



CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

THE COMMONS AT HIGHLAND HEIGHTS

Prepared for:
CITY OF HIGHLAND HEIGHTS
176 JOHNS HILL ROAD
HIGHLAND HEIGHTS, KENTUCKY 41076

Prepared by:
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Verdantas Project No: 241829

November 2025



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1. Project Information

PROJECT: THE COMMONS AT HIGHLAND HEIGHTS

OWNER: CITY OF HIGHLAND HEIGHTS
176 JOHNS HILL ROAD
HIGHLAND HEIGHTS, KENTUCKY 41076
CAMPBELL, KENTUCKY

ENGINEER: VERDANTAS, LLC
300 BUTTERMILK PIKE, SUITE 332
FORT MITCHELL, KENTUCKY 41017

CONTACT: FRANK TWEHUES, P.E.
TELEPHONE: (513) 792-8421
EMAIL: FTWEHUES@VERDANTAS.COM
Web Site: www.verdantas.com

PROJECT #: 241829

BID OPENING DATE: TUESDAY, NOVEMBER 25, 2025 @ 1:00 PM

ADVERTISING DATE: TUESDAY NOVEMBER 4, 2025

COMMENCEMENT DATE: MARCH 1, 2026

COMPLETION DATE: JULY 31, 2026



2. CITY OF HIGHLAND HEIGHTS OFFICIALS

MAYOR

Greg Meyers

CITY ADMINISTRATOR

Michael Giffen

CITY COUNCIL

Deb Ball

John Braun

Gary Chinn

Patricia Hayley

Rene Heinrich

Jesse Hockenberry



3. Legal Notice – Invitation to Bid

CITY OF HIGHLAND HEIGHTS, KENTUCKY

CAMPBELL

LEGAL NOTICE

Sealed proposals will be received at the office of the City Clerk, Municipal Building, **CITY OF HIGHLAND HEIGHTS, 176 JOHNS HILL ROAD, HIGHLAND HEIGHTS, CAMPBELL, KENTUCKY, 41076** until **1:00 PM.** local time on **TUESDAY, NOVEMBER 25, 2025**, for furnishing all labor, materials, and equipment necessary to complete project known as **THE COMMONS AT HIGHLAND HEIGHTS** and, at said time and place, publicly opened and read aloud.

Bids must be in accordance with drawings and specifications and on forms available from Verdantas LLD at a non-refundable cost of One Hundred Dollars (\$100.00) for mailed hard copies and \$45.00 for electronic files. Documents may be ordered by registering and paying for the documents online at <https://bids.verdantas.com>. Please contact planroom@verdantas.com or call 440-530-2351 if you encounter any problems registering or paying for the documents.

The bid specifications, drawings, plan holders list, addenda, and other bid information (**but not the bid forms**) may be viewed and/or downloaded for free via the internet at <https://bids.verdantas.com>. The bidder shall be responsible to check for Addenda and obtain same from the web site.

Proposals must contain the full name of the party or parties submitting the same and all persons interested therein. It is the intent and requirements of the owner that this project be completed no later than **JULY 31, 2026**.

The City Council of the **CITY OF HIGHLAND HEIGHTS**, reserve the right to waive irregularities and to reject any or all bids.

The City Council of the **CITY OF HIGHLAND HEIGHTS** shall authorize acceptance of the bid made by the responsible bidder who, in Council's judgment, offers the best and most responsive proposal to the City, considering quality, service, performance record, and price; or Council may direct the rejection of all bids. The City may award based on "functional equivalence" concerning specified work or products.

By the order of the City Council of the **CITY OF HIGHLAND HEIGHTS**.

Publishing Date: LINKNKY.com – **NOVEMBER 4, 2025**



4. Instructions to Bidders

4.1 General

Sealed bids will be received until **NOVEMBER 25, 2025**, at **1:00 PM**, at the office of the City Clerk, Municipal Building, **CITY OF HIGHLAND HEIGHTS, 176 JOHNS HILL ROAD, HIGHLAND HEIGHTS, 41076** for the furnishing of labor and materials required for the **THE COMMONS AT HIGHLAND HEIGHTS**, all in accordance with these instructions, conditions, specifications, and on the enclosed forms. All shall be submitted in a sealed envelope addressed to the **CITY OF HIGHLAND HEIGHTS** and shall be plainly marked on the outside of the envelope **THE COMMONS AT HIGHLAND HEIGHTS**. No bid may be withdrawn, once the bid has been deposited with the Owner, except in accordance with Kentucky Standard Specifications for Road and Bridge Construction, Section 102.11. Proposals received after the time for the opening of bids will be returned to the Bidder unopened. All bids shall remain valid for a period of sixty (60) days from the date of Bid Opening.

4.2 Definition of Terms

Whenever the term “Bidder” occurs, it shall mean any person, firm or corporation as a Prime Contractor who submits a proposal/bid for the Project, either acting directly or through a duly authorized representative.

Whenever the term “Bid Packet” occurs, it shall mean all the documents contained herein and any addenda thereto.

Whenever the term “City” or “Owner” occurs, it shall mean the **CITY OF HIGHLAND HEIGHTS**. The Mayor, or their designee, shall be the representative for the Owner.

Whenever the term “Contract” occurs, it shall mean the written agreement between the Owner and the Contractor covering the performance of the Work on the Project and the furnishing of labor and/or materials in the construction of the Work on the Project, including the Contract Documents.

“Contract Documents” shall mean these Instructions to Bidders and General Conditions, the Specifications, any Drawings and/or Plans, the Contract Bond and all other forms or certificates required by these Instructions, all forms included with the Contractor’s Bid, all the material contained in this Bid Packet, any Change Orders, and all addenda to any of the aforementioned items. The Contract Documents shall be a part of the Contract as if fully rewritten therein.

Whenever the term “Contractor” occurs, it shall mean a person, firm or corporation contracting with the Owner as a Prime Contractor to supply labor, materials, or equipment or all for the Project.

Whenever the term “Construction Manager” or “Engineer” occurs, it shall mean CT Consultants, Inc., or agent so designated by the Owner to act as the Owner’s agent.

Whenever the term “Director” occurs, it shall mean the Owner, or the Owner’s agent.

Whenever the term “Project” occurs, it shall mean the entire public improvement proposed by the Owner to be constructed in part or in whole pursuant to the Contract.

Whenever the term “Proposal or “Bid” occurs, it shall mean the offer of the Bidder to perform the Work on the Project, when said offer is made out and submitted on the prescribed forms, properly signed and guaranteed, and in the prescribed manner.



Whenever the term “Subcontractor” occurs, it shall mean a person, firm, or corporation other than the Prime Contractor supplying labor and materials for the Work to the Contractor and under the control of the Contractor.

Whenever the term “the Work” occurs, it shall mean the Work to be performed in constructing and completing the Project, including all labor, materials and equipment.

4.3 General Provisions

The most current State of Kentucky, Transportation Cabinet, Department of Highways (KTC) Standard Specifications for Road and Bridge Construction, as specifically set forth herein, are adopted and made part of these Contract Documents, unless specifically excluded herein.

All references to the Director, the Director of Highways, the First Assistant Director, and Chief Engineer, the Deputy Director of Design and Construction, the Deputy Director of Operations, the Engineer of Construction, the Engineer of Maintenance, the Engineer of Bridges, the Engineer of Tests, shall be considered to read the Engineer.

All references to the State, the State of Kentucky, the Cabinet, or the Transportation Cabinet shall be considered to read the Owner.

4.4 Examination of Plans, Specifications, General Provisions and Site

The Bidder is expected to examine carefully the site of the proposed Work, the proposal, plans, specifications, contract documents, general provisions, and addenda, before submitting a proposal. The submission of a bid shall be considered evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the plans, specifications, general conditions, special provisions, addenda and Contract.

Subject to public safety and convenience, prospective Bidders will be permitted to explore the site of the Work by boring or test pits, permits for which will be issued by the Engineer.

Explorations shall be at the sole risk and expense to the Bidder and under conditions of safety, maintaining traffic, and restoring all areas disturbed by any and all explorations to conditions equal to, or better than, the condition prior to exploration.

The Owner does not make any representation of soil or foundation conditions or materials, nor does it represent that drawings may not be modified to meet changes in soil conditions encountered as the Work progresses. The Contractor must inspect the site of the proposed Work and must assume all risk as to the nature and behavior of the material which may be encountered in excavation, whether apparent on the surface or disclosed only in the course of the Work.

4.5 Interpretation of Quantities in Proposal

The quantities appearing in the proposal are approximate only and are prepared for the comparison of the bids. Payment to the Contractor will be made only for the actual quantities of Work performed



and accepted or materials furnished and accepted in accordance with the Contract except for lump sum contracts and except for lump sum items in unit price contracts. The scheduled quantities of Work to be done and materials to be furnished may be increased, decreased, or omitted as hereinafter provided.

4.6 "Or Approved Equal" Items

In the preparation of these documents and plans, several proprietary products may have been specified. In all such cases, it is to be understood that the Contractor may offer a substitute for the specified product, as indicated by "Or Approved Equal". However, the Contractor must be aware that, before commencement of construction, he must provide information to the Engineer concerning the substituted product, and that the Engineer must approve in writing the offered product as being equal to the specified product before use or incorporation in the Work.

Unless otherwise modified by the Engineer, proprietary products are to be installed and/or constructed in strict compliance with the pertinent manufacturer's specifications.

4.7 Addenda

The Contractor shall notify the Engineer promptly of any discrepancies in, or omissions from the Contract Documents. The Engineer will issue a clarifying addendum to each person on record as having received a set of Contract Documents. The Owner will not be responsible for oral instruction or information. Questions received less than five (5) days prior to bid date cannot be answered. Any Addenda issued during the bidding period are to be included in the Proposal and shall become a part thereof.

4.8 Alternate Bid

It is the Owner's intent for the Contractor to bid on both the base and alternate bid items (if provided). Upon award of the Contract, the Owner will inform the Contractor, in writing, if the standard bid or alternate bid items will be included with the Project.

Award of the project will be based on the standard bid and/or alternate bid items ultimately selected by the Owner for inclusion in the project and award amount.

The Owner reserves the right to award or delete any or all combinations.

4.9 General Conditions

The successful Bidder/Contractor shall be responsible for all site operations related to the Work as shown and described in the Specifications, Plans and related General Provisions, and shall meet all requirements of these Instructions, General Provisions, and Specifications. All Work shall be completed in compliance with these Instructions, the General Provisions, Specifications, Plans and other Contract Documents.



4.10 Bidder Qualifications

The Owner requires that the Bidder furnish satisfactory evidence that he has the necessary resources to fulfill the conditions of the Contract and the Specifications. Each Bidder shall submit on the form included in the Bid Packet, a statement of the Bidder's qualifications. Each Bidder must furnish satisfactory evidence that it is operating a business of a type that can meet the Specifications for the Work and that it has operated such business for at least the last two (2) years. Only Bidders who have sufficient experience; ample equipment and personnel; adequate financial resources or the ability to obtain such resources as required during the performance of the Contract; who are able to comply with the required performance schedule for the Work; who have a satisfactory record of integrity; who have a satisfactory record of performance (Bidders who are delinquent in current contract performance, when the number and the extent of the delinquencies of each are considered, shall be presumed to be unable to fulfill this requirement, in the absence of evidence to the contrary or circumstances properly explained); and who are otherwise qualified and eligible to receive an award under applicable Kentucky laws and regulations, shall be considered.

The Owner 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, and the Bidder shall furnish to the Owner 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 Owner that the Bidder is qualified to carry out properly the terms of the Contract.

The Owner requires that the Bidder furnish a list of references of **all** persons, corporations, political subdivisions or firms for whom the Bidder has done the type of Work required for this Project within the last two (2) years.

4.11 Subcontracts

The Bidder shall submit, with his bid, a complete list of the names and addresses of any subcontractors he contemplates for use on the Project. In addition, the Owner requires that the Bidder furnish a list of subcontractor references of **all** persons, corporations, political subdivisions or firms for whom the proposed subcontractor has done the type of Work proposed under contract between the Contractor and the subcontractor within the last two (2) years.

The subcontractor must be acceptable to the Owner and approved by the Owner, in writing, prior to the execution of the Contract. Although such approval shall not be arbitrarily withheld, subcontractors that have proven unsatisfactory in the past or do not have adequate manpower or resources to perform the Work will not be accepted. Only subcontractors who have sufficient experience; ample equipment and personnel; adequate financial resources or the ability to obtain such resources; who are able to comply with the required performance schedule for the Work; who have a satisfactory record of integrity; who have a satisfactory record of performance (Bidders who are delinquent in current contract performance, when the number and the extent of the delinquencies of each are considered, shall be presumed to be unable to fulfill this requirement, in the absence of evidence to the contrary or circumstances properly explained); and who are otherwise qualified and eligible to receive an award under applicable Kentucky laws and regulations, shall be considered.

The subcontractor must submit a non-collusion affidavit prior to the execution of the Contract.

Approval of the proposed subcontractor(s) will not be given by the Owner unless and until the above requirements are met. Although the Bidder is not required to submit the required Subcontractor forms, filled out by any proposed subcontractors, with its bid, the Bidder is hereby advised of these requirements



so that appropriate action can be taken to prevent subsequent delays in subcontract awards and/or the execution of the Contract.

After the Subcontractors have been approved and the Contract signed, no changes in the subcontractors shall be made without the prior written approval of the Owner.

4.12 Bid Guaranty

In accordance with Kentucky Transportation Cabinet Standard Specifications for Road and Bridge Construction Section 102.09, and in order to assure that if the Bidder's bid is accepted that it will enter into the Contract with the Owner, each bid must be accompanied by a Bid Guaranty in the form of either:

1. A Bond for 10% percent of the bid, in the form of a Bid Guaranty Bond, acknowledged by the Bidder, as principal, and by a surety company qualified to do business in the State of Kentucky, and satisfactory to the Owner as surety; or
2. A cashier's check or certified check issued by a responsible bank or trust company, and made payable to the order of the Owner, in the sum of at least ten percent (10%) of the Bid.

The Bid Guaranty shall be enclosed in the sealed envelope containing the Bid.

If the bidder chooses to submit a Bid Guaranty Bond, the bond shall be in form prescribed by KTC Standard Specifications for Road and Bridge Construction Section 103.05. The Bond must be signed by an authorized agent of an acceptable surety bonding company and by the Bidder. The bond must be countersigned by a resident agent of the bonding company and its corporate seals must be affixed to all copies. ***The name and address of both the surety and surety's agent must appear on the bond.*** Bid Guaranty must be supported by credentials showing the Power of Attorney of the surety's agent.

Bid guaranties (cashier's check or certified check) will be returned to unsuccessful Bidders within fifteen (15) days of the execution of the Contract with the successful Bidder.

Once the bid is awarded pursuant to the Notice of Award, the Contractor will be required to execute the Contract with the Owner within ten (10) days of its receipt of said Notice. Execution of the Contract shall require the submittal of a Performance Bond (unless the Bidder has already submitted a Bid Guaranty Bond), proof of insurance, and other documents, as outlined below. Executed copies of the bond and insurance certificates are required for each set of Contract Documents. If the Contractor fails to execute the Contract within the required time, the Contractor's Bid Guaranty may be forfeited to the Owner, not as a penalty, but as liquidated damages, in accordance with the terms of the Bid Guaranty. The Project may then be rebid or awarded to the next lowest and best bidder, as the Owner determines at its own discretion.

4.13 Preparation of Proposal

The Bidder shall submit their Proposal upon the forms furnished by the Owner. All blank spaces for bid prices must be filled in, in words or figures, and shall be written in ink or typewritten. The Bidder shall initialize any corrections or changes in the Proposal.

The Bidder's Proposal must be signed in ink by the individual, by one or more members of the partnership, or by one or more officers of a corporation, or by an agent of the Bidder legally qualified and acceptable to the Owner. If the Proposal is made by an individual, his name and business address must be shown; by a partnership, the name and business address of each partnership member must be shown; by a corporation, the name of the state under the laws of which the corporation is chartered and the name and



title of the officer or officers having authority under the bylaws to sign contracts, the name of the corporation and the business address of its corporate officials must be shown.

A foreign corporation submitting a Proposal must comply with the laws of doing business in the State of Kentucky, if its Proposal or any part thereof is accepted.

To be considered responsive, each bid shall consist of the following, fully executed:

1. Bidder Information Sheet
2. Bid Proposal
3. Bid Form
4. Bid Guaranty and Contract Bond
5. Certificate as to Interest
6. Subcontractors List
7. Certification As to Kentucky Resident Status OR Certification As to Non-Resident Status
8. Personal Property Tax Affidavit

The Bidder's attention is directed to all applicable Federal, State, and local laws, and the rules and regulations of all authorities and agencies having jurisdiction over the Work. All such laws, rules, and regulations shall apply to the Contract and every aspect of the Work and shall be deemed included as a part of the Contract as if the same were fully written therein.

The attention of Bidders is especially directed to the following:

1. Federal and Civil Rights Law regulating Equal Opportunity Employment
2. Bid Guaranty and Contract Bond requirements
3. Statutory requirements of the State of Kentucky relative to licensing of corporations organized under the laws of any other state
4. Federal or State of Kentucky Prevailing Wage Law

The price or prices shown on the proposal shall include all costs associated with the Work (including labor), shall be the actual price(s) to be paid by the Owner, and shall include all discounts, allowances, etc. Each Bidder shall bid on each item listed in the Proposal.

Where a discrepancy appears between the sum shown in the "Total" column and the correct product of the sums appearing in the "Estimated Quantity" and "Unit Price" columns, the correct product of the sums appearing in the "Estimated Quantity" and "Unit Price" columns shall control.

4.14 Commencement And Completion Dates

Contractor may not begin work prior to **MARCH 1, 2026** (unless previous approval is given by the Owner).

It is the intent and requirement of the Owner that the proposed work shall be installed and operational no later than the date stated in the contract contained within this document.

4.15 Delivery of Proposals

The total Contract Documents and Specifications book shall be placed, together the required completed forms, in a sealed envelope addressed to the Owner. Proposals will be received until the hour and date set for the opening thereof and must be in the hands of the Owner's appointed representative by such



time. Proposals received after the time indicated for the opening of bids will be returned to the Bidder unopened.

4.16 Withdrawal or Modification of Proposals

No bid may be withdrawn, once the bid has been deposited with the Owner, except in accordance with Kentucky Standard Specifications for Road and Bridge Construction, Section 102.11. Likewise, modifications to a bid, once submitted, shall not be accepted.

