensure that it is consistently the same material previously approved and delivered to the site. If changes in material occur, soil delivery shall cease immediately, the Contractor shall not incorporate the new material into the work until the material meets these specifications. The Contractor shall test the new material as a new source and submit his results to the **Construction Manager** for approval. If **Construction Manager** rejects the material, the Contractor shall immediately remove the material off the project site at no additional cost to the Owner.

3.2 INSTALLATION

- A. Planting Medium shall be placed over the Geotextile Fabric which shall create a porous barrier between the Planting Medium and the Gravel sub-base.
- B. Planting Medium shall be evenly placed to the thickness and configuration as directed by the **Construction Manager** or as shown on the Plans. Planting Medium shall not be placed when the subgrade or planting medium is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed seeding, planting or soil structure.
- C. If possible, Contractor shall place Sandy Planting Medium over the Geotextile Fabric on the same day as gravel placement, in order to prevent the intrusion of fines.
- D. Placement of planting medium shall be performed only when it can be followed within five days by planting or seeding. After planting medium placement and final grading, no heavy equipment, pickup trucks, or other construction vehicles (other than LGP equipment) shall be permitted to travel on these completed areas. The Contractor shall, through mechanical raking and hand grading with rakes and shovels, grade all areas around fences, pipes and other structures in preparation for seeding or planting.
- E. The Contractor shall, as part of the planting medium spreading operation, mechanically rake and clean all undesirable materials from the planting medium prior to seeding or planting operations. The soil shall be firm prior to seeding operations. The discing of the soil just prior to seeding is not permitted. The method for this work must be accepted by the **Construction Manager**.
- F. The Contractor shall dispose of all undesirable materials raked from the planting medium in accordance with the direction of the **Construction Manager**.
- G. The Contractor shall pay all costs, fees, etc. to rectify any deficiencies in placement of the planting medium layer, to the acceptance of the **Construction Manager**.

4. PART 4 – APPEAL PROCESS

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- 4.1 The Construction Manager shall check for discoloration and evidence of unacceptable contents. If the Construction Manager suspects that the soil possesses hazardous or contaminated characteristics, it will be rejected. Should the Contractor contest the Construction Manager's determination, then samplings of the rejected soil will be sent to a Laboratory which is accredited by the PADEP for the selected analytical method.
- 4.2 Environmental Analysis shall include, but not be limited to, U.S.E.P.A. Standard Test Methods for determination of Contaminant Concentrations and the Toxicity Characteristic Leaching Procedure (T.C.L.P.) for determination of Leachability of at least 39 Components. The extraction portion of the T.C.L.P. Test shall be performed according to E.P.A.-SW846 Method 1311. Analysis of the extract shall be performed by E.P.A. Methods SW846; 8021 for Volatiles, 8270 for Semi-Volatiles and 6010 for Priority Pollutant Metals (P.P.L.), including lead. Other characteristic tests may include those for ignitability, corrosivity, and reactivity, as deemed required by the Construction Manager.
- 4.3 Construction Manager shall review the results of testing to confirm that the criteria and concentrations listed above are met. If the soil fails, then the Contractor shall be responsible for:
 - A. Payment of fees for services of the PA accredited lab.
 - B. Removal and legal disposal of rejected material.
 - C. Replacement with acceptable Planting Medium.
 - D. All other expenses, as well as potential fines that may be incurred.

END OF SECTION 033008

SECTION 033009 – STORMWATER STORAGE TANK

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Installation of Storm Chamber beneath River Roots (RR) Basin #2.
 - 2. Installation of Floating Filter and connection with 1" PEX tubing (feeder line to Hand Pump).
 - 3. Assembly and installation of 12" Corrugated Double-Walled HDPE Vault/Riser at top of Storm Chamber.
- B. Related Sections include the following:
 - 1. Section 033001 "Delivery Pipes."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Shop drawings.