4.17 Public Opening of Proposals

Proposals will be opened and read aloud publicly at the time and place designated in the Legal Notice to Bidders. Bidders, their authorized agents, and other interested parties are invited to be present.

4.18 Disqualification of Bids

Any bid submitted unsealed or unsigned, or any bid deemed unresponsive will be disqualified and returned to the Bidder. Bids submitted without a Bid Guaranty or an invalid Guaranty will be disqualified and will be returned to the Bidder.

4.19 Non-Responsive Proposals

Proposals may be considered non-responsive and may be rejected for the following reasons:

1. If the Proposal is on a form other than that furnished by the Owner or if the form is altered or any part thereof is detached.
2. If there are unauthorized additions, conditional or alternate bids, conditions, or irregularities of any kind which may tend to make the Proposal incomplete, indefinite or ambiguous as to its meaning.
3. If the Bidder adds any provisions reserving the right to accept or reject the Award or to enter into the Contract pursuant to the Award. This does not exclude a bid limiting the maximum gross amount of awards acceptable to any one Bidder at any one bid letting, provided that any selection of awards will be made by the Owner.

4.20 Rights Reserved By The Owner

The Owner reserves the right to review and evaluate all bids for a period of sixty (60) days.

The Owner reserves the right to reject any and all bids, to waive any discrepancies or irregularities in the bidding, and to determine, in its own discretion, which Proposal is the best bid. Lowest bid, while a major consideration, will not exclusively govern the Bid Award. The Bid Award shall be made from all considerations, including costs and the responsibility of the Bidder.

The Owner reserves the right to reject the bid of any Bidder who has previously failed to perform properly or complete on time contracts of similar nature; who is not in a position to perform the Contract; or who has habitually, and without just cause, neglected the payment of bills or otherwise disregarded his obligations to subcontractors, materialmen or employees.



In addition to the above-mentioned items, the Owner will also consider the following in determining the best bid: that the Bidder maintains a permanent place of business; has adequate equipment to do the Work properly and expeditiously; has suitable financial status to meet the obligations incidental to the Work; and has the necessary experience.

The Owner reserves the right to award or delete any or all items or combination of items.

4.21 Material Guaranty

Before the Contract is awarded, the Bidder may be required to furnish a complete statement of the origin, composition and manufacturer of any or all materials to be used in the construction of the Work together with samples, of which said samples may be subjected to any tests the Owner, in its sole discretion, deems appropriate to determine their quality and fitness for the Work.

4.22 Notice of Award

The award of the Contract, if it be awarded, will be made to the best overall Bidder whose Proposal complies with all the requirements prescribed. In no case will an award be made until all necessary investigations are made as to the responsibility of the Bidder to whom it is proposed to award the Contract. The successful Bidder will be notified by letter, mailed or emailed to the address shown on his Proposal that his bid has been accepted and that he has been awarded the Contract.

4.23 Documents Required Prior To Signing of Contract

Immediately upon the award of the bid and prior to the signing of the Contract, the Contractor shall furnish to the Owner:

1. Kentucky Workers' Compensation Certificate.
2. Credentials showing the Power of Attorney of the Agent of the Surety
3. A Certificate of Compliance issued by the Division of Insurance showing the right of the bonding company to do business in the State of Kentucky.
4. A Certificate of Insurance with coverage as specified in these Instructions, covering the period of time the Work will be in progress.
5. Listing of selected subcontractor(s) for Owner approval, in accordance with the second paragraph under "Subcontracts" of these Instructions.

4.24 Contract Guaranty

The Contractor at the time the Contract is entered into, shall furnish a Performance Bond, in the form prescribed by KTC Standard Specifications for Road and Bridge Construction Section 102.09, payable to the Owner, for the total amount of the Contract. Said Bond shall be duly executed by the Contractor, as principal, and by a surety company qualified to do business under the laws of the State of Kentucky



and satisfactory to the Owner, as surety, for the faithful performance of the Contract and payment for labor and materials. The Bond must be signed by an Authorized Agent of an acceptable surety bonding company and by the Contractor. The Performance Bond must be countersigned by a resident agent of the bonding company and its corporate seals must be affixed to all copies. The name and address of both the surety and surety's agent must appear on Bond, and it must be supported by credentials showing the Power of Attorney of the surety's agent.

The premiums of such Bonds shall be paid by the Contractor.

If the Contractor fails to perform under the Contract, the Performance Bond may be forfeited by the Contractor to the Owner, in accordance with the termination provisions contained herein.



5. General Provisions

5.1 Quantities

The Owner reserves the right to delete quantities of either labor or materials or both, from the Contract, as deemed necessary by the Owner, to meet any funding restrictions for the Work.

5.2 Subcontractors

The Contractor may utilize subcontractors, subject to the following:

1. The Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of the Contract or his rights, title or interest in or to the same or any part thereof, without the written consent of the Owner. Such consent shall not release or relieve the Contractor or his Surety from any obligation or liability under the Contract. In no case will the Contractor be permitted to sublet more than fifty percent (50%) of the total Contract cost.
2. The Contractor shall not award subcontracts to any subcontractor without prior written approval of the Owner.
3. The Contractor shall be fully responsible for the acts or omissions of any of its subcontractors. Nothing contained in the Contract or the Contract Documents shall create any contractual relationship between the Owner and any subcontractors.
4. The Contractor shall cause appropriate provisions to be inserted in all subcontracts that bind the subcontractor to the Contractor under the same terms of any provisions of the Contract Documents that are applicable to the Work of the subcontractor, and that give the Contractor the right to terminate the subcontractor for any violation of those provisions by the subcontractor.

5.3 Insurance

The Contractor shall not commence Work under the Contract until it has obtained all insurance required under this paragraph. The policies shall also protect the Owner, its officers, agents, and employees as additional insured, and shall be in a form approved by the Owner. Certified copies of the insurance policies, fully executed by officers of the insurance company, shall be submitted with the executed Contract and must be submitted before the Notice to Proceed will be sent. Coverage will be provided through insurance companies licensed to do business in the State of Kentucky.

During the term of the Contract, the Contractor will agree to provide evidence of insurance in the amounts stated below. The Contractor may also be required to submit the original insurance policies for inspection and approval of the Owner before Work is commenced. Said policies shall provide that they cannot be cancelled, permitted to expire, or be changed without fifteen (15) days advanced written notice to the Owner. The Contractor shall provide all insurance required by this Contract.

Required Insurance: The Contractor shall take out, and maintain during the life of the Contract, Comprehensive General Liability Insurance, Automobile Liability Insurance and an Excess Liability



Umbrella Form. Such policies shall protect the Contractor and the Owner from any and all claims or damages for bodily injury, including accidental death, as well as any and all claims for property damage, during the performance of any and all Work under the Contract, whether such performance be by the Contractor, any subcontractor, or by anyone directly or indirectly employed by either of them or in any such manner as would impose liability on the Owner. The **minimum** required limits for each type of policy are as follows:

A. Comprehensive General Liability:

- | | | |
|-----|------------------------------|---|
| (1) | General Aggregate | \$1,000,000 |
| (2) | Bodily Injury/Wrongful Death | \$1,000,000 per person
\$1,000,000 per occurrence
\$2,000,000 aggregate liability |
| (3) | Property Damage* | \$1,000,000 per occurrence
\$2,000,000 aggregate liability |

B. Comprehensive Automobile Liability:

- | | | |
|-----|------------------------------|---|
| (1) | Bodily Injury/Wrongful Death | \$1,000,000 per occurrence
\$1,000,000 aggregate liability |
| (2) | Property Damage* | \$1,000,000 per occurrence
\$1,000,000 aggregate liability |

*Including any damage caused by blasting or underground excavation.

C. Excess Liability Umbrella Form:

- | | | |
|-----|-------------------|-------------|
| (1) | General Aggregate | \$3,000,000 |
| (2) | Each Occurrence | \$1,000,000 |

Owner's Protective Liability Insurance: The Contractor shall take out, and maintain during the life of the Contract, an Owner's Protective Liability Insurance policy in the name of the Owner. The primary insurance policy shall not be less than a minimum combined single limit of \$1,000,000. In addition, a \$1,000,000 excess policy will be required. The policy shall protect the Owner from any claims or damages that may arise out of or result from the performance of any Work or from any operations, either directly or indirectly, by the Contractor or its subcontractors under the Contract.

Subcontractor's Insurance: The Contractor shall require subcontractors not protected under the Contractor's insurance policies to take out and maintain insurance of the same nature and kind and in the same amounts as required of the Contractor.

Workers' Compensation Insurance: Before any Work is commenced, the Contractor shall take out, and maintain during the life of the Contract, Workers' Compensation Insurance for all of its employees, in accordance with the laws of the State of Kentucky. In case any Work is subcontracted, the Contractor shall require the subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees, unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in Work under this Contract is not protected under the Workers' Compensation statute, the Contractor shall provide Employee Liability Insurance for any such employees and shall provide or cause each subcontractor to provide the same.



5.4 Antidiscrimination Clause

The Contractor hereby agrees to the following:

1. That in the hiring of employees for the performance of the Work under this Contract or any subcontract, neither the Contractor nor any subcontractor, nor any persons acting on behalf of the same, will discriminate against any citizen in the employment of or laborers or workers who are qualified and available to perform the Work, for reasons of race, creed, color, national origin, religion, age, sex, handicap, or familial status; and
2. That neither the Contractor nor any subcontractors, nor any persons acting on behalf of the same, shall in any manner discriminate or intimidate any employee hired for the performance of the Work on account of race, creed, color, national origin, religion, age, sex, handicap, or familial status.

5.5 Preconstruction Conference And Partnering

A preconstruction conference with the Owner will be required of the successful Bidder/Contractor. Said conference will be held for the purpose of reviewing the Specifications, Plans, and execution of the Work. The Engineer will arrange the meeting between the Contractor, the Owner, and representatives of the utility companies, and all parties shall be notified of the time, date, and location of the conference by the Engineer. The Agenda for the conference shall include, as a minimum, the following items:

1. Status of Contract and Notice to Proceed
2. Utility company requirements, BUD notification
3. Designation of emergency 24-hour Contractor contacts
4. Discussion of critical items
5. Required permits.
6. Notice to property owners
7. Maintenance of Traffic
8. Review of testing requirements and inspection procedures
9. Operations schedule and completion date
10. Listing of haul roads
11. Confirmation of subcontractors and suppliers
12. Review of the Change Order process
13. Payment Request submittal procedures
14. Payroll submittal procedure

5.6 Haul Roads

The Contractor shall also provide at the preconstruction conference, a list of the local roads to be used for the purpose of hauling equipment and/or material to or from the Project site. Only the local roads in the vicinity of the Project have to be listed; state and/or Federal roads do not have to be included. Where necessary, the list shall include the extent of the roads to be affected and any special restrictions, such as height or weight restrictions, which may be applicable. Construction shall not commence until the Owner has reviewed the haul roads list and approved the same. The submission of the list and approval of the same do not relieve the Contractor the responsibility for conforming to and obeying all applicable height and weight restriction on the haul roads, nor from responsibility for any damages done to, on or along said haul roads. The Contractor is referred KTC Standards and Specifications for Road and Bridge Construction Section 105.10 concerning restrictions.



5.7 Permits

The Contractor will be required to obtain all permits necessary in connection with the Work. All permits shall be subject to the inspection of the Owner.

Work on this project will be subject to the requirements of the encroachment permit obtained from the Kentucky Transportation Cabinet, including work hours and maintenance of traffic requirements.

5.8 Operations/Progress Schedule and Coordination

At the preconstruction meeting, the Contractor shall submit to the Engineer a schedule showing the method and manner which the Contractor proposes to pursue so as to complete the proposed Work in such a manner that it will be ready for final acceptance within the time stated in the Proposal. Said schedule will show location, sequence, equipment, manpower, and estimated calendar days to complete each segment of Work required. Upon approval by the Engineer of the starting point of the various phases of the construction, the method and manner of performing the Work and the sequence of operations shall not be altered except with the approval of the Owner. Changes to said schedule are to be issued in writing and approved by the Engineer and Owner before operations are changed or rescheduled.

The Contractor shall use all practical means to make the progress of the Work conform to that shown on the progress schedule which is in effect. No payment will be made to the Contractor while he is delinquent in the submission of a progress schedule. Should the prosecution of the Work, for any reason, be discontinued, the Contractor shall notify the Owner at least twenty-four (24) hours in advance of resuming operations.

5.9 Coordination of Specifications, Plans and General Provisions

The specifications, the supplemental specifications, the plans, general provisions, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary to each other and to describe and provide for a complete project. In case of discrepancy, calculated dimensions will govern over scaled dimensions, plans will govern over specifications, proposals and special provisions will govern over both specifications and plans.

The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, he shall immediately notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications. See "Extra Work" and "Modification of Contract or Change Orders".

All items salvaged as part of this Contract shall be removed by the Contractor without damage as excavation and work progresses, and placed within the right-of-way where they may be conveniently picked up by the Owner's forces. Old materials not reserved by the Owner and not being used in the work will become property of and must be disposed of by the Contractor.



5.10 Plans

If applicable, the plans illustrate the general character and scope of the Work covered by the Specifications and Contract Documents. Additional detailed drawings and other information deemed necessary by the Engineer will be furnished to the Contractor when and as required by the Work. Shop drawings, when approved by the Engineer, shall govern all details of the Work and shall take precedence over all other drawings. Figured dimensions on drawings shall take precedence over general drawings and shall be considered as explanatory and not as indicating extra work.

5.11 Notice To Proceed

Once the Contract has been entered into and the preconstruction conference held, the Owner will provide the Contractor a Notice to Proceed. Said Notice shall state the beginning date the Contractor shall commence the Work and the date by which the Work is to be completed.

5.12 Safety Standard And Accident Prevention

With respect to all Work performed under the Contract, the Contractor shall comply with all safety standard provisions of (1) all applicable building and construction codes; (2) the *Manual of Accident Prevention in Construction*, published by the Associated General Contractors of America; (3) the requirements of the Occupational Safety & Health Act, and the requirements of Title 29 of the Code of Federal Regulations, Chapter 15.

The Contractor shall maintain at the job site all medical items and equipment necessary for administering first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or doctor's care of all persons injured on the job site. In no case shall the Contractor permit any employee to work at the job site before it has made arrangements for the immediate removal of injured persons to a hospital or doctor's care.

The Contractor shall at all times exercise every precaution for the protection of persons, including its employees, and property, and shall guard against creating any unnecessarily hazardous conditions. This protection shall include, but is not limited to, sheeting and shoring, barricades, and warning lights as needed.

The Contractor shall be responsible for all accidents arising out of or connected with its performance under the Contract and Contract Documents, and shall indemnify and hold harmless the Owner and the Engineer from all liability, costs, suits, claims or actions brought against it for any injury or alleged injury to any person or property. All loss or damage to the Work arising from fire, floods, storms or other natural causes, or from any detention, obstruction or difficulties which may be encountered in the prosecution of the Work shall be borne by the Contractor.

No blasting of any kind will be permitted on this Project.

5.13 Cooperation By Contractor

The Contractor will be supplied with three (3) copies of the specifications and three (3) sets of approved plans and contract assemblies including special provisions, one (1) set of which the Contractor shall keep available on the Work site at all times.



The Contractor shall give the Work the constant attention necessary to facilitate the progress thereof. He shall cooperate with the Engineer, his inspectors, and all other Contractors of any agency in every way possible.

5.14 Cooperation Between Contractors

The Contractor shall coordinate his work with other Contractors within or adjacent to the Project area. All completed Work shall meet the line and grade of other work in an acceptable manner.

5.15 Warranty

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations, to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

5.16 Control Of Material

The materials used on the Work shall meet all requirements of the Contract. In order to expedite the inspection and testing of materials, the Contractor shall notify the Engineer of his proposed sources prior to delivery. **All materials supplied shall meet KTC requirements or as otherwise specified in these Contract Documents.**

Unless otherwise specified, all materials shall be new, and both workmanship and material shall be of proper quality and sufficient for the purpose contemplated. The Contractor shall furnish, if requested by the Owner or Engineer, satisfactory evidence as to type and quality of materials and workmanship.

All items of equipment and/or material proposed by the Contractor for substitutions must be pre-approved by the Engineer, in writing, and shall be equal or superior to the items specified in the Contract Documents. If substitutions proposed by the Contractor for a specified item requires engineering revisions, the total expense of said revisions shall be paid by the Contractor.

Any items of labor or materials required, but not shown as a separate pay item in the Proposal, shall be furnished and installed as incidental to the Contract, except as noted in the plans and specifications.

5.17 Storage Of Materials

The Contractor shall obtain prior written approval from the Owner for any locations proposed for use for the temporary storage of construction materials, tools and/or equipment. All such materials shall be neatly and compactly maintained in a manner as to cause the least inconvenience to adjacent property owners and to traffic. Under no circumstances shall existing drainage courses be blocked or water hydrants,



valves, or meter pits covered in storing materials. All materials stored upon public thoroughfares must be provided with warning lights and reflective striping at nighttime and on weekends in a manner to alert traffic of such obstructions.

Private property shall not be used for storage purposed without written permission of the owner or lessee, and if requested by the Engineer, copies of such written permission shall be furnished him.

Any additional space required must be provided by the Contractor at their expense.

5.18 Sanitary Measures

The Contractor shall construct and maintain sanitary conveniences for use by its employees at the site of the Work. Such conveniences shall be of sufficient number and shall be placed in locations approved by the Engineer. The Contractor shall require all employees and persons connected with the Work to use said conveniences, and any employee or person who violates this rule shall not again be employed at the site of the Work by the Contractor. Such conveniences shall be in compliance with all State and local health department regulations, and the Contractor shall promptly and fully comply with all health department orders and regulations regarding said conveniences.

5.19 Public Convenience And Safety

The Contractor shall at all times so conduct his work as to assure the least possible obstruction to traffic. The safety and convenience of the general public and the residents along the highway and the protection of persons and property shall be provided for by the Contractor as specified under subsection Maintenance of Traffic.

The Contractor shall provide and maintain safeguards, safety devices and protective equipment and take any other needed actions as may be necessary to protect the public and property in connection with the work. The Contractor shall notify the Chiefs of the Police Department and Fire Department of the temporary blocking of any street.

The presence of barricades, lights or other traffic control devices provided and maintained by any party other than the Contractor, shall not relieve the Contractor of this responsibility.

5.20 Protection And Restoration Of Property

The Contractor shall be responsible for the preservation of all public and private property. The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect or misconduct in his manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the project shall have been completed and accepted.

Dust nuisance originating from any work shall be controlled by the Contractor at the sole expense of the Contractor.

When and where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the nonexecution thereof by the Contractor, he shall restore, at his own expense, such property to a condition



equal or better to that existing before such damage or injury was done, by repairing, rebuilding or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

When mailboxes, road or street name signs and supports interfere with construction, the Contractor shall remove and erect them in a temporary location during construction in a manner satisfactory to and as directed by the Engineer. After completion of the construction and before final acceptance of the project, the Contractor shall erect the mailboxes, road or street name signs and supports in a permanent location in accordance with the plans unless otherwise directed by the Engineer. This shall be considered a subsidiary obligation of the Contractor under the affected items. The Contractor shall cooperate with the Engineer in protecting and preserving cornerstones and monuments that are within the work area. Monuments, cornerstones and land markers unexpectedly encountered shall be protected, referenced and preserved in the same manner.

5.21 Clean Up During Construction

The Contractor shall at all times maintain the job site and working areas in an orderly condition, reasonably clean and free of accumulations of dirt and debris. If the Contractor fails to maintain the job site and working area in a satisfactory condition, the Owner shall have the right to employ others to do so at the Contractor's expense, commencing 24 hours after the Contractor has been notified that the job site and/or working areas require clean-up.

5.22 Final Clean-Up

As soon as portions of the work are ready for use, they shall be thoroughly cleaned by the Contractor of all dirt and rubbish, and cleared of all materials, forms, falsework, temporary structures and equipment.

The Contractor shall also clean out all sewer drains, inlets, manholes, and other underground lines and structures affected by his work and restore all disturbed areas to their original or better condition.

As soon as portions of the work are ready for use, they shall be thoroughly cleaned by the Contractor of all dirt and rubbish, and cleared of all materials, forms, falsework, temporary structures and equipment.

The Contractor shall also clean out all sewer drains, inlets, manholes, and other underground lines and structures affected by his work and restore all disturbed areas to their original or better condition.

5.23 Final Inspection

When the work has been entirely completed and final cleanup has been performed, the Engineer will inspect the improvement. If items remain which must be completed or remedied by the Contractor, he shall perform the work immediately upon being notified by the Engineer. When such items have been corrected by the Contractor, final inspection will be made. The work must pass final inspection before it will be accepted by the Owner.

5.24 Utilities

Any utility, such as telephone, electricity or water, required by the Contractor for the performance of the Work shall be the responsibility of the Contractor, who shall be responsible for the cost of the same.



5.25 Sewage, Surface, and Floor Flows

The Contractor shall furnish all the necessary equipment, shall take all necessary precautions, and shall assume the entire cost of handling and properly disposing of any sewage, seepage, storm, surface, flood or underground flows which may be encountered at any time during the performance of the Work. The manner of providing for these flows shall meet with the approval of the Engineer, and the entire cost of same shall be included in the unit prices stipulated for the various items of the Work. As applicable, all work must comply with the municipality or County storm water regulations.

5.26 Use Of Existing Facilities

The Owner, upon written notice to and with the approval of the Contractor, shall have the right to connect any sewers, conduit, or pipeline with any existing similar facilities or appurtenances, or to grant permits to make connections therewith at any time before the Work is completed. The Contractor shall not interfere with any such connections and no extra compensation shall be made to the Contractor on account thereof. The performance of the Work shall be planned in such a manner as to allow the use of all existing facilities during the construction period.

5.27 Underground Utility Facilities/Cooperation With Utilities

The Owner will notify all utility companies, all pipeline owners, or other parties affected and endeavor to have all necessary adjustments of the public or private utility fixtures, pipelines, and other appurtenances within or adjacent to the limits of construction made as soon as practicable.

Within ten (10) days of the award of the Contract, the Owner shall notify all utilities of the name, address, and phone number of the Contractor. The Contractor shall notify the Registered Underground Utility Protection Service and nonmember owners of the starting date at least two (2) working days prior to starting the Work. The utility shall mark, stake, or otherwise designate the location of the underground facilities within 48 hours of receiving the Contractor's notice of the starting date. The marking or locating shall be coordinated to stay approximately two (2) days ahead of the planned construction.

The Identification of underground facilities, any necessary relocation thereof, and the protection of the same shall be undertaken in conformance with KTC Standards and Specifications for Road and Bridge Construction Section 107.15. At least two (2) working days prior to commencing Work in an area that may involve underground utility facilities, as shown on the plans, the Contractor shall notify the Engineer, the registered utility protection service, and the owners of the underground utility facility who are not members of the registered utility service.

The existing underground utilities are shown as accurately as possible on the plans, based on the information available. The Owner and/or Engineer do not assume any liability for location of underground service lines. Any utility services damaged that were previously marked in the field shall be replaced at the Contractor's expense.

Where the plans provide for conduit to be connected to, or to cross either over or under, or close to an existing underground structure, it shall be the responsibility of the Contractor to locate the existing structure, both as to line and grade, before starting to lay the proposed conduit, in order to assure compatibility with line and grade of the conduit. Payment for all such operations shall be included in the unit price bid for the pertinent conduit item.



The Contractor shall make arrangements with the utility company if adjustments to proposed grade of existing facilities (e.g. manholes, catch basins, valves, boxes, etc.) are to be made prior to the commencement of any paving operations. This shall include utility facilities not shown on the plans but that are located within the pavement area. Work performed on utility facilities shall be in strict accordance with the specifications of the applicable utility company and shall be performed under the direction, supervision and inspection of said company.

At points where the Contractor's operations are adjacent to properties of telephone and power companies, or are adjacent to other property, damage to which might result in considerable expense, loss, or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The Contractor shall cooperate with the owner of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

In the event of interruption to underground or overhead utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall immediately alert the occupants of nearby premises as to any emergency that the Contractor may create or discover at or near such premises. The Contractor shall then notify the Engineer and the owner or operator of the utility facility of the disruption and shall cooperate with said utility owner or operator in the restoration of service. If water service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until the local fire authority has approved provisions for continued service.

5.28 Maintenance During Construction

The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces to the end that the roadway or structures are kept in satisfactory condition at all times.

In the case of a contract for the placing of a pavement course upon other pavement courses or a subgrade previously constructed, the Contractor shall maintain the previous pavement course or subgrade during all construction operations.

5.29 Failure To Maintain Roadway Or Structure

If the Contractor, at any time, fails to comply with the provisions of the above-reference section, the Engineer will immediately notify the Contractor of such non-compliance. If the Contractor fails to remedy unsatisfactory maintenance within 24 hours after receipt of such notice, the Engineer may immediately proceed to maintain the Project and the entire cost of this maintenance will be deducted from monies due or to become due to the Contractor on his Contract.



5.30 Protection Of Existing Structure

It shall be the responsibility of the Contractor to perform the Work in such a manner as not to damage or destroy any existing feature which is not marked for replacement or removal. The Contractor shall, at its own expense, protect and maintain any bridges, curbs, gutters, sidewalks, roadways, or any other private or public structures that may be endangered in the prosecution of the Work. The Contractor shall also exercise due care during the Work so as not to destroy any trees, plants, shrubs, or structures not specifically marked for removal or relocation within the area of the Project site. The Contractor hereby agrees to repair and make good any damages caused to any such property by reason of its prosecution of the Work.

In some instances, the Contractor will be required to excavate under and around existing utilities. The Contractor shall exercise extreme care so as not to damage the utility during the Work.

The Contractor shall schedule his operations so that the improved areas have had sufficient time to cure, set and/or harden before the area is opened to traffic or other use. The Contractor shall be responsible for the immediate repair of all improved areas if damage is done by traffic or other use. The Contractor shall also be responsible for the immediate rectification of problems created in areas outside of the improved areas, which are attributable to the failure of the improved area, such as, but not limited to, the tracking of materials into unimproved areas.

The Contractor shall be responsible for the protection of areas outside of the limits of the designated Project site, but which are adjacent to those limits. This will include those areas used by construction traffic for access to and from the Project site. Where the Engineer and/or the Owner determine that the Contractor's operations have been responsible for damage to areas outside of the Project site limits, the Contractor shall be responsible for the repair of the area, subject to the approval of the Engineer. No additional compensation will be due the Contractor for any such repairs.

5.31 Construction Videos And Photographs

Contractor shall document existing site conditions, progress of the work and the completed project through the use of videos and photographs. Videos and photographs shall be taken along the length of the project area and all areas of egress to the site pre-construction, during construction and post-construction. Pictures shall be taken at all property affected by the Work and at least every 50 feet along the project area. All existing structures or facilities affected by the Work shall also have videos and photographs taken of their before and after conditions. The OWNER shall be present during the pre-construction and post construction videotaping and photograph work and shall determine the limits at each location. All photographs shall be in digital format with a time and date stamp. All videos shall be provided in digital format.

Before starting work, take a minimum of two photographs to show existing conditions at and adjacent to each driveway, landscaped area, fence and any other permanent structure that could potentially be affected by construction. Areas of particular concern or currently damaged areas adjacent to the work area shall be documented and reported to the OWNER.

CONTRACTOR shall audibly record a brief description of each video and the date and time of the recording.

Provide digital files of each photograph and video to the OWNER and ENGINEER as soon as they are available. Each digital file shall be labeled with the following information:



- i. Date photograph or video taken.
- ii. Title of Project.
- iii. Description of view shown in photograph or video.
- iv. Numbered identification of exposure.

All work for the above shall be incidental to the Contract.

5.32 Monuments And Landmarks

The Contractor shall not remove, relocate or in any way damage any monuments, survey pins or landmarks without the approval of the Engineer. Any monument, survey pin or landmark so removed without approval of the Engineer may be replaced by the Owner and the expense of the survey and replacement charged to the Contractor.

5.33 Base Lines and Benchmarks

The Contractor shall carefully preserve all base lines and benchmarks which have been set by the Owner or its agent. The Contractor shall be charged with the expense of resetting any base lines or benchmarks caused by the loss or disturbance of such by the Contractor.

5.34 Restoration Of Disturbed Areas

In all cases where the Work requires the restoration of areas with topsoil, seeding and mulching, the Contractor shall not seed and mulch until directed to do so by the Engineer. The Engineer shall not so direct the Contractor until he has assured that the site is properly graded and topsoiled.

Upon completion of the seeding and mulching, the Contractor shall immediately notify the Engineer of the same. Upon receipt of notice from the Engineer that the restoration is complete, the Owner shall notify the property owners of their maintenance duties.

In cases where the Engineer determines the seeding and mulching should not be performed until after the designated completion date for the Work, the Engineer shall notify the Contractor of the same, in writing. Suspension of the seeding and mulching at the direction of the Engineer shall not count against the Contractor as a delay.

5.35 Supervision Of The Work

The Engineer or upon the authorization of the Engineer, the Owner's Public Works Director, shall in all cases, determine the amount, quality acceptability and fitness of the kinds of labor and material, which are to be paid for under the Contract. The Owner or the Owner's agent shall determine all questions related to the Work and the performance thereof, and decide every question which may arise relative to the fulfillment of the Contract on the part of the Contractor.

The Engineer will evaluate the materials furnished and the labor to be performed under the Contract, and is authorized by the Owner to reject all labor or materials, or any part thereof, that does not comply in



kind, quality, quantity, time, place or manner with the Contract or Contract Documents. The approval or acceptance or any part of the Work, or any payment on account thereof, shall not prevent the rejection of said labor or materials at any time thereafter during the term of the Contract, if said labor or materials are found to not be in accordance with the requirements of the Contract or the Contract Documents.

5.36 Defective Or Unacceptable Work

All materials and each part or detail of the Work shall be subject to evaluation by the Engineer. The Engineer shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Contractor, as is required to make a complete and detailed review.

Any work done or materials used without direct observation by an authorized representative may be ordered removed and replaced at the Contractor's expense.

All work, which does not conform to the requirements of the Contract, will be considered unacceptable unless otherwise determined acceptable.

Should defective or unacceptable labor or materials be suspected, and the Engineer so require, the Contractor shall uncover, take down or make openings in the finished work for the purpose of examination at such points as the Engineer designates.

If the Work so exposed or examined is satisfactory, the cost of uncovering, taking down or making openings shall be paid by the Owner to the Contractor as a change in Work; however, should the Work thus exposed or examined be unsatisfactory, the cost of uncovering, taking down or making openings shall be borne by the Contractor.

If the exposed or examined labor or materials are found to be unacceptable or defective by the Engineer, he shall serve on the Contractor written notice of his rejection of the unsatisfactory labor or materials, his instructions for remedying the same, and a time within which the defective material or labor is to be remedied. If the Contractor neglects or refuses to remove and/or replace the defective labor or materials within the time limit given, the Owner may remedy the situation and charge the expense thereof to the Contractor. The expense so charges shall be deducted out of the monies due to the Contractor under the Contract. If the amounts still due the Contractor under the Contract are insufficient to meet the expense, the additional monies shall be paid by the Contractor, and if the Contractor refuses or neglects to pay, the monies shall be paid by his Surety or shall be deducted from its Performance/Contract Bond.

If, in the opinion of the Owner, an emergency arises that jeopardizes the continuity of water service and/or the public health, safety or welfare of the residents of the Owner, the Owner shall give notice of the emergency to the Contractor by telephone or in person. If the Contractor is unable to remedy the situation at the time it exists, the Owner reserves the right to immediately take steps to have the situation remedied. If, in the opinion of the Owner, the emergency was created through the carelessness or recklessness of the Contractor, then the Contractor and its Surety shall be liable to the Owner for all expenses incurred by the Owner in correcting the situation.

5.37 Intent of Contract

The intent of the Contract is to provide for the construction and completion in every detail of the Work described. The Contractor shall perform all items of work covered and stipulated in the proposal and perform altered and extra work, furnish all labor, materials, equipment, tools, transportation and supplies required to complete the work in accordance with the plans, specifications and terms of the Contract. Should any misunderstanding arise as to the intent or meaning of the plans, specifications, special



provisions or proposal, or any discrepancy appear, the decision of the Engineer shall be final and conclusive.

5.38 Measurement Of Quantities

For all contracts, except lump sum contracts, after an item of the Work is completed and before final payment is made, the Engineer will determine the quantities of various items of work performed, as the basis for final settlement. The Contractor, in case of unit price items, will be paid for the actual amount of work performed in accordance with these specifications as provided under the various items.

5.39 Plans And Estimated Quantities

The Plans and Bid Proposal quantities prepared by the Owner are intended to outline the Work to be done by the Contractor. The estimated quantities shall be used in determining the total amount of the bid and for the purpose of determining the lowest and best bid. It is understood and agreed, however, that the Plan is subject to minor changes from time to time during the progress of the Work, that the estimated quantities listed in the Proposal are approximate only, that the Contractor has no claim for damage and is not entitled to extra pay above and beyond the agreed unit prices on account of increasing or decreasing the quantities, and that in measuring the work for payment to the Contractor, the Owner shall consider only the number, length, area and solid contents of the various items of Work incorporated in the improvement in accordance with the Plans or as ordered placed by the Owner.

5.40 Prices

The Owner will pay to the Contractor the prices herein stipulated as full compensation for everything furnished and work completed by the Contractor under the Contract, including all incidental work required but not specifically mentioned, and for any work arising from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work, as herein specified and for well and faithfully completing the work, together with remedying all defects developing during the guarantee period.

5.41 Alternation Of Plans Or Character Of Work

The Owner reserves the right to make, at any time during the progress of the Work, such increases or decreases in quantities and such alterations in details of construction as may be found to be necessary or desirable. Such increases or decreases and alterations shall not invalidate the Contract nor release the Surety, and the Contractor agrees to perform the Work as altered, as if it had been a part of the original Contract.

Unless such alterations and increases or decreases materially change the character of the work to be performed or the cost thereof, the altered work shall be paid for at the same unit prices as other parts of the Work. No claim shall be made by the Contractor for any loss of anticipated quantities and the quantities of work as done. Payments shall be in accordance with Section 109 of the KTC Standard and Specifications for Road and Bridge Construction. If, however, the character of the Work of the unit costs thereof are materially changed, an allowance shall be made on such basis as may have been agreed to



in advance of the performance of the Work, or in case no such basis has been previously agreed upon, then an allowance shall be made, either for or against the Contractor, in such amount as the Owner may determine to be fair and equitable.

Should the Contractor encounter or discover during the progress of Work, subsurface or latent physical conditions at the site differing materially from those indicated in this Contract, or unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract, the Engineer shall be promptly notified in writing of such conditions before they are disturbed. The Engineer will thereupon promptly cause the investigation of said conditions, and if they are found to so materially differ and cause an increase or decrease in the cost of, or the time required for performance of the Contract, an equitable adjustment will be made.

Any adjustment in compensation because of a change or changes resulting from one or more of the conditions described in the previous paragraph will be made in accordance with the provisions of Extra Work. Any adjustments in Contract time because of changes will be made in accordance with the provisions in 108.07 of the Kentucky Standard Specification for Road and Bridge Construction.

5.42 Extra Work

Items of work with unit prices included in the estimate of the original Contract, in an amount less than \$10,000 may be authorized as Extra Work by the Engineer.

5.43 Modification Of Contractor Or Change Orders

Items of Work not included in the estimate of the original Contract and additional units of items included in the estimate of the original Contract in an amount in excess of \$10,000, may be authorized as a Modification of the Contract or Change Order. Payment shall be in accordance with Sections 109.04 of the Kentucky Standard Specification for Road and Bridge Construction. The Owner may, when necessary by ordinance, authorize alterations or modifications in the Specifications and Plans for the Work, or omit from the Work covered by this Contract any portion thereof. Before any such alteration or modification shall be effective, the price to be paid for the Work or the material, or both, under the altered or modified Contract, shall have been agreed upon in writing and signed by the Contractor and by the Contractual Agent or Agents of the Owner. It is expressly agreed that such changes shall not, in any way, violate or annul the Contract, and the Contractor hereby agrees not to claim or bring suit for any damages, whether for loss of profits or otherwise, on account of these changes. Whenever, during the progress of the Work, any change or modification of the Work is agreed upon, such change shall be considered and treated as though originally contracted for, and shall be subject to all provisions of the original Contract.

The Contractor's Sureties will not be notified of changes in the work or cost thereof, except when by reason of any Change Orders, the total Contract price increases by more than twenty (20%) percent of the original price.

5.44 Disputes And Contractor Claims

In cases where there arises a dispute (whether over payment, claims, or quality of Work) between the Contractor and the Owner, the Contractor shall not cease Work on the Project because of said dispute,



unless told to cease work by the Owner. The Contractor shall continue Work on the Project and agrees that such a dispute shall not relieve him from the requirements under "Time of Completion and Damages for Delays".