2. PART 2 – PRODUCTS

- 2.1. All PVC pipes and fittings shall meet the requirements of ASTM D1785 and ASTM D2665 and shall be either Schedule 40 or Schedule 80 as shown in the Plans.
- 2.2. Stormwater Storage Tank shall be Storm Chamber SC-44 or approved equal.
- 2.3. 12" Corrugated Double-Walled HDPE pipe meeting the requirements of ASTM M294.
- 2.4. 6" Fatboy Inserta Tee Pipe Connection available from www.insertatee.com or approved equivalent
- 2.5. Polylok 3004-C 12" flat cover available from www.polylok.com or approved equivalent.
- 2.6. Menards Model GFR1208 12" to 8" Reducer available from www.menards.com or approved equivalent.
- 2.7. RAINFLO Vacuum Filter and Float w 8 feet of flex tubing available from www.rainharvest.com or approved equivalent.
- 2.8. 1" PEX pipe meeting the requirements of ASTM F877.
- 2.9. #8 Yellow Plastic Chain available from www.homedepot.com or approved equivalent.
- 2.10. #10 x 1-1/2 in. Stainless Steel Eye Bolt with 2 x stainless steel nuts and washers.

3. PART 3 – EXECUTION

3.1 PREPARATION

- A. RR Basin #2 shall be excavated with EPDM Liner installed and nine inches of AASHTO #57 gravel placed at the bottom of the Basin as shown in Plans.

3.2 INSTALLATION

- A. Place non-woven geotextile fabric over the nine-inch gravel layer.
- B. Cut out the eight-inch diameter opening at the top of the Storm Chamber where the pre-cast form is provided.

SECTION 033009 – STORMWATER STORAGE TANK

- C. Cut a small hole at the north end of the Storm Chamber for the Floating Filter and Flexible Vacuum Hose.
- D. Place SC-44 Storm Chamber over the geotextile fabric.
- E. Securely attach 8-foot length of Yellow Plastic Chain to the ring on the Floating Filter. The chain shall be passed through the opening and vault, and attached to the vault interior for access from the surface.
- F. Place the Floating Filter and flex tubing (8 feet in length) within the interior of the Storm Chamber, allowing a short length of hose to protrude through the hole.
- G. Use tape or some other material to make a simple (non-biodegradable) gasket by wrapping around the hose. The seal need not be water tight but should be sufficient to keep out sediment.
- H. Install the HDPE Reducer within the 8" opening at the top of the Storm Chamber per manufacturer's instructions.
- I. Cut a length of 12" Corrugated Double-Walled HDPE pipe such that the top of the pipe reaches the elevation shown in the Plans, and attach to the Reducer per manufacturer's instructions.
- J. Identify the elevation required for the invert of the corresponding Delivery Pipe, and core a hole near the top of the HDPE Vault for installation of the Fatboy Inserta Tee Pipe Connection, following manufacturer's instructions, such that the invert is at the proper elevation.
- K. Install a #10 x 1½" Stainless Steel Eye Bolt within the interior of the vault near the top. Attach with stainless steel washers and nuts at both the interior and exterior of the vault wall. Securely attach the other end of the Yellow Plastic Chain to the eye.

END OF SECTION 033009

SECTION 033010 – UNDERDRAIN AND FLOW CONTROL VAULT

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Assembly and placement of Underdrains within gravel layer and connection with Flow Control Vault at River Roots (RR) Basins 1, 3, 4 and 5.
 - 2. Assembly and installation of Vault
- B. Related Sections include the following:
 - 1. Section 033009 "Stormwater Storage Tank."
 - 2. Section 033007 "Overflow Riser."
 - 3. Section 033001 "Delivery Pipes."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Shop drawings.

2. PART 2 – PRODUCTS

- 2.1. All PVC pipes and fittings shall meet the requirements of ASTM D1785 and ASTM D2665 and shall be either Schedule 40 or Schedule 80 as shown in the Plans.
- 2.2. All 6" Perforated Sch 40 PVC underdrain pipes shall have perforations around the entire pipe perimeter (360°). Underdrain pipes may have slots or holes.
- 2.3. 6" Fatboy Inserta Tee Pipe Connection available from www.insertatee.com or approved equivalent.
- 2.4. 12" Corrugated Double-Walled HDPE pipe meeting the requirements of ASTM M294.
- 2.5. Polylok 3004-C 12" flat cover available from www.polylok.com.
- 2.6. Concrete Support Pad 12"x12"x2"

3. PART 3 – EXECUTION

3.1 PREPARATION

- A. All RR Basins shall be excavated and EPDM Liners installed prior to installation of Underdrain and Vault.