In all cases, the Contractor shall submit to the Owner any claims for disputed amounts, in writing, within seven (7) calendar days of learning of said dispute. In submitting such claim, the Contractor shall include his actual original calculations and raw cost data, along with his job cost reports and field diaries.

If the Owner makes to the Contractor an offer on a claim which the Contractor refuses, and if the Contractor then gets an amount equal to or less than the Owner's last offer in court, the Contractor shall pay all legal costs, including attorney's fees and expert witness fees, that the Owner incurs from the date of the Owner's last offer until the day the Contractor is awarded judgment.

Any claims or disputes shall be limited by the requirements of "Modification of Contract or Change Order".

5.45 Time Of Completion And Damages For Delays

The Project construction time shall commence upon the date indicated in the Notice to Proceed, which shall be sent to the Contractor by the Owner. The Contractor shall agree to commence the Work on the date specified in the written Notice to Proceed, weather permitting, and to fully complete the Work by the date stated in the contract, unless such time for completion is extended, in writing, by the Owner. However, neither the Contractor nor any subcontractors shall commence any part of the work under the Contract until it has obtained all insurance required, as listed in the General Conditions, and such insurance has been approved by the Owner.

The Contractor agrees that time is of the essence, and therefore, if the Contractor neglects, fails, or refuses to complete the Work within the allotted time, or fails to secure an extension of time for delays, the Contractor does hereby agree to pay to the Owner, as liquidated damages and not as a penalty, the amount as stated in the Contract for each calendar day beyond the completion date stated in the Notice to Proceed, unless the time for completion has been extended in writing by the Owner. Such damages shall be deducted from any monies due and owing to the Contractor under the Contract. If the amounts still due the Contractor under the Contract are insufficient to meet the expense, the additional monies shall be paid by the Contractor, and if the Contractor refuses or neglects to pay, the monies shall be paid by his Surety or shall be deducted from its Performance/Contract Bond.

If the Contract is revised in any material respect and it is determined that said revision will cause delay in the completion of the work, the Engineer will postpone the completion date by the number of calendar days he determines to be equitable.

If the Contractor finds it impossible for reasons beyond his control to complete the work by the date as specified or as extended in accordance with the provisions of this subsection, he may make a written request to the Engineer for an extension of time setting forth therein the reasons which he believes will justify the granting of his request. Requests for extensions of time shall be filed in writing by the Contractor to the Engineer not later than thirty (30) days following the termination of the delay. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion in such amount as the conditions justify.

Delays caused by weather or seasonal conditions should be anticipated and will not be considered as the basis for an extension of time. The Engineer will not allow any extension of time for weather or resulting conditions, except for delays caused by earthquakes, tornadoes or other catastrophic forces per Section 108 of the Kentucky Standard Specification for Road and Bridge Construction.



The extended time for completion shall then be in full force and affect the same as though it were the original time for completion.

If the Owner should suspend the Work in whole or in part, the date for completion shall be extended by the number of days that the suspension directly or indirectly delays the completion of the Work.

If the Work is delayed for unforeseeable causes beyond the control and without the fault of negligence of the Contractor, such as severe or unusual climatic conditions, acts of God, acts of the Owner or interference by other contractors, extensions of time may be granted by the Owner, upon the Contractor's written request for an extension. The Contractor shall, within five (5) days from the beginning of such delay, notify the Owner in writing of the causes of the delay and request an extension. In no case shall such an extension of time exceed the time actually lost to the Contractor by reason of such delay or interference.

The Owner, reserves the right to suspend the whole or any part of the Work, when in the best interest of the Owner, in its sole discretion. Without any additional compensation to the Contractor for such suspension; however, the Contractor shall be granted an extension of time for completing the Work in the same amount of time that it was delayed by such suspension, unless said suspension was necessitated by the actions or inactions of the Contractor.

5.46 Failure To Complete On Time

If the Contractor fails to complete the Work within the time or times allowed by the Contract, the Owner, if satisfied that the Contractor is carrying the Work forward with reasonable progress and deems it to be in the best interest of the Public, may allow him to continue in control of the Work. It shall be necessary for the Contractor to make written application to the Owner in order to warrant such continuance. Payments to the Contractor for work performed and materials furnished will be made.

When the work is not completed within the time or times allowed by the Contract, and the Contractor is permitted to remain in control, the Work shall be prosecuted at as many different places, at such times, and with such forces as the Owner may request.

For each calendar day that any work shall remain uncompleted after the Contract completion date or dates, the sum specified in the Contract will be deducted from any money due the Contractor, not as a penalty but as liquidated damages provided, however, that due account shall be taken of any adjustment of the completion date or dates granted under the provision of "Time of Completion and Damages for Delays". In the event one or more interim completion dates are specified without specific separate liquidated damages, the amount set forth in the Schedule in Section 108 of the Kentucky Standard Specification for Road and Bridge Construction will separately apply to each interim date. In the event a period of liquidated damages for an interim completion date overlaps a subsequent completion date, the liquidated damages will be cumulative.

Permitting the Contractor to continue and finish the Work or any part of it after the date or dates fixed for its completion, or after the date or dates to which completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its right under the Contract.

The Owner may waive such portions of the liquidated damages as may accrue after the work is in condition for safe and convenient use by the public.



5.47 Unsatisfactory Progress And Termination Of The Contract

In case the Contractor or any Subcontractor fails to furnish materials or to execute the Work in accordance with the Plans and Specifications, or if the provisions of the Contract are otherwise violated, then in any such case, upon ten days written notice to the Contractor and his Surety, the Owner shall have the right to declare the Contractor in default on the Contract. Said notice shall contain the reason for the Owner's intention to declare the Contractor in default on the Contract and, unless within ten days after service of said notice the violation shall cease or satisfactory arrangements shall have been made for its correction, the Contractor, upon the expiration of said ten days, shall be in default on the Contract and his right to proceed under the Contract shall be terminated.

In the event the Contract is thus declared to be defaulted, the Owner will immediately notify the Contractor and his Surety of such action, and will at once cause the work already done to be measured and computed. The action of the Owner in the declaration of the default of the Contract shall be final and conclusive, and the Contractor shall not be entitled to claim or receive any damages for not being allowed to continue. After the default of the Contract, the Surety shall have the right to take over and complete the Work, provided, however, that the Surety shall notify the Owner in writing of its intent to do so within twenty (20) days after the notice of the default of the Contract. Such completion of the Work by the Surety shall be done in strict accordance with all the provisions of the original Contract. However, if the Surety does not take over the Contract as stated above, then the Owner shall cause the Work to be completed under a second contract. If the cost of the Work done under the second contract exceeds what it would have cost under the original Contract, the increased cost shall be paid from any money due the Contractor under the Contract, and if that is not sufficient, then the increased cost shall be paid by the Contractor and/or his Surety.

The Contractor and/or his Surety shall also pay all cost and expense of reletting the Work and all damages resulting from noncompletion of the Work within the Contract time. If, when the Work is completed, it is found that there is any money due the Contractor, it will be paid to him; but no money shall be paid to the Contractor under the Contract after it has been declared in default, until the Work has been completed and accepted and all claims and suits resulting therefrom shall have been settled.

5.48 Payments

The Owner shall pay to the Contractor the price stipulated in the Contract, by making progress payments to the Contractor during the performance of the Work, on the basis of the value of work performed.

The Contractor shall submit an invoice to the Engineer of the quantity of work performed for approval. Requests for payment shall not be made more frequently than every thirty (30) days. The Engineer shall forward the invoice to the Owner for approval, and upon approval of the invoice by the Engineer and the Owner. The Owner shall pay the Contractor within thirty (30) days.

With each payment, the Contractor shall submit all material tickets for concrete and asphalt materials delivered to and used on the project. Each ticket shall be dated and indicated the amount of materials used. Requested quantities for that pay period shall match the amount of materials used. If these tickets are not submitted, the City will not make payment until these items are provided.

Partial payment may be reduced or withheld entirely if, in the opinion of the Owner, construction is not proceeding according to the Contract, or if for any other violation, or for failure of the Contractor to comply with the orders of the Owner, or pending settlement of claims of liens filed against the Contractor.

The Owner shall make partial payments to the Contractor for work performed and materials delivered to the site at 95% of the value of work.



The Contractor shall submit one (1) signed and notarized copy of each Application for Payment to the Engineer either electronically or hard copy. The request shall include waivers of lien and similar attachments if required.

5.49 Waiver Of Mechanic's Lien

Prior to Final Application for Payment, the Contractor shall submit waivers of mechanic's liens from subcontractors, materialmen, and suppliers for all construction to date.

1. Owner reserves the right to designate which entities involved in the Work must submit waivers.
2. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
3. Waiver Forms: Submit waivers of lien on forms provided.

5.50 Acceptance Of Final Payment

After the final inspection has been made and the Owner has accepted the Work, the final estimate and Final Statement of Cost will be prepared. If any items were erroneously overestimated in any partial estimate, such errors will be corrected in any subsequent partial estimate or in the final estimate, and the Contractor shall have no right to any such excess and shall not be entitled to any damage on account of such corrections in the final estimate.

The following paperwork is necessary from the Contractor to close-out the Project:

1. Final invoice for payment.
2. Final affidavit listing all subcontractors/suppliers used on the Project and indicating the amount paid in full
3. Final Release of Liens from all subcontractors indicating the amount paid in full.
4. Prevailing Wage Affidavit, if applicable.
5. Guarantee
6. Final Release of Lien.
7. Concrete Test Reports, if applicable.
8. Asphalt tickets stamped with the Inspector's seal, if applicable.
9. Any additional testing reports as required by the Contract.

After the final estimate and Final Statement of Cost have been prepared and after the Contractor has fulfilled all of his obligations under the Contract and all the above paperwork has been accepted, the Owner will pay the entire sum found to be due the Contractor after deducting all previous payments and any liquidated damages, if applicable.

After the final estimate and Final Statement of Cost have been prepared and after the Contractor has fulfilled all of his obligations under the Contract, the Owner will pay the entire sum found to be due the Contractor after deducting all previous payments and any liquidated damages, if applicable.



The date of acceptance of the Work by the Owner shall be the date of approval of the Final Statement of Cost.

If, after physical completion of the work and acceptance of the Owner's final measurements by the Contractor, the Owner finds that the Final Statement of Cost or final estimate or both may be unavoidably delayed, he may allow a payment on one-hundred percent (100%) of the final measurements, less such estimated amount of money as the Owner may deem necessary to withhold to take care of any contingencies which may arise.

Should the Contractor have any claim against the Owner because of a variance with the Owner's final measurement, the Owner may allow payment based on the Owner's measurement pending adjustments of the disputed item or items. Acceptance of payment on such basis shall not stop the Contractor's claim nor prevent its satisfactory adjustment.

Retainage shall be paid to the Contractor within thirty (30) days from the date of the Owner's final acceptance of the Work and the completion of the Contract. Upon the Contractor's acceptance of this final payment, the Owner and the Engineer shall be released from any and all claims and any liability to the Contractor for anything further under or relating to the Contract or the Contract Documents, including any act or omission by the Owner or any of its employees or agents, including the Engineer; however, no payments, final or otherwise, shall operate as a release on the Contractor or its Sureties from any obligations under the Contract or the Contract Documents.

5.51 Termination Of The Owner's Liability

No person, partnership, firm, or company other than the Contractor shall have any interest in the Contract and no claims shall be made or held valid and neither the Owner nor its agents shall be held liable for, nor shall be held to pay any money except as herein provided. The acceptance by the Contractor of the final payment made as aforesaid shall operate as, and shall constitute, a release to the Owner and its agents from any claim or liability to the Contractor for anything done or furnished for, or relating to the Work or for any act or neglect of the Owner or any person related to or connected with the Work.

5.52 Termination For Cause

- A. In the event that any of the provisions of the Contract are violated by the Contractor, or by any of its subcontractors, the Owner may serve written notice upon the Contractor and its surety of its intention to terminate the Contract. Such notice shall list the act or omission causing the breach, upon the service of such notice, the Contractor shall have ten (10) business days to correct the breach or to make arrangements for correction that is satisfactory to the Owner.
- B. If no such correction or arrangements are made within the allotted time, the Owner may, in its sole discretion, terminate the Contract on a date solely determined by the Owner. In the event of such termination, the Owner shall immediately serve notice thereof to the Contractor and its surety. The surety shall then have the right to take over and perform the Contract provided, however, if the surety does not elect to continue performance, the Performance Bond will be forfeited and the Owner shall cause the Contract to be completed.
- C. Upon termination for cause the payment to the Contractor of compensation earned for Work performed to the date of such termination shall be in full satisfaction of all claims against the owner under this Contract, however the Owner shall have the right to deduct from any amounts due and owing to the Contractor, including retainage, any costs, both direct and incidental,



incurred by the Owner in completing the Project. The Contractor and/or surety shall be liable for any excess costs the Owner may so incur, and the Owner shall have the right to pursue any legal remedies necessary to affect the same.

5.53 Termination For Convenience

- A. The Contractor hereby acknowledges that as the Owner is a public entity, due to unforeseen circumstances, funding restraints, or changes in the nature of the Work, it may become necessary for the Owner to terminate the Contract for convenience.
- B. In the event the owner finds it necessary to terminate the Contract for convenience, the Owner shall serve notice upon the Contractor and its surety of its intention to terminate the Contract ten (10) business days prior to the termination date.
- C. Upon termination for convenience, the Owner shall pay to the Contractor all compensation due for Work performed to the date of termination, including all costs for materials that were to be incorporated into the Project that cannot be returned; all restocking fees for materials that were to be incorporated into the Project that can be returned only upon the payment of a restocking fee. The Contractor shall submit to the Owner detailed invoices and proof of restocking fees, if any, within ten (10) business days of his receipt of notice of termination from the Owner. In addition, the Owner will negotiate compensation with the Contractor for actual costs incurred as a result of the termination.

5.54 Contractors Right To Terminate Contract

The Contractor may terminate the Contract, upon ten (10) days written notice to the Owner if any public authority should stop the work for three (3) months, or if the Owner should fail to issue a Certificate of Payment, or if the Owner should fail to pay in accordance with this agreement.

5.55 Guarantee Of Work

The Contractor hereby guarantees all work performed for a period of one (1) year from the date of completion, against all defects resulting from the use of inferior materials or equipment (unless said materials or equipment were provided by the Owner) or inferior workmanship. The Contractor hereby agrees that during the guarantee period, it shall make all repairs, corrections, replacements or changes that, in the opinion of the Engineer, are necessary due to the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the Contract or Contract Documents. The Contractor shall, promptly upon receipt of written notice from the Owner, remove and replace all unsatisfactory work with suitable materials, equipment or workmanship, without additional expense to the Owner.

If the Contractor fails to proceed with these terms of the guarantee in a timely manner, the Owner shall have the right to have the defects corrected, and the Contractor and its sureties shall be liable to the Owner for all expenses incurred by the corrections.

Any or all special guarantees applicable to any definite parts of the Work, including the materials or equipment, shall also be subject to the terms of this section during the first year of the life of such special guarantees.



Customary manufacturer's guarantees in excess of one year shall be turned over to the Owner. If the terms and conditions as set forth are met to the satisfaction of the Owner and Contractor, the Owner may reduce the Performance Bond to ten percent (10%) of the total amount paid the Contractor in the performance of this Contract as a Guarantee bond.

5.56 Notice

Any written notice required to be served under the Contract or the Contract Documents shall be served by certified mail, or by personal service at the parties' places of business.

5.57 No Estoppel

At no time shall the Owner be precluded or estopped by any provisions of the Contract, from demanding and recovering from the Contractor any damages sustained because of the Contractor's failure to comply with the Contract or the Contract Documents. The final inspection of the Work shall not be binding or conclusive upon the owner if it subsequently appears that the Contractor willfully, fraudulently, or through collusion with an agent of the Owner, supplied inferior materials or workmanship, or departed from the terms of the Contract or Contract Documents, notwithstanding the acceptance of the Work and payment for the same by the Owner.

5.58 Assignment

Neither the Contract or any part thereof, nor any funds to be received there under, by the Contractor shall be assigned, except upon the prior written permission of the Owner, upon any conditions that may be imposed by the Owner, and upon the prior written permission of any sureties who executed the Performance Contract Bond on behalf on the Contractor.

5.59 Independent Contractor Status

At all times during the term of the Contract, the Contractor shall be and remain as an Independent Contractor with respect to all services performed under the Contract, The Contractor agrees that all income reporting requirements to the U.S. government, the State of Kentucky, and any local governments are its responsibility and not that of the Owner. The Contractor shall be responsible for the payment of all taxes including, but not limited to, Federal, state, and local taxes, Social Security taxes, unemployment insurance taxes, and other taxes or license fees required by law, for its officers, agents, and employees. The Contractor agrees that neither it, nor any of its officers, agents, nor employees is entitled to receive workers' compensation, unemployment compensation, vacation leave, sick leave, or any other fringe benefits provided to the employees of the Owner or any other Owner agency, under this Contract. Contractor acknowledges that under this Contract, the Owner is not required to contribute to the Kentucky Public Employees Retirement System on behalf of the Contractor, its officers, agents, or employees, nor is the Contractor eligible to contribute to or receive benefits from said system.



5.60 Other Contracts

The Owner reserves the right to allow other work or to enter into other contracts for work or materials to be constructed or placed in or about the Work to be performed under this Contract, and to order the starting and progress of such other contracts at any time prior to the completion of this Contract. The Contractor hereby agrees to allow the construction or progress of other such work, under such arrangements for the joint occupation for the site of the Work as the Engineer may establish. The Contractor hereby waives any claim for damages or extra compensation by reason of any real or supposed interference with his performance of the Work; however, if in the judgment of the Engineer, the joint occupation of the site has unreasonably impeded the progress of the Contractor's work under the Contract, then the time for completion of the Work may be extended by the Owner.

5.61 Patents

The Contractor shall indemnify and hold harmless the Owner, its officers, employees, and agents from all liabilities, judgments, costs, damages, or claims arising from the infringement of any patent, patent rights or royalty rights by reason of the use of any patented materials, machinery, devices, and equipment furnished or used in the performance of the Work, or by reason of the use of patented designs furnished and incorporated into the Work by the Contractor and accepted by the Owner, excepting any materials or equipment furnished by the Owner. In the event that any claim, suit, or action in law or equity of any kind whatsoever is made or brought against the Owner involving any such patents, then the Owner shall have the right to retain, from the money due and owing to the Contractor, an amount the Owner deems sufficient to protect the Owner against loss until such claim, suit, or action has been settled and evidence of such settlement has been satisfactorily presented to the Owner's Law Director.

5.62 Laws, Ordinances And Regulations

The intent of the Contract and the Contract Documents is to include each and every provision and clause required by law to be inserted herein, and they shall be read and enforced as though there were included herein. The Contractor shall keep itself fully informed of, and shall strictly observe and comply with, all applicable Federal, State, County, and local laws, rules and regulations, and ordinances; building code requirements; permit requirements; licensing requirements; inspection requirements; all laws, rules, and regulations regarding the employment of and payment of all laborers, the legal rights of all laborers employed under the Contract; all orders or decrees that exist or that may be enacted by anybody or tribunal having jurisdiction or authority over any aspect of the Work. The Contractor shall also insure that its subcontractors are also informed of and strictly comply with and observe all applicable laws, rules, regulations, and ordinances.

The Contract shall be required to give all notices and pay all fees for any required permits, licenses, or inspection, unless the Owner assumes the responsibility for giving such notices or paying such fees. The Engineer will discuss any special permits that may be required for the Project at the preconstruction conference.

The Contractor shall indemnify and hold harmless the Owner, the Owner's officers, employees and agents, including the Engineer, against any claim or liability arising from or based upon any violation of any such law, rule, regulations, ordinance, order, decree or requirement, whether by the Contractor itself, its employees or agents, or any of its subcontractors.



Should the Contractor at any time find that any requirement of the Contract of the Contract Documents is at variance with any applicable law, rule, regulation, requirement, order, or decree, it shall promptly notify the Engineer.

5.63 Environmental Protection

The Contractor shall observe and comply with all Federal, State, and local laws and regulations controlling pollution of the environment and shall comply with provisions of Section 107 of the Kentucky Standard Specification for Road and Bridge Construction.

5.64 Taxes

The Contractor will be required to pay, without additional expense to the Owner, all Federal, State, local and other taxes which may be applicable to the Work, excepting any taxes and assessments on the real property comprising the site of the Work.

The Contractor hereby agrees to withhold all City income taxes due or payable under the provisions of the Codified Ordinances of the City for wages, salaries, and commission paid to its employees who will work within the City limits for more than 12 workdays and further agrees that any of its subcontractors shall be required to withhold any such City income taxes due under said Code for services performed under this Contract. The Contractors are advised to get full information from the Tax Office prior to bidding.



6. Utility Ownership

Gas	Scott Pfefferman – Duke Energy 617 Todhunter Road Monroe, Ohio 45050
Electric	Matt Coleman 2010 Dana Ave-EF 324 Cincinnati, Ohio 45207
Water	Kyle Ryan P.O. Box 18640 Erlanger, Kentucky 41018
Telephone	Breck Cowan/Underground Jodi Geiman/Overhead Altafiber 221 E. Fourth St., M.L. 121-900 Cincinnati, Ohio 45201
Cable TV	Chris Gapinski 10920 Kenwood Road Cincinnati, Ohio 45252
Sanitary and Storm Sewer	Zach Atkerson 1045 Eaton Drive Fort Wright, Kentucky



7. Specifications For Construction

In general, unless specifically set forth herein, the work, material, and methods of measurement and payment shall conform to the applicable divisions and paragraphs (as noted on the Bid Proposal or in the plans) of the most current edition of the:

Commonwealth of Kentucky
Transportation Cabinet
Department of Highways, Frankfort

Standard Specifications
for
Road and Bridge Construction



8. Special Provisions

8.1 Items 105.07 / 107.15 - Cooperation With Utilities

All portions of Item 105.07 and Item 107.15 of the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction shall apply.

At least two (2) working days prior to commencing construction operations in an area which may involve underground utility facilities as shown on the plans, the Contractor shall notify the Engineer, the registered utility protection service, and the owners of each underground utility facility not members of the registered utility protection service.

The existing underground utilities are shown as accurately as possible on the plans, based on information available. The Owner and/or the Engineer do not assume any liability for location of these underground utility service lines. Any utility services damaged that were previously marked in the field shall be replaced at the Contractor's expense.

Where the plans provide for conduit to be connected to, or to cross either over or under, or close to an existing underground structure, it shall be the responsibility of the Contractor to locate the existing structure, both as to line and grade, before he starts to lay the proposed conduit, in order to assure compatibility with line and grade of the proposed conduit. Payment for all operations described above shall be included in the unit price bid for the pertinent conduit item.

The Contractor shall adjust or arrange with utility company to adjust to proposed grade all existing utility facilities, i.e., manholes, catch basins, valves, boxes, etc., prior to the commencement of paving operations. This shall include utility facilities not shown on the plans, which may be found to be located within the pavement area. Work performed on the utility facilities shall be in strict accordance with the specifications of the applicable utility company and shall be performed under the direction, supervision, and inspection of said company.

8.2 Coordination With Utilities

Coordination of work schedules with affected utilities will be required. Upon the contract award, the coordination of all necessary relocations or adjustment of all utility facilities becomes the responsibility of the Contractor.

8.3 Item 105.06 – Cooperation Between Contractors

The Contractor shall coordinate his work with other Contractors within or adjacent to the project limits. All improvements completed under this contract shall meet the line and grade of other work in an acceptable manner.

8.4 Item 106 – Control Of Material

Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of proper quality and sufficient for the purpose contemplated. The Contractor shall furnish, if so required, satisfactory evidence as to type and quality of materials and workmanship.



All items of equipment and/or material proposed by the Contractor for substitutions must be approved by the Engineer in writing and shall be equal or superior to the items specified in the contract documents. If said substitution proposed by the Contractor for a specified item requires engineering revisions, the total expense of said revisions shall be paid by the Contractor.

Any items of labor and materials required, but not shown as a separate pay item in the proposal, shall be furnished and installed as incidental to the contract, except as noted in the plans and specifications.

8.5 Item 106.08 - Storage Of Materials

The Contractor shall obtain prior approval in writing from the Owner for the locations to be used for the temporary storage of construction materials, tools, and/or machinery. All such materials, tools, and machinery shall be neatly and compactly piled in such a manner as to cause the least inconvenience to the property owners and to traffic. Under no circumstances shall existing drainage courses be blocked or water hydrants, valves, or meter pits covered. All materials, tools, machinery, etc., stored upon public thoroughfares must be provided with warning lights and reflective sheeting at nighttime and weekends to alert traffic of such obstructions.

8.6 Item 108.02 - Preconstruction Conference

Prior to the commencement of construction activities, the Engineer will arrange a meeting between the Contractor, the representatives of the Owner, and the representatives of each of the utility companies. The time, date, and location of said meeting will be determined after the awarding of the contract, and the parties will be notified by the Engineer.

The agenda for the preconstruction meeting shall include the following items:

1. Announcement of Award
2. Utility Company Requirements
3. Designation of Emergency 24-hour Contractor Contacts
4. Discussion of Critical Plan Items
5. Review of Testing and Inspection Procedures
6. Operations Schedule
7. Listing of Haul Roads
8. Identification of Subcontractors
9. Review of Change Order Process
- 10.. Payment Request Submittal Procedure

The Contractor shall coordinate all work with the Engineer. A detailed schedule of operations shall be furnished by the Contractor to the Engineer at the preconstruction meeting and shall list the order of operations and the time frame for the completion of each item of work. The schedule of operations shall be approved by the Engineer and the Owner in writing prior to the beginning of the work. Changes to said schedule are to be issued in writing and approved by the Engineer and the Owner before operations are



changed or rescheduled. No payment will be made to the Contractor while he is delinquent in the submission of a progress schedule.

The Contractor shall supply to the Engineer at the preconstruction meeting, a list of the local roads to be used for the purpose of hauling equipment and/or material to or from the job site. Only the local roads in the vicinity of the project have to be listed; state and/or federal roads do not have to be included. Where necessary, the list shall include the extent of the roads to be affected and any special restrictions, such as height or weight restrictions, which may be applicable along said roads. Construction shall not commence until the Engineer and/or Owner has reviewed the haul road list and approved the haul roads in writing.

The submission of the list to and the review and approval of the list by the Engineer do not relieve the Contractor of the responsibility for the conforming to and the obeying of all applicable height and weight restrictions on the haul roads and of the responsibility for any damage done to and/or along said haul roads. The Contractor is referred to Item 105.10 concerning load restrictions.

8.7 Item 107.04 - Permits, Licenses And Taxes

The Contractor shall insure that all required notices are given and all permits acquired before the commencement of work. The Engineer will discuss any special permits required for this project at the preconstruction meeting.

8.8 Item 107.14 - Contractor's Responsibility For Work

It shall be the responsibility of the Contractor to perform his work in such a manner as not to damage or destroy any existing feature (i.e., existing inlets, conduits, etc.), which is not marked for replacement or removal. The Contractor shall exercise due care during construction so as not to destroy any trees, plants, shrubs or structures not specifically marked for removal or relocation within the work limits. In some instances, the Contractor will be required to excavate under and around the existing utilities. Extreme care should be used not to damage the utility during this operation. The Contractor shall schedule his operations so that the improved areas have had sufficient time to cure, set and/or harden before the area is opened to traffic or use. The Contractor shall be responsible for the immediate repair of the improved area if any damage is done by traffic. The Contractor shall also be responsible for the immediate rectification of problems created in areas outside of the improved areas which are attributable to the failure of the improved area, i.e., the tracking of materials into unimproved areas.

The Contractor shall be responsible for the protection of areas outside of the designated work limits, but which may be adjacent to those work limits. This will include those areas used by construction traffic for access to and from the work areas. Where the Engineer and/or the Owner determine that the Contractor's operations have been responsible for damage to areas outside of the work limits, the Contractor shall be responsible for the repair of the area subject to the approval of the Engineer. No additional compensation will be due to the Contractor for any such repairs as described above.



8.9 Stake Out

Construction stakeout shall be provided by the **Owner** to establish line and grade as shown on the plans. Construction stakeout will be provided one – time and shall include:

- Storm sewer, with offset stakes at inlets/manholes
- Project Control (will be provided to Contractor)
- Lightpole offset stakes
- Wall offset stakes
- Pavement corners and grades

Any additional staking shall be provided by the Contractor.

8.10 Testing

In addition to material testing by the supplier, on-site material and soil testing will be required to insure the work meets the specifications established as part of this project. The Contractor shall bear the cost and provide all materials and supplies to facilitate the testing and shall be responsible for coordinating all testing with the selected testing agency. The Contractor shall bear the cost of all other testing and provide all required materials, labor, apparatus, services, and facilities in connection therewith.

All testing shall be done in the presence of the Engineer by an approved testing laboratory and one copy of the test shall be sent directly to him.

When questions arise as to whether the requirements of the Contract have been fulfilled, the Contractor shall engage an independent testing laboratory to perform any tests necessary to establish the acceptability of the work.

Should such additional tests show in the judgment of the Owner the work or materials to be defective or otherwise not meeting the requirements of the Contract, the Contractor shall, immediately upon notification by the Owner, remove, replace or reconstruct same, as the case may require and shall if directed by the Owner, make such further tests as may be necessary to determine fulfillment of the Contract requirements. The cost of all re-tests shall be deducted from the Contractor's fee for said work.

All tests shall be made under the supervision and direction of the Owner or Engineer except those required by a public authority shall be under the supervision and direction of such authority.

8.11 Testing Requirements

Minimum testing requirements shall be as follows:

Soil Testing: Excavation and embankment construction shall be constructed in accordance with the Kentucky Standard Specification for Road and Bridge Construction Item 204, 205 206 and 207. The testing agency shall test all embankments per the Kentucky Standard Specification for Road and Bridge Construction Item 206.03.03.

Subgrade shall be prepared in accordance with the Kentucky Standard Specification for Road and Bridge Construction Item 207. Following visual inspection, CONTRACTOR shall demonstrate to the Engineer or his representative, that the exposed subgrade does not contain previously unidentified soft areas by proof rolling. Proof rolling shall consist of rolling the entire surface with approved mechanical equipment



while observing the subgrade for displacement or deformation. Areas marked for repair shall be addressed per the details provided in the plans.

Flexible Pavement: Shall be tested as per the latest edition of the Kenton County Subdivision Regulations.

Portland Cement Concrete: Shall be tested as per the latest edition of the Kenton County Subdivision Regulations.

8.12 Items 202 / 203 Removals

When a bid item is to include the cost of removal of a classified or unclassified material, it shall be the responsibility of the Contractor to verify in the field the type of material and the thickness of the material to be removed prior to submitting his bid. No additional allowance will be due the Contractor for added expense of removals due to unknown materials or thickness.

8.13 Items 202 / 203 - Debris Removal

The Contractor will be responsible for removal of all construction debris from the site. All debris shall be disposed of in a proper manner and shall be as directed by all applicable local, state, or federal regulations.

8.14 Item 202 – Clearing And Grubbing

Clear grub, remove and dispose of all vegetation (including trees), building and foundations not removed by others, conduit, storm structures, and debris within designated limits inside the construction area of the project. Do not remove objects designated to remain or to be removed according to other provisions of the Contract. Also, protect from injury or defacement all vegetation and objects designated to remain. All planters and plant materials other than grass and trees marked for removal shall be salvaged and set aside in a location conveniently accessed by the property owner. During final restoration it shall be the Contractor's responsibility to replace the planters and plant materials to match the existing locations and dimensions. This item shall also include all labor, equipment and personnel to remove, salvage and reinstall all signs, mailboxes and fences not specifically noted for relocation on the construction plans. Portions of the fence that are damaged during work operations, or are in a condition such that they cannot be reused, shall be replaced with new, like material at no additional cost to the Owner. Whenever work is not taking place, all fence areas that have been removed shall be provided with temporary fencing to close off the opening until such time as the fence can be replaced with permanent materials. All work shall be in accordance with Kentucky Transportation Cabinet Standard Specifications Section 202 and shall include all items specified for removal within the construction area, and shall also include any items not specifically identified but are needed for removal to complete the construction per the plans. Payment shall be one lump sum.

8.15 Item 205/206 – Excavation and Embankment

Grading Plan includes the excavation and embankment of unclassified material needed to bring the existing grade to the proposed finished grade as indicated on the plan. Payment shall per the CY quantity



as provided in the bid set for the contractor to place materials as determined by the contractor, in order to bring the site to finished grade. This may include bringing in material from off site or hauling excess material off site, in addition to moving around material on site. The quantity in the bid tab represents a surface to surface cubic yardage of material being handled on-site. Of that quantity, the design calculations have an excess of material of approximately 600 CY to be hauled off-site for disposal. The Owner or Engineer do not guarantee quantity or classification of material. Contractor shall confirm CY quantities prior to bidding. No adjustments shall be made to CY quantity in the bid item.

8.16 Item 206 / 207 / 302 / 701 - Testing Of Compacted Materials

Compaction testing of embankment, granular backfill, and/or subgrade shall be done by an independent qualified testing laboratory under a contract with the Contractor. Testing shall be done in the presence of the Engineer at locations specified by the Engineer and shall meet standards as specified in Items 206, 207, 302 and 701. The Contractor shall include the cost of all required tests in the unit price bid for the pertinent item and no separate compensation is to be made for said testing.

8.17 Item 212 / 213 - Erosion Control And Water Pollution Control

The Contractor shall take extreme care to prevent unnecessary erosion, water pollution and siltation at all points of the project. Temporary seeding and mulching, straw bales, slope drains, inlet protection, silt fence etc., shall be used as necessary or as directed by the Engineer. The cost of all temporary erosion control measures shall be paid for as a lump sum bid item.

8.18 Full-Depth Pavement Sawing

All existing pavement to be widened and/or removed shall be sawed full depth at the limits of removal, using a diamond saw blade to provide a uniform edge and prevent damage to pavement that is to remain in place. The cost of the sawing shall be incidental to the contract.

8.19 Item 403 - Brooming And Cleaning

The existing surface shall be cleaned and prepared in accordance with Item 403.03. The cost for such work is to be included in the unit price bid for Item 403, Asphalt Concrete.

8.20 Item 601 – Concrete General

All concrete for roadway paving, curbs, sidewalks, drive aprons, and steps shall be in accordance with the Kenton County Subdivision Regulations with the following exceptions:

Concrete Roadway Pavement:

- Expansion for joint filler material shall consist of a flexible foam material such as Ceramar by W.R. Meadows or approved equal.
- Pavement lugs may be omitted.
- Contractor may substitute No. 57 crushed limestone for No. 467 crushed limestone.



8.21 Utility Adjustments

Utility adjustments including but not limited to water meters, valves, catch basins, gas valves, telephone manholes, storm and sanitary manholes, and gas meters shall be incidental to Item 402/403 and shall be completed in accordance with the requirements of the appropriate utility company. Contractor to coordinate with the appropriate utility company for adjustments.

8.22 Existing Pipe

The location, size, type and depth of all existing pipes are shown as nearly exact as available information will permit. The Engineer will not be responsible for any variations found during construction.

Where the plans provide for conduit to be connected to, or to cross either over or under, or close to an existing underground structure, it shall be the responsibility of the Contractor to locate the existing structure, both as to line and grade, before he starts to lay the proposed conduit, in order to assure compatibility of line and grade of the proposed conduit.

Payment for all operation described above shall be included in the unit price bid for the pertinent conduit item.

8.23 Item 701 – Grading At Inlets And Outfalls Of Proposed Conduits

The cost of the necessary reconstruction and/or regrading of swales or disturbed areas at the inlets and outfalls of all proposed conduits shall be included in the price bid for the pertinent conduit and inlet items.

8.24 Item 701 – Review of Drainage Facilities

Before any work is started on the project and again before final acceptance by the Owner, the Contractor, with the Engineer, shall make an inspection of the existing sewers within the work limits, which are to remain in service and which may be affected by the work. The condition of the existing conduits and their appurtenances shall be determined from field observations. Written records of the inspection and/or photographic documentation shall be kept by the Engineer.

All existing sewers inspected initially by the above-mentioned parties shall be maintained and left in a condition reasonably comparable to that determined by the original inspection. Any change in the condition resulting from the Contractor's operations shall be corrected by the Contractor to the satisfaction of the Engineer. All existing and/or new conduits, inlets, catch basins, and manholes constructed and/or cleaned as a part of the project shall be free of all foreign matter and in a clean condition before the project will be accepted by the Owner. Payment for all operations described above shall be included in the unit prices bid for the pertinent item.

8.25 Item 701 – Removal of Water

The Contractor shall keep all excavations free from water while the excavation for or the construction of conduits is in progress; shall build all dams, bulkheads, underdrains, sumps, and other work necessary for this purpose; and shall provide and keep the excavation dry and free from water at all times.



The Contractor shall provide for the disposal of all water removed from the excavations in such manner as to prevent injury to the public, the public health, public or private property, or to any portion of the work completed or in progress, or the surface of the streets, and to prevent any inconvenience to the public. No ground and/or surface water shall be diverted into existing sanitary sewers.

No conduits shall be laid or built in water, and waste shall not be allowed to flow over to rise upon any concrete, brick masonry or conduit until the work has been observed and has set for at least twenty-four (24) hours.

The flow of water in all existing sewers, drains, gutters, or watercourses encountered during the construction period shall be adequately maintained by the Contractor at his expense.

8.26 Item 704 – Under Drain

Payment for Item 704 - Under Drain will be made at the contract unit price per linear foot for all materials, equipment and labor to complete the work per Kentucky Standard Specifications for Road and Bridge Construction Section 704 and these plans and specifications.

Payment for underdrain shall include 4" rigid perforated PVC pipe, Non-Woven Geotextile (Mirafi 140N or Approved Equal), No. 57 Stone backfill and trench as shown and noted on the provided plans/details.

Payment for edge drain extension shall include excavation, 4" solid PVC pipe, bedding and backfill. Yard Restoration to be paid under a separate bid item.

Payment shall also include any connections/taps to drainage structures.

8.27 Item SPL – Conduit, Drainage and Utility Items

Unless otherwise specified on the plans, the unit price bid for the pertinent conduit, drainage and/or utility item shall include the cost of all necessary appurtenances, connections, fittings, plugs, tees, collars, etc.

Unless otherwise noted on the plans, the unit price for the pertinent conduit, drainage and/or utility item is to include the costs involved in the excavation of the trench in unclassified material, the supplying and placing of the required bedding material and the backfilling of the trench with the specified material to the appropriate subgrade elevations.

Any additional fill required due to the relocation of storm sewer shall be included in the storm sewer unit price. All backfill in pavement areas shall consist of flowable fill.

8.28 Item 610/710 – Conduit End Treatment

Immediately after placement of any conduits, the Contractor shall construct the end treatments required by the plans at both the outlet and inlet ends. This shall include headwalls, concrete riprap, rock channel protection, sodding, etc. The cost of the necessary reconstruction and/or regrading of swales or disturbed areas at the inlets and outfalls of all proposed conduits shall be included in the price bid for the pertinent conduit and inlet items.



8.29 Item SPL – Storm Sewer, Manholes, Inlets, Catch Basins and Headwalls

Storm sewer manholes, inlets and catch basins shall be constructed as per the details on the construction drawings and conforming to the requirements of SD1 Specifications Section 02630. All castings for manholes, catch basins and inlets shall conform to those specified in the standard construction drawings. Grated inlet tops shall be placed as specified on the plans. Tops of casting elevations are subject to final adjustments as approved by the Engineer. All castings used shall be subject to the final approval of the Engineer. Payment for these items shall include connection to proposed or existing storm sewer conduit.

Any additional backfill required due to the removal of an existing storm structure and relocation of the proposed storm structure shall be incidental to the manhole, inlet or catch basin. All backfill in pavement areas shall consist of flowable fill.

8.30 Shoring and Trench Box

Trenches and excavations for appurtenances shall be adequately shored and braced or a trench box utilized whenever the trenches and excavations cannot be opened up to a sufficient width to maintain natural soil stability and sloped per current OSHA regulations. All shoring shall meet safety codes in effect at the time of the work; and, if none are in effect, they shall meet the requirements of Employers Mutual, Factory Mutual, Associated General Contractors safety manuals or OSHA guidelines.

The Contractor is fully responsible at all times for the safety of their excavators and total compliance with OSHA regulations.

Shoring and sheeting, when used, that does not extend below the top of the sewer pipes may be removed at the Contractor's option after the trench backfill has been placed and compacted to a point one foot above the top of the pipes. Following removal of the shoring and sheeting, the space left shall be filled immediately with backfill material and compacted.

Shoring and sheeting that extends below the top of the sewer pipes shall be left in place below a point one foot above the top of the pipes and not be disturbed. The Contractor may remove the portion of shoring and sheeting above this point at his option.

When shoring and sheeting is not removed, the portion to a point two feet (2') below finished grade shall be removed. Bracing shall not be removed until after the trench backfill has been placed and compacted to a point one foot (1') above the top of the sewer pipes.

8.31 Item SPL – Sheet piling and Shoring

The Contractor shall furnish, put in place, and maintain such piling, sheeting, bracing, etc., as is required by the State of Kentucky. The Contractor shall furnish, put in place, and maintain and remove such sheeting, shoring, planking and bracing as may be required to support the sides of the excavations and to prevent any movement which could in any way injure the work, human life, or adjacent structures and property, obstruct surface drainage channels or waterways, or otherwise injure or delay the work. If required at any time by the Engineer, the Contractor shall furnish and install such additional sheeting, shoring and bracing as may be necessary to protect the work, but compliance with such orders or failure on the part of the Engineer to give such orders shall in no case release the Contractor from liability for any damages or injuries caused by weak or insufficient sheeting, shoring and bracing, nor from his responsibility to protect the work or adjacent property.



Except when ordered left in place, all wood sheeting above the top of the pipe, steel sheet piling, braces, shorer, walers or stringers, shall not be withdrawn until the backfill is practically complete. As the backfill progresses to the elevation of a set of walers and braces, such bracing shall be removed. All sheeting and bracing specified, shown on the plans, or directed by the Engineer to be left in place shall not be removed. All sheeting left in place shall be cut off at least two (2) feet below final finish grade. During the removal of sheeting, care must be taken to prevent movement of the sides of the excavation. All voids left by the withdrawal of sheeting shall immediately be carefully refilled by ramming with tools adapted to the purpose, pneumatic or other approved type, or by flushing sand into the voids.

Whenever the Engineer, in writing, orders any type sheeting, shoring, bracing or foundation material left in place, or when so shown on the plans or specified, the Contractor will be paid for the actual amount so left in place at prices stipulated for the applicable items. Sheeting, shoring and bracing left in place by the Contractor for his own convenience will not be paid for under any item.

8.32 Item SPL – Gas Control Devices, Wiring and Plumbing

Gas control devices, wiring and plumbing shall consist of the materials, installation and labor of the gas service to the fire pit, starting at and including the gas regulator to the fire pit. Work shall be completed per the Gas Service Schematic and Control Wiring Schematic details located in the bid plans. This work also includes setting of the controls, enclosures, electrical conduit and valving in the face of the curved wall.

8.33 Control Of Work

Construction work shall take place between the hours of 7:00 A.M. to 7:00 P.M., Monday through Saturday unless otherwise restricted by the Encroachment Permit.

8.34 "Or Approved Equal" Items

In the preparation of these documents and plans, several proprietary products may have been specified. In all such cases, it is to be understood that the Contractor may offer a substitute for the specified product, as indicated by the words "Or Approved Equal." However, the Contractor must be aware that, before commencement of construction, he must provide information to the Engineer concerning the substituted product, and that the Engineer must approve in writing the offered product as being equal to the specified product before use or incorporation into the work.

Unless otherwise modified by the Engineer, proprietary products are to be installed and/or constructed in strict compliance with the pertinent Manufacturer's specifications.

8.35 Payment

No adjustments to unit prices shall be due to the Owner or the Contractor for increases or decreases in the Engineer's approximate unit quantities shown in the proposal resulting from changes in the amount of work performed.

THE OWNER RESERVES THE RIGHT TO AWARD OR DELETE ANY OR ALL COMBINATIONS.



9. Supplemental Specifications Section

1. Section 033000 – Cast-In-Place Concrete
2. Section 042000 – Unit Masonry
3. Section 047200 – Cast Stone Masonry
4. 02 41 01 Tree Preservation
5. 11 68 13 Playground Equipment
6. 12 93 10 Site Furnishings
7. 32 14 16 Unit Paving
8. 32 18 17 Synthetic Turf
9. 32 91 00 Planting Preparation
10. 32 92 23 Sodding
11. 32 93 00 Exterior Plants
12. 32 94 10 Landscape Stone



SECTION 033000 – CAST-IN-PLACE 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. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.
- C. Mass Concrete: Any large volume of cast-in-place concrete with dimensions large enough to require that measures be taken to cope with the generation of heat and attendant volume change so as to minimize cracking (ACI Committee 116).
 - 1. Structural components shall be considered as Mass Concrete when the minimum dimension of the concrete exceeds 36-inches and the ratio of volume of concrete to the surface area is greater than 1.0. The surface area for this ratio includes the summation of all the surface areas, including the bottom surface.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- 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. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer,
 - 2. Submit a concrete mix design for each proposed mix design showing:
 - 3. Expected strength at 7 and 28-days
 - 4. Slump, before and after introduction of high-range water-reducing admixture
 - 5. Water/cement ratio

6. Weights and test results of ingredients
 7. Aggregate gradation
 8. Test results of mix design prepared by an independent testing laboratory
 9. Other physical properties necessary to review each mix design for conformance with these specifications
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
1. Location of construction joints is subject to approval of the Engineer.
- E. Mass Concrete Temperature Control Plans. The plan shall include, but are not limited to, the following:
1. Identifying the Mass Concrete elements.
 2. Identifying the proposed weather and temperature when Mass Concrete elements will be placed.
 3. Coordinating with the Engineer to create a Mass Concrete Temperature Control Plan.
- F. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, cement, pozzolan, admixtures, patching compounds, waterstops, joint systems, curing compounds, form materials and form-release agents, curing compounds, floor and slab treatments, bonding agents, adhesives, vapor retarders, semirigid joint filler, joint-filler strips, repair materials, dry shake finish materials, and others as requested by Engineer.
1. Product literature, technical data, and dosage of proposed admixtures including, but not limited to, air entraining, water reducing, retarding, shrinkage reducing, etc.
 2. Product literature and technical data for curing and sealing compounds, bonding compounds, surface hardeners, adhesive anchor products, post-installed anchors, retardant, etc.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
 2. Admixtures.
 3. Form materials and form-release agents.
 4. Curing compounds.
 5. Bonding agents.
 6. Adhesives.
 7. Semirigid joint filler.

8. Joint-filler strips.
 9. Repair materials.
- B. Material Test Reports: For the following, from a qualified testing agency:
1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity
- C. Field quality-control reports.

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. Mass Concrete Temperature Control Plans
1. A Mass Concrete Temperature Control Plan for Mass Concrete pours shall prevent:
 - a. Temperature differentials between concrete core and the surface shall not exceed 35°F.
 - b. Maximum curing temperature of 160°F.
- D. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 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

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.8 FIELD CONDITIONS

- A. 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.
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, 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.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301.
 - 2. ACI 117.

2.2 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal framed plywood faced, or other acceptable panel type materials, to provide continuous, straight, smooth, exposed

surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint layout shown on drawings.

1. Use plywood complying with U.S. Product Standard PS 1 B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two (2) edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces. Coat form surfaces in contact with concrete using a non-residual, water based form coating.
- D. Form Ties: Factory fabricated, adjustable length, snap off metal or glass fiber-reinforced plastic form ties, designed to prevent form deflection and to prevent spalling concrete upon removal.
 1. Provide units which will leave no metal closer than 1 1/2" to the exposed surface.
 2. Commercially fabricated for use in form construction, provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface.
 3. All form ties shall have a factor of safety of two (2) to determine the recommended safe working load.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Steel Wire: ASTM A 82, plain, cold drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric. (Flat sheets only)
- D. Welded Deformed Steel Wire Fabric: ASTM A 497.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.
 1. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 2. For exposed to view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.5 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, gray; Type I/II, or Type II. The cement shall contain less than 0.60 percent alkalis.
 - 2. Fly Ash: ASTM C 618, Class F or C.
 - 3. Slag Cement (Ground Granulated Blast Furnace Slag): ASTM C 989/C 989M, Grade 100 or 120.
 - 4. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 4M coarse aggregate or better, graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: $\frac{3}{4}$ inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride. Do not use accelerating admixtures.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: ASTM C 94/C 94M and potable.
- F. Aggregate: ASTM C33, ASTM C136
 - 1. Aggregates shall be non-reactive and shall be washed before use.
 - 2. Tests for size and grading of fine and coarse aggregates shall be in accordance with ASTM C136. Combined aggregates shall be well and uniformly graded from coarse to fine sizes to produce a concrete that has optimum workability and consolidation characteristics. The final combined aggregate gradation shall be established during the design mix.
 - 3. Coarse aggregate shall be hard, angular (not river washed), dense and durable gravel or crushed rock free from injurious amounts of soft and friable particles, alkali, and organic matter. Other deleterious substances shall not exceed the limits listed in ASTM C33, Table 3. Gradation of coarse aggregate shall conform to ASTM C33, Table 2.

4. Fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine. Gradation shall conform to ASTM C33..

2.6 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Water: Potable.
- C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. ChemMasters, Inc.
 - c. Dayton Superior.
 - d. Euclid Chemical Company (The); an RPM company.
 - e. Kaufman Products, Inc.
 - f. L&M Construction Chemicals, Inc.
 - g. SpecChem, LLC.
 - h. W.R. Meadows, Inc.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 according to ASTM D 2240.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.8 CONCRETE MIXTURES, GENERAL

- A. 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.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 1. Fly Ash: 25 percent maximum.
 2. Combined Fly Ash and Pozzolan: 25 percent maximum.
 3. Slag Cement: 50 percent maximum.
 4. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
 5. Silica Fume: 10 percent maximum.
 6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent maximum, with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
 7. Combined Fly Ash or Pozzolans, Slag Cement, and Silica Fume: 50 percent maximum, with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.10 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use air entraining admixture in concrete, as required, for proper air entrainment ratio.
 2. Use water-reducing or high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 3. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 4. Use water-reducing or high-range water-reducing or plasticizing admixture, as required, in pumped concrete, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.9 CONCRETE MIXTURES

- A. Footings, concrete structure, and flatwork: Normal-weight concrete.
 1. Minimum Compressive Strength: 4500 psi at 28 days.
 2. Maximum W/C Ratio: 0.45 unless noted otherwise.
 3. Portland Cement: Type I/II.
 4. Pozzolan: 19% to 22% by weight of cementitious materials
 5. Air Entrainment: 6% $\pm$ 1½%
 6. Coarse Aggregate Size: ASTM #57 or #67
 7. Slump Limit: 4 inches, plus or minus 1 inch, if no high-range water-reducing admixture or plasticizing admixture is used. 6 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

2.10 CONCRETE GROUT MIXTURES FOR MASONRY ELEMENTS

- A. Grout: Normal-weight concrete.
 - 1. Minimum Compressive Strength: 3000 psi at 28 days.
 - 2. Maximum W/C Ratio: 0.55 unless noted otherwise.
 - 3. Portland Cement: Type I/II.
 - 4. Pozzolan: 19% to 22% by weight of cementitious materials
 - 5. Air Entrainment: 5% $\pm$ 1½%
 - 6. Coarse Aggregate Size: 3/8" pea gravel
 - 7. Slump Limit: 7 inches, plus or minus 1 inch.

2.11 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced from the following:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
 - 2. Fly Ash: ASTM C 618, Class C or F.
 - 3. Normal-Weight Aggregate: ASTM C 33/C 33M, 3/8-inch (10-mm) nominal maximum aggregate size.
 - 4. Water: ASTM C 94/C 94M.
- B. Produce conventional-weight, controlled low-strength material with 1500 psi compressive strength when tested according to ASTM C 495/C 495M.

2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
 - 1. 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.

2.14 VOID FORM

- A. Void Form design requirements shall conform to the following:
 - 1. The void form shall provide temporary support platform for concrete placement until concrete has cured and can be supported by the adjacent slab.
 - 2. The void form shall create space between concrete structures, thereby reducing the volume of concrete.
 - 3. The void form shall be designed for combined loads from the concrete, reinforcing, and a 50 psf construction live load.

2.15 MASS CONCRETE TEMPERATURE CONTROL PLAN

- A. Depending on the ambient temperature for the placement, possible modifications could include, but are not limited to, the following:
 - 1. Increasing the percentage of pozzolan and reducing the volume of Portal Cement.
 - 2. Substituting an equal mass of ice for the mass of mixing water.
 - 3. Utilizing cooled aggregate.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- 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 347 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 or mortar.
- E. Construct 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.
- 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. Chamfer exterior corners and edges of permanently exposed concrete, except under masonry bearing.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 STEEL REINFORCEMENT INSTALLATION

- 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, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.3 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 Engineer.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of slabs on grade.
 - 2. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 4. Space vertical joints in walls as indicated and in accordance with approved construction joint submittals. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces, unless noted otherwise.
 - 6. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces, only in elevated interior slabs and other interior concrete which will not be in contact with ground or water.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool 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- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. 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.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is 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 not to 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.

3.5 FINISHING FORMED SURFACES

- A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to view, to receive a rubbed finish.
- B. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete.
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.6 FINISHING SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Do not spray or sprinkle water on slabs.
- 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 restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated to receive trowel finish.
- 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.

1. Apply a trowel finish to surfaces indicated or to be covered with resilient flooring, carpet, or ceramic tile set.
 2. Finish and measure surface, so gap at any point between concrete surface and an unlevleled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Provide broom finish where indicated on Drawings.

3.7 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 305.1 for hot-weather protection during curing.
- B. Formed Surfaces: Cure formed concrete surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture 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 lap over adjacent absorptive covers.
 2. 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.
 - a. Removal: After curing period has elapsed, for areas to receive floor coverings or penetrating liquid floor treatment, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.8 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 two months. 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 joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.9 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports. Contractor shall coordinate dates and times of required tests and inspections with the testing agency.
- B. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Verification of use of required design mixture.
 4. Concrete placement, including conveying and depositing.
 5. Curing procedures and maintenance of curing temperature.
 6. Verification of concrete strength.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

- a. When frequency of testing provides 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. Perform an additional test to verify slump before adding high-range water-reducing admixture or plasticizing admixture, for each slump test required after adding high-range water-reducing admixture or plasticizing admixture.
3. Air Content: ASTM C 231/C 231M, 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 or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and field cure at least three sets of two standard cylinder specimens for each composite sample. Additional standard cylinders may be cast and cured, at the Contractor's option.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one field-cured specimen at 3 days, one at 7 days, and three at 28 days. Hold one specimen for additional future testing if required. Additional compressive-strength tests may be added, at the Contractor's option.
 - a. A compressive-strength test shall be the average compressive strength from specimens obtained from same composite sample and tested at age indicated.
7. 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.
8. Test results shall be reported in writing to Engineer, 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 all 3-, 7- and 28-day tests.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
10. 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 Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Engineer.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to the straightedge method within 48 hours of finishing.

END OF SECTION 033000

SECTION 042000 - UNIT 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:
 - 1. Concrete masonry units.
 - 2. Clay face brick.
 - 3. Mortar and grout.
 - 4. Steel reinforcing bars.
 - 5. Masonry joint reinforcement.
 - 6. Ties and anchors.
 - 7. Miscellaneous masonry accessories.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection:
 - 1. Colored mortar.
- C. Samples for Verification: For each type and color of the following:
 - 1. Face brick, in the form of straps of five or more bricks.
 - 2. Special brick shapes.
 - 3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
- D. Qualification Data: For testing agency.

- E. Material Certificates: For each type and size of the following:
1. Masonry units:
 - a. Include material test reports substantiating compliance with requirements.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
 - d. For masonry units, include data and calculations establishing average net-area compressive strength of units.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Mortar admixtures.
 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 5. Grout mixes. Include description of type and proportions of ingredients.
 6. Reinforcing bars.
 7. Joint reinforcement.
 8. Anchors, ties, and metal accessories.
- F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- G. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- H. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

- C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls and hold cover securely in place.
- B. Do not apply uniform for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
 - 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
2. Density Classification: Normal weight.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.4 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick: Facing brick complying with ASTM C 216.
 1. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
 2. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 3. Size (Actual Dimensions): Modular Brick 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.
 4. Application: Use where brick is exposed unless otherwise indicated.
 5. Color and Texture: Basis of Design: Carolina Ceramics Brick Company – Pebble Beach Velour.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.

- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cemex S.A.B. de C.V.
 - b. Essroc.
 - c. Holcim (US) Inc.
 - d. Lafarge North America Inc.
 - e. Lehigh Hanson; Heidelberg Cement Group.
- E. Mortar Cement: ASTM C1329/C1329M.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Lafarge North America Inc.; Lafarge Mortar Cement.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Euclid Chemical Company (The); an RPM company; Color-Crete Integral Color.
 - c. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
 - d. Solomon Colors, Inc.; SGS Mortar Colors.
- G. Colored Cement Products: Packaged blend made from portland cement and hydrated lime, masonry cement, or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 1. Colored Portland Cement-Lime Mix:
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Essroc; Riverton Portland Cement Lime Custom Color.
 - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
 - 3) Lafarge North America Inc.; Eaglebond Portland & Lime.
 - b. Lehigh Hanson; Heidelberg Cement Group; Lehigh Custom Color Portland/Lime Cement.
 - 2. Colored Masonry Cement:

- a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
 - 2) Essroc; Brixment-in-Color or Flamingo Color Masonry Cement.
 - 3) Holcim (US) Inc; Rainbow Mortamix Custom Color Masonry Cement.
 - 4) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.
 - 5) Lehigh Hanson; Heidelberg Cement Group; Lehigh Custom Color Masonry Cement.
 3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 4. Pigments shall not exceed 10 percent of portland cement by weight.
 5. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
- H. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- I. Aggregate for Grout: ASTM C 404.
- J. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products: Subject to compliance with requirements, provide one of the following
 - a. BASF Corporation.
 - b. Euclid Chemical Company (The); an RPM company; Accelguard 80, Accelguard 90, or Accelguard NCA.
 - c. GCP Applied Technologies Inc.; Morset.
- K. Water: Potable.

2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Exterior Walls: Hot-dip galvanized, carbon steel.
2. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
3. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
4. Wire Size for Veneer Ties: 0.148-inch (3.77-mm) diameter.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
6. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
7. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.7 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.

1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units.
2. Wire: Fabricate from 3/16-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.

D. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Fabricate sheet metal anchor sections and other sheet metal parts from minimum 0.075-inch thick steel sheet, galvanized after fabrication.
3. Fabricate wire ties from minimum 0.187-inch diameter, hot-dip galvanized steel wire unless otherwise indicated.
4. Fabricate wire connector sections from minimum 0.187-inch diameter, hot-dip galvanized, carbon steel wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.

6. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) FERRO Corporation; Heavy Duty Slotted Rap-Tie.
 - 2) Hohmann & Barnard, Inc; BL-407.
7. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie formed to fit anchor section.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Heckmann Building Products, Inc.; 213 with 282.
 - 2) Hohmann & Barnard, Inc; HB-200-X or HB-200/DA-213.
 - 3) Wire-Bond; RJ-711 (#2401).
8. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 9 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 5-1/2 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
 - a. Products: Subject to compliance with requirements, provide the following:
 - 1) Hohmann & Barnard, Inc; DW-10.
9. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and base for inserting wire tie.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Heckmann Building Products, Inc.; 315-D with 316.
 - 2) Hohmann & Barnard, Inc; DW-10HS or X-Seal Anchor.
 - 3) Wire-Bond; 1004, Type III.
10. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for

inserting wire tie. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs.

- a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Hohmann & Barnard, Inc; DW-10-X.
 - 2) Wire-Bond; 1004X, Type III X.
11. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Heckmann Building Products, Inc.; Pos-I-Tie.
 - 2) Hohmann & Barnard, Inc; 2-Seal Tie.
 - 3) Wire-Bond; Sure Tie Anchoring System #4520, #4530, #4510.

2.8 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: Headed or L-shaped 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; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.
- B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.

- b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
- c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
- d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.10 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.11 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Retain one or more of first three subparagraphs below to indicate acceptable mortar types.
 - 3. Use portland cement-lime or mortar cement mortar unless otherwise indicated.
 - 4. For exterior masonry, use portland cement-lime or mortar cement mortar.
 - 5. For reinforced masonry, use portland cement-lime or mortar cement mortar.
 - 6. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
 - 1. For masonry below grade or in contact with earth, use Type S.
 - 2. For reinforced masonry, use Type S.

3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.
 4. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Pigments shall not exceed 5 percent of mortar cement by weight.
 3. Insert materials and proportions used for sample in first subparagraph below if known.
 4. Mix to match existing mortar.
 5. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Face brick.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Mix to match existing mortar.
 2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:
 - a. Face brick.
- F. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 2. Verify that foundations are within tolerances specified.

3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build masonry construction to full thickness shown.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for items to be installed before completing masonry. After installing items, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 1. Mix units from several pallets or cubes as they are placed.
- F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
 1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond for brick, to match existing brick bond pattern; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches (50 mm). Bond and interlock each course of each wythe at

corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

- D. **Stopping and Resuming Work:** Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. **Built-in Work:** As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
 - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten screw-attached anchors to backup substrate with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 - 2. Embed tie sections in masonry joints. Provide not less than 2 inches (50 mm) of air space between back of masonry veneer and face of sheathing.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. (0.25 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick as follows:
1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

3.9 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 1 special inspections according to the "International Building Code."

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- D. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- E. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.11 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.12 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 047200 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Trim units.
2. Accessories.

B. Related Requirements:

1. Section 042000 "Unit Masonry" for mortar, grout, ties, anchors, flashings, masonry cleaners, and accessories installed as part of this Section, as well as typical requirements for masonry construction that are not included in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For cast stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Initial Selection: For colored mortar.

D. Samples for Verification:

1. For each color and texture of cast stone required, 6 inches square in size.
2. For each trim shape required, 6 inches in length.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and testing agency.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by CSI or APA.
- B. Furnish cast stone for installation in mockups specified in Section 042000 "Unit Masonry."
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with other masonry work to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
 - 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units if required, using dollies with wood supports.
 - 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.

- B. Hot-Weather Requirements: Comply with hot-weather construction requirements in TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Cast Stone: Obtain cast stone units from single source from single manufacturer.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

2.2 CAST STONE MATERIALS

- A. General: Comply with ASTM C1364.
- B. Portland Cement: ASTM C150/C150M, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C114. Provide natural color or white cement as required to produce cast stone color indicated.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C33/C33M; gradation and colors as needed to produce required cast stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C33/C33M, gradation and colors as needed to produce required cast stone textures and colors.
- E. Color Pigment: ASTM C979/C979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
 - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - 2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 - 3. Air-Entraining Admixture: ASTM C260/C260M. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
 - 4. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 5. Water-Reducing, Retarding Admixture: ASTM C494/C494M, Type D.
 - 6. Water-Reducing, Accelerating Admixture: ASTM C494/C494M, Type E.

G. Reinforcement:

1. Deformed steel bars complying with ASTM A615/A615M, Grade 40. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast stone material.
 - a. Epoxy Coating: ASTM A775/A775M.
 - b. Galvanized Coating: ASTM A767/A767M.
2. Plain-Steel, Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.
3. Galvanized-Steel, Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.
4. Fiber Reinforcement: ASTM C1116/C1116M.

H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666, Type 304.

2.3 CAST STONE UNITS

A. Cast Stone Units: Comply with ASTM C1364.

1. Units are manufactured using the manufacturer's selected method.
2. Trim units (wall caps).

B. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.

1. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
2. Provide drips on projecting elements unless otherwise indicated.

C. Fabrication Tolerances:

1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

D. Cure Units as Follows:

1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
 2. Keep units damp and continue curing to comply with one of the following:
 - a. No fewer than five days at mean daily temperature of 70 deg F or above.
 - b. No fewer than seven days at mean daily temperature of 50 deg F or above.
- E. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
1. Color: As selected by Architect to match existing, adjacent units. A custom color shall be provided if a close match is not achievable with manufacturer's available colors.

2.4 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666.
- B. Dowels: 1/2-inch- diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

- A. Set cast stone as indicated in TMS 604.
- B. Install cast stone units to comply with requirements in Section 042000 "Unit Masonry."
- C. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
 2. Coordinate installation of cast stone with installation of flashing specified in other Sections.

- D. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- E. Set units in full bed of mortar with full head joints unless otherwise indicated.
 - 1. Set units with joints 1/4 to 3/8 inch wide unless otherwise required to match existing, adjacent cast stone.
 - 2. Build anchors and ties into mortar joints as units are set.
 - 3. Fill dowel holes and anchor slots with mortar.
 - 4. Fill collar joints solid as units are set.
 - 5. Build concealed flashing into mortar joints as units are set.
 - 6. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
- F. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 ft., 3/8 inch in 20 ft., 1/4 inch in 20 ft., or 1/2 inch maximum.
- B. Variation from Level: Do not exceed 1/8 inch in 10 ft., 3/8 inch in 20 ft., 1/4 inch in 20 ft., or 1/2 inch maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
 - 1. Remove mortar fins and smears before tooling joints.
 - 2. Remove excess sealant immediately, including spills, smears, and spatter.

- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 5. Clean cast stone by methods described in Cast Stone Institute Technical Bulletin #39, or with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200

SECTION 02 41 01

TREE PRESERVATION

PART 1—GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this section.

1.2 DEFINITIONS

- A. DIAMETER shall be defined at breast height (dbh) which is the average tree diameter at 4.5 feet from the ground on the uphill side of the tree.
- B. CALIPER shall be defined as the diameter of the trunk at 6 inches above the soil for trees up to 6 inches in caliper and diameter at 12 inches above the soil for trees up to 12-inch caliper.
- C. ROOT ZONE shall be defined as 1 foot of radius around trunk for every inch of trunk diameter at 4.5 feet above ground level on the uphill side of the tree.
- D. DRIP LINE shall be defined as the outer limits of the tree canopy for each tree projected downward onto the ground as shown in the drawings.
- E. TREE PRESERVATION AREA shall be defined as all areas which contain trees and all existing trees noted to remain and be protected within the limits of construction. Protective fencing shall be erected as shown in the drawings.
- F. DAMAGE shall be defined as any negative physical impact to an existing tree trunk, canopy, and/or roots caused by accidental or negligent construction activities, also including unauthorized encroachment into the tree preservation areas protected by fencing or failure to comply with specifications and drawings whether fencing is present or not, at any time during the construction process, including the finishing steps of landscape installation and fine grading operations.
- G. CERTIFIED ARBORIST shall be an individual provided by the contractor to provide tree preservation measures and tree protection throughout construction. The individual shall be ISA Certified.

1.3 QUALITY ASSURANCE

- A. No site preparation work, including demolition, staging or any delivery/storage of materials, shall begin in areas where trees are designated to remain and be protected until protection and treatment measures have been agreed upon and completed.
- B. Tree preservation measures along with treatment measures and materials will be reviewed and approved by the Owner's Representative, Certified Arborist, and project Landscape Architect prior to installation. Protection of trees or woody shrubs identified to remain means maintenance of the trees in good health and vitality, as well as protection from physical damage and disease.

- C. Publications listed herein are part of this specification to extent referenced:
 - 1. Tree Care Industry Association (formerly National Arborist Association) Standards.
 - 2. ISA—International Society of Arboriculture
 - 3. American National Standard for Tree Care Operations.
 - a. ANSI Z133.1–1994.
 - b. ANSI A300–1995.
 - 4. American Nurseryman Association Standards.
- D. Certified Arborist Qualifications:
 - 1. Minimum of five years' experience in arboriculture within the Greater Cincinnati region.
 - 2. Three references from public clients for whom similar services have been supplied.
 - 3. Staff that are ISA Certified Arborists.
- E. Trees on site which are to be preserved shall be prepared and treated to increase their potential for survival and improve their health and condition. Contractor shall meet or exceed the most recently published Tree Care Industry Association (formerly National Arborist Association) Standards for all work. All work is to be performed completely as specified unless changes are agreed upon in writing due to unforeseen limiting circumstances.
- F. Equipment and Safety:
 - 1. Equipment shall be modern and well maintained. Any instruments used to cut roots and limbs shall be sharpened well enough to make clean cuts. Contractor shall adhere to all applicable state and federal regulations. Contractor shall be responsible for damage to property resulting from equipment, including fluid leakage or damage resulting from equipment failure. Incidents of this type shall be reported immediately to Owner's Representative.
 - 2. Contractor shall be responsible for damage to structures, installations, fixtures, paving, concrete, plant materials and other items on the site which result from the execution of work prescribed.

1.4 PERFORMANCE STANDARD

- A. Damaged trees, as determined by a Certified Arborist and agreed upon by the Landscape Architect and Owner's Representative, less than 12 inches in diameter shall be replaced with trees of equal caliper or the largest commercially available trees of the same species.
- B. Contractor shall be responsible for all expenses related to the replacement of damaged trees including: locating replacement trees at nurseries, tagging, review/approval of replacements, purchasing, transporting, installing, warranty for one year, and any other associated expenses.
- C. Contractor is responsible for damage for any trees damaged as a result of Contractor error or failure to follow contract specifications. Contractor may be required to remove tree and stump for trees determined to be destroyed as a result of contractor negligence. Damaged trees greater than 12 inches in diameter shall be compensated for by the contractor at \$500.00 per inch of diameter, i.e. a damaged 18 inches tree = \$9,000.00 due to the Owner.
- D. Diameters of damaged trees, if any, shall be determined by an Arborist for the assessment of damages.
- E. Contractor is responsible for providing a qualified Certified Arborist to conduct work that may be required due to damage to trees during construction. Certified Arborist is to meet the qualifications outlined herein.

1.5 SUBMITTALS

- A. List products to be used and companies/personnel, including their qualifications that will be performing the required work.
- B. Certified Arborist qualifications.

1.6 SUMMARY

- A. Furnish all labor, materials, supplies, equipment and tools to perform all operations in connection with and reasonably incidental to preserve or repair trees damaged by construction. The work shall include but not be limited to, the following:
 - 1. Erecting and maintaining tree protection fences
 - 2. Root pruning as indicated on drawings.
 - 3. Repair operations.
 - 4. Payments or replacements for damaged trees as identified by Owner's Representative.
- B. Construction activity within the root zone of existing trees to remain and be protected shall be prohibited and can be considered as damage to the tree. This shall include but is not limited to the following activities:
 - 1. Removing tree preservation fencing.
 - 2. Parking or driving equipment, machinery or vehicles.
 - 3. Storing construction materials, equipment, stockpiling, excavation or fill, soil, gravel, etc.
 - 4. Dumping chemicals, wash-out materials from cleaning equipment, concrete or mortar remainder, trash, garbage, or debris.
 - 5. Burning within or in proximity to protected areas.
 - 6. Trenching or grading within the drip lines of protected trees without notifying Owner's Representative in writing 10 days in advance of operation. This includes utilities, lighting, irrigation, drainage, paving, structures, etc.
 - 7. Trenching or grading without root pruning.
 - 8. Any construction activity within the drip line of an existing tree.
- C. Timing: If disturbance is required during the active growing season, additional measures may be needed to protect the tree. These measures may include but are not limited to: mulching/protection of disturbed roots and temporary irrigation of disturbed trees.
- D. Silt shall not be allowed to build up against the Tree Preservation Area silt fences.
- E. Contractor shall work with Owner's Representative to make field adjustments as necessary in order to promote long-term health and viability of the trees.

PART 2-PRODUCTS

2.1 MATERIALS

- A. The use of trade name and supplier's name and address is to indicate a possible source of the product. Products of the same type from other sources shall not be excluded, provided they possess like physical and functional characteristics and are approved by Owner's Representative.
- B. Every effort shall be made to utilize chemicals of an organic or biodegradable nature in order to offer least impact to the natural environment. Contractor is responsible for mixing, applying and disposal of all chemicals in accordance with strict adherence to manufacturers' directions. Protect adjacent structures, vehicles, pedestrians, pavement and plants from exposure to any chemicals.

- C. Tree Protection Fencing: Posts to be steel fence posts spaced 6'-0" on center with standard snow fencing or orange polyethylene construction fencing, exposed height above grade 4'-0". Signs shall be affixed to the fencing every 100 feet with appropriate language, such as "Tree Protection Zone (TPZ)—No grade change, storage of materials, or equipment is permitted within this TPZ."

PART 3—EXECUTION

3.1 TREE IDENTIFICATION

- A. Individual trees and tree protection areas are as shown on the drawings.
- B. Prior to any site work, the Contractor shall tag and number every existing tree that will remain on site, as identified on the Plans. After the trees are tagged and numbered, the Contractor shall hire a Certified Arborist to evaluate all trees designated to remain and make the Owner and Landscape Architect aware of any potential concerns regarding health, structure, risks and any recommended remedial measures to improve the likelihood of the trees' survival and good health after construction.

3.2 COORDINATION

- A. Before start of work, meet at the work site with all parties involved. Review areas of scheduling and possible conflict with various trades and other site work. Coordinate layout of work and resolve conflicts before proceeding with work. All tree preservation strategies shall be agreed upon by Owner's Representative and Landscape Architect.
- B. Tree preservation fencing shall go up prior to beginning any and all site work. Once the fencing is in place, it shall not be moved or crossed any time during construction. If a conflict arises during construction between proposed plans and tree preservation fencing, the Owner's Representative and Landscape Architect shall be contacted immediately before any work is done in the conflicted area.
- C. All tree removal, tree pruning, and work affecting existing trees and tree preservation, shall be reviewed with Owner's Representative prior to any work starting in the tree preservation area.

3.3 TREE WORK AGENDA

- A. Contractor shall notify Owner's Representative of any trees which may interfere with project access or work at any time during construction, a minimum of 14 days prior to the start of the proposed work. Any special provisions or adjustments to the tree preservation strategies must be approved by Owner's Representative.

3.4 PRE-CONSTRUCTION PRUNING

- A. Assessment by Contractor is required per area of work to ensure there is adequate clearance to do work under existing trees to remain. Review any clearance issues with Owner's Representative. All required trimming shall be performed by Contractor after review and approval by Owner's Representative.

3.5 TREE REMOVAL

- A. Trees marked on Plans and/or designated in the field by Owner's Representative shall be removed from site as noted in the drawings and specifications.

- B. Trees noted for removal shall be removed without damage to adjacent trees to be protected, existing structures, utilities, etc.
- C. All canopy branches and tops of trees shall be hauled off site and properly disposed of.
- D. Stumps should be ground or removed from site as directed by the Owner's Representative and Certified Arborist.

3.6 GENERAL

- A. Review of Tree Preservation Plans and Limits of Clearing:
 - 1. The Contractor shall be required to hold a meeting in the field with the Subcontractors, the Owner's Representative, the Landscape Architect, and the Certified Arborist to review the location of trees to be preserved and the requirements of tree preservation coordination and damages. Concerns relating to tree preservation shall be brought to the Certified Arborist's attention at that time.
- B. Any work required by plans which is in a Tree Preservation Area shall be performed by hand or method(s) otherwise approved by Landscape Architect. All work will be performed in a manner to prevent compaction, siltation, and disturbance of the root mat of all associated trees and understory trees.
- C. In areas where tree roots are to be exposed to damage by demolition or construction activity, the exposed roots shall be kept moist at all times. Exposed roots shall be covered with a layer of mulch or wood chips.
- D. Contractor shall be responsible for ensuring that all subcontractors are aware of, and adhere to, tree preservation requirements.

3.2 DAMAGES AND PENALTIES

- A. All trees marked on Plans and/or designated in the field within the fence lines shall be preserved by the Contractor. Trees marked for preservation within sensitive tree areas indicated on plan may be assessed damages. Compensation for damage of trees due to Contractor negligence and/or accidents shall be assessed by Owner's Representative. Penalties will be in the form of a fine levied against the Contractor for each specific violation.
- B. Contractor is responsible for damage compensation for any trees damaged as a result of contractor error or failure to follow contract specifications. Contractor may be required to remove tree and stump for trees determined to be destroyed as a result of contractor negligence. Damaged trees greater than 12 inches in diameter shall be compensated for by the contractor at \$500.00 per inch of diameter, i.e. a damaged 18 inches tree = \$9,000.00 due to the Owner.

3.3 SITE MONITORING

- A. The Certified Arborist shall conduct periodic site visits to ensure compliance with tree preservation requirements. Prompt response shall be made to requests by Certified Arborist, which affects the survival of trees to be preserved.
- B. The Owner's Representative may conduct periodic site visits to ensure compliance with tree preservation requirements. Prompt response shall be made to requests by Owner's Representative, which affects the survival of trees to be preserved.

3.4 SITE MAINTENANCE

- A. Contractor shall keep all traveled areas watered regularly or apply other approved dust control methods to prevent excessive dust accumulation on foliage of trees to be preserved. Contractor shall be responsible for all costs associated with the removal of excessive dust from the foliage of trees.

3.5 TREE TRIMMING

- A. Contractor shall assess area of work to ensure there is adequate clearance to do work under existing trees to remain. Review any clearance issues with the Owner's Representative. All required trimming shall be performed by Contractor after review and approval by Owner's Representative.
- B. Trimming for adequate clearance to facilitate equipment use and construction activities will be performed prior to the work commencing.
- C. Trimming for worker and public safety and for the health and vigor of preserved trees, as directed by the Certified Arborist, is also required prior to construction work commencing.

3.6 ROOT PRUNING

- A. Where excavation or construction within the drip line of a tree is necessary or as noted on the drawings, root pruning may be required. A root cut shall be made as described below.
 - 1. Blade shall be sharpened prior to use.
 - 2. Root cuts shall be marked in the field by Contractor and reviewed by Owner's Representative and Landscape Architect prior to cutting.
 - 1. The arborist shall also make any recommendations related to preserving any critical structural roots (e.g., this is the closest point to this particular tree that the soil can be disturbed.) during the root pruning process.
 - 2. Once reviewed by Owner's Representative and Landscape Architect, Contractor shall follow his/her recommendations to cut along the approved marks prior to any excavation.
 - 3. Contractor shall prune all roots as directed with circular saws of varying types and/or a rotary type stump grinder to a depth of 18" or to the maximum depth of the required grading cut, whichever is less.
 - 4. Root pruning shall be coordinated with the tree protection fencing. In some cases that fence line is on the root cut, provisions for root pruning need to be accommodated before the fence is erected.
 - 5. During the excavation process, if roots greater than 2 inches in diameter that have not been root pruned are encountered, they shall be reviewed by the Certified Arborist to determine structural stability of the tree. Contractor shall follow instructions from the Certified Arborist for cutting (e.g., cutting with a saw or sharp axe). Roots shall not be ripped with earth moving equipment.

3.7 TREE PROTECTION FENCING

- A. Tree protection fencing shall be installed in the locations indicated on the drawings.
- B. Install approved protective fencing around each tree designated to remain and be protected. Maintain fencing throughout duration of project. Contractor accepts full responsibility for liabilities associated with protective fencing that is not appropriately maintained. Temporary removal of fencing shall require approval of Owner's Representative and Landscape Architect.
- C. Tree protection fencing shall be as specified and include approved signage as described in section 2.1 C.

- D. No access to fenced areas shall be permitted by anyone other than the Certified Arborist without prior approval by the Owner's Representative
- E. Contractor shall provide maintenance, repair, and removal of fence during duration of this contract.
- F. Tree protection fencing shall be in-place and in good condition upon the completion of the construction process.
- G. At Substantial Completion and only after directed by the Owner's Representative, Contractor shall remove tree protection fencing and all such materials.

3.8 MULCHING

- A. Selected trees in high impact areas, if identified on the plans, adjacent to construction shall be mulched with a 2-inch depth of shredded hardwood bark mulch.

3.9 OTHER REMEDIAL ACTIVITIES

- A. Contractor shall provide other Arboricultural services as needed to respond to damage by construction activities. These services may include any of the above, as well as fence repair, vertical mulching, etc. Contractor shall respond to calls for remedial work within 48 hours of notification.
- B. As recommended by the Certified Arborist, vertical mulching techniques shall be used to reduce compaction where it may be causing trees stress. Holes shall be augered using a 2-3-inch mechanical auger to a depth of 12-18 inches. Holes shall be evenly distributed throughout the affected root zone in an 18- to 24-inch grid pattern and backfilled with humus. Care shall be given to avoid damaging large roots when withdrawing.

3.10 CLEANUP

- A. Remove from site all excess materials, soil, debris, and equipment directly related to tree preservation activities.

END OF SECTION 02 41 00

SECTION 11 68 13 PLAYGROUND EQUIPMENT

PART 1—GENERAL

1.1 SECTION INCLUDES

- A. Work Included:
 - 1. Playground equipment.
 - 2. Location of each item of playground equipment is indicated on the design intent drawings.

1.2 RELATED SECTIONS AND DIVISIONS

- A. Section 32 13 13 - Concrete Paving.
- B. Section 32 18 16.13 - Playground Protective Surfacing.

1.3 REFERENCE STANDARDS

- A. ASTM F 1292 - Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of Playground Equipment; 2004.
- B. ASTM F 1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; 2007a.
- C. CPSC Pub. No. 325 - Handbook for Public Playground Safety; Consumer Products Safety Commission; 2008.
- D. IPEMA for certified public play equipment and play surfacing.

1.4 DEFINITIONS

- A. Play Event: A piece of playground equipment that supports one or more play activities.
- B. Use Zone: The area under and around a play event within which the ground surfacing must meet fall impact attenuation requirements of ASTM F1292 when tested at the fall height specified for the play event.
- C. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it, as defined in ASTM F 1487.
- D. Protective Surfacing: Resilient ground surfacing as specified in Section 32 18 16.13 - Playground Protective Surfacing. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.
- E. Subgrade: The surface of the ground on which the protective surfacing is installed; the subbase for the protective surfacing is installed over the subgrade.

1.5 SUBMITTALS

- A. Proposals for Substitutions: Substitutions that will increase the fall height, platform height, or maximum equipment height will not be considered. Submit shop drawings with proposed modifications clearly identified and sufficient information to determine compliance with specified criteria.
- B. Product Data: For all manufactured equipment, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.
 - 1. Certifications: Provide International Play Equipment Manufacturers Association (IPEMA) certification that product complies with ASTM F 1487.
- C. Product Data: For fabricated items, provide the following:
 - 1. Wood Finishes: Provide information on wood finish chemical content and toxicity level.
 - 2. Galvanized Steel: Certification of galvanized coating thickness.
- D. Shop Drawings: Provide detailed scale drawings for each playground site element and play event
 - 1. Play event shop drawings to show: play event layout, Use Zone perimeters, and fall height
 - 2. Show locations and dimensions of footings and anchorage points.
 - 3. Show locations of related construction such as walkways and roadways, fences, site furnishings, and plantings.

4. Show locations for existing trees to be preserved as they relate to any potential construction constraint. Notify the Landscape Architect and Owner's Representative immediately if a constraint is identified.
- E. Samples: For each item for which color must be selected provide color chart showing full range of colors and finishes.
- F. Maintenance Data: Provide manufacturer's recommended maintenance instructions and list of replaceable parts for each equipment item, with address and phone number of source of supply.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Maintain one copy of the latest edition of ASTM F 1487 and CPSC Pub. No. 325 at project site.
- B. Manufacturer Qualifications: Company is regularly engaged in manufacturing materials and products specified in this Section, with not less than three years of experience.
 1. Provide documentation showing that playground equipment similar to that specified has been installed in minimum ten sites and been in successful service for minimum of five years; provide addresses.
 2. Provide certificate of Insurance AA rated for minimum 1,000,000 dollars covering both product and general liability.
 3. Manufacturer's Representative: Provide name, company name and address, and playground safety training certificate.
- C. Installer Qualifications: Company certified by manufacturer for training and experience installing play events and equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store equipment to project site in accordance with manufacturer's recommendations.
- B. Store materials in a dry, covered area, elevated above grade.

1.8 WARRANTY

- A. Provide data and documents that conform with manufacturers standard warranty.

PART 2—PRODUCTS

2.1 PLAYGROUND EQUIPMENT – GENERAL

- A. Design Assumptions: Because the safety of the playground depends on strict conformance to the design criteria, this information is provided for Contractor's information.
 1. Playground has been designed for children ages 2 through 12.
 2. If deviations from specified dimensions, especially fall heights, is required, obtain approval prior to proceeding. Follow approval request procedure as specified for substitutions.
- B. Mount all equipment on concrete footings, unless otherwise indicated.
 1. The playground protective surfacing constitutes a resilient layer installed over a subbase (non-resilient) that is installed over the subgrade. The top of footings and anchorage devices is to be covered by full depth of the resilient portion of the protective surfacing.
 2. Protective Surfacing Depth: See Section 32 1816.13.
 3. Provide supports as required to mount equipment at proper height above finish and subgrades to allow installation of sufficient depth of protective surfacing. Portion of support below top of surfacing must comply with specified requirements for equipment.
 4. Paint the portion of the support that is intended to be installed below the top surface of the protective surfacing a different color, or mark in other permanent way, so that installers and maintainers of protective surfacing can easily determine whether sufficient depth has been installed.
- C. Label each equipment item with permanent labels stating age group that equipment was designed for, manufacturer identification, and warning labels in accordance with ASTM F 1487.

2.2 PLAYGROUND EQUIPMENT

- A. Comply with ASTM F 1487 and CPSC Pub. No. 325. Provide equipment complying with specific requirements for the relevant age group(s).
 - 1. Provide components having factory-drilled holes. Do not use components with extra holes that will not be filled by hardware or covered by other components.
- B. All equipment specified is basis of design per design intent documents. Other equipment of equal specification will be considered on a pre-approved basis only. Aesthetics and character are critical part of design intent and will be included in consideration when evaluating substitution request.
- C. In the event of a discrepancy between drawings and specifications, the drawing shall take precedence.

2.3 MATERIALS

- A. All manufacturers listed are basis of design.
- B. Steel Pipe and Tube: Conforming to ASTM A 135/A 135M, ASTM A 500, or ASTM A 513; hot-dipped galvanized and free of excess weld and spatter.
 - 1. Tensile Strength: 45,000 psi (310 MPa), minimum.
 - 2. Yield Point: 33,000 psi (225 MPa), minimum.
 - 3. Galvanizing: Hot-dip metal components in zinc after fabrication, in accordance with ASTM A 123/A 123M; remove tailings and sharp protrusions and burnish edges.
- C. Extruded Aluminum: ASTM B 221 or ASTM B 221M, Alloy 6061, 6062, or 6063.
 - 1. Tensile Strength: 39,000 psi (270 MPa), minimum.
 - 2. Yield Point: 36,500 psi (250 MPa), minimum.
- D. Hardware: Of design without hazardous protrusions, corners, or finishes, and requiring tools for removal after installation; countersunk fasteners are preferred.
 - 1. Use stainless steel for metal-to-metal connections. Select type to minimize galvanic corrosion of materials connected by hardware.
 - 2. Use stainless steel for wood-to-wood and wood-to-metal connections.
 - 3. Use stainless steel with plastic components.
 - 4. Bearings: Self lubricating.
 - 5. Hooks, Including S-Hooks: Closed loop; maximum gap 0.04 inches (1 mm), less than the thickness of a dime.
 - 6. Rails, Loops, and Hand Bars: Same metal as item is mounted on or aluminum; with powder coating.
 - 7. Anchors: In accordance with manufacturer's recommendations.
- E. Powder Coating for Steel: Electrostatically applied and oven cured polyester powder over electrostatic zinc coating.
- F. Concrete: As specified.

PART 3—EXECUTION**3.1 LAYING OUT THE WORK**

- A. Stake the location of all playground elements, including Use Zone perimeters, perimeter of protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations for review by Owner's Representative, Landscape Architect and Playground Consultant.
- B. Stake the layout of the entire Use Zone perimeter before starting any work and before subbase under resilient surfacing is laid.
 - 1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
 - 2. Verify that Use Zone perimeters do not overlap other Use Zones that, by regulations and play events, may not overlap.

3. Verify that Use Zones are free of obstructions that would extend into the resilient portion of the protective surfacing.
4. If conflicts or obstructions exist, notify Landscape Architect
5. Do not proceed until revised drawings have been provided, showing corrected layout, and obstructions have been removed.

3.2 EXAMINATION

- A. Verify that playground equipment footings have been installed in proper locations and at proper elevations.
- B. Verify location of underground utilities and facilities in the playground area. Damage to underground utilities and facilities will be repaired at Contractor's expense.

3.3 INSTALLATION

- A. Coordinate work with preparation for and installation of protective surfacing specified in Section 32 18 16.13. The resilient portion of the protective surfacing is to be installed after playground equipment installation.
- B. Install in accordance with CPSC Pub. No. 325, ASTM F 1487, manufacturer's instructions, and requirements of authorities having jurisdiction.
- C. Anchor equipment securely below the bottom elevation of the resilient surfacing layer.
- D. Install without sharp points, edges, or protrusions; entanglement hazards; or pinch, crush, or shear points.
- E. Do not modify play events on site without written approval of manufacturer.
- F. Install required signage if not factory-installed.
- G. All elements requiring shop drawings shall be installed only after approval by Owner's Representative and Playground Consultant.

3.4 FIELD QUALITY CONTROL

- A. Owner's Representative and Playground Consultant will inspect playground equipment after installation to verify that playground meets specified design safety and accessibility requirements.
- B. Repair or replace rejected work until compliance is achieved.

3.5 CLEANING

- A. Restore adjacent existing areas that have been damaged from the construction.
- B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.
- C. Clean playground area of excess construction materials, debris, and waste.
- D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction.

3.6 PROTECTION

- A. Protect installed products until Substantial Completion.
- B. Replace damaged products before Substantial Completion.

END OF SECTION 11 68 13

SECTION 12 93 10

SITE FURNISHINGS

PART 1-GENERAL

1.1 SECTION INCLUDES

- A. Lounge Chair
- B. Cafe Tables
- C. Picnic Tables
- D. Foosball Table
- E. Cornhole
- F. Fire Pit
- G. Fire Pit Screen
- H. Trash Receptacle
- I. Drinking Fountain

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Divisions 1 through 33 Specification Sections, apply to this Section.
- B. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2000.
- C. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2000.
- D. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2000.
- E. ASTM A 325M - Standard Specification for High-Strength Bolts for Structural Steel Joints (Metric); 2000.
- F. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 1999.
- G. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2002.

1.3 SUBMITTALS

- A. See Administrative Requirements section, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product specified, including detailed installation diagrams and recommended installation methods.
- C. Provide shop drawings for all furnishings that require customizations to standard products.
- D. Selection Samples: For each product specified, two sets of chips representing manufacturer's colors/finishes as specified.

PART 2-PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Basis of Design: Manufacturers listed are the basis of design or approved equal. Other alternatives will be considered on a pre-approved basis only.

- B. Lounge Chair
 - 1. Manufacturer: Dumor
 - 2. www.dumor.com
 - 3. Model: 533-22 Adirondack chair w/ armrests
 - 4. Wood: IPE
 - 5. Color: Recycle Blue
- C. Cafe Table
 - 1. Manufacturer: Victor Stanley
 - 2. www.victorstanley.com
 - 3. Model: N-365
 - 4. Wood: IPE
 - 5. Color: Black
 - 6. Option: solid top with gameboard
 - 7. Mounting: Surface Mount
- D. Picnic Table
 - 1. Manufacturer: Victor Stanley
 - 2. www.victorstanley.com
 - 3. Model: PT-2
 - 4. Wood: IPE
 - 