3.2 INSTALLATIONS

- A. Place 6" Perforated Sch 40 PVC and filter sock directly over the EPDM Liner as shown in the Plans. Non-woven geotextile fabric may be used in place of the filter sock.
- B. Cut a section of 12" Corrugated Double-Walled HDPE pipe to meet the elevations shown in the Plans.
- C. Place approximately one inch of sand bedding over the liner to sit beneath the two 12"x12"x2" Concrete Support Pads, and place both Concrete Support Pads on the sand bedding at the locations shown in the Plans.
- D. Place a Polylok 3004-C 12" flat cover over the bottom end of the HDPE Vault.

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- E. Core a hole near the base of the HDPE Vault for installation of the Fatboy Inserta Tee Pipe Connection, following manufacturer's instructions, and weld connections to the Perforated Pipe. The Perforated Pipe shall remain level as it connects with the Vault.
- F. Attach and solvent weld a 90° PVC elbow to the Perforated Pipe and inside the HDPE Vault.
- G. Cut a length of 6" PVC pipe to attach to the elbow such that the rim of the riser pipe is at the elevation shown in the Plans. Press the riser into the elbow but do not solvent weld.
- H. Drill a 1/2" diameter hole in the 6" end cap. Place the cap over the riser but do not solvent weld.
- I. Identify the elevation required for the invert of the corresponding Delivery Pipe, and core a hole near the top of the HDPE Vault for installation of the Fatboy Inserta Tee Pipe Connection, following manufacturer's instructions, such that the invert is at the proper elevation.
- J. Cut a short length of 6" Sch 80 PVC pipe to connect the vault with the Overflow Riser assembly (RR Basins 1, 2 and 3) or with the Delivery Pipe (RR Basins 4 and 5) and solvent weld the pipe to the fittings.
- K. Place the Polylok 3004-C 12" flat cover over the top of the HDPE Vault.
- L. Attach a 6" PVC Long Sweep 90° Elbow to the free end of the Perforated Pipe and weld.
- M. Attach a 5-foot length of 6" Sch 40 PVC Pipe to the Elbow and weld. Temporarily cover the pipe end until backfilling is complete.
- N. Bind the Filter Sock at each end of the Perforated Pipe to prevent intrusion of material.
- O. After all backfilling of gravel and planting medium is complete and final grades are approved, cut the 6" cleanout pipe to grade and attach/weld cleanout cover.

END OF SECTION 033010

SECTION 033011 – STONE SPILLWAY AT PIPE OUTFALLS

1. PART 1 – GENERAL

1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2. SUMMARY

- A. This Section includes the following:
 - 1. Placement of 3'x4' geotextile mat and R-4 stone at pipe outfalls as shown in Plans.
- B. Related Sections include the following:
 - 1. Section 033001 "Delivery Pipes."

1.3. SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Shop drawings.

2. PART 2 – PRODUCTS

- 2.1. R-4 Stone as specified in PennDOT Form 408
- 2.2. Winfab 200W woven synthetic geotextile as available from www.roadfabrics.com/product/winfab-200w/ or approved equivalent.

3. PART 3 – EXECUTION

3.1. INSTALLATION

- A. Identify location where spillway is to be installed. Spillway shall be installed after final placement of planting media within the basins.
- B. Hand excavate a slight depression (approximately 6 inches in depth) in the area of the spillway. The spillway shall be placed lengthwise (with respect to the pipe) and shall extend 6 to 12 inches beneath the pipe.
- C. Cut a section of Winfab 200W geotextile to approximately 3'x4'.
- D. Place geotextile over the excavated depression. Hand place R-4 stones over geotextile such that there are at least two courses of stone throughout. Stones shall cover the edges of the geotextile mat.

END OF SECTION 033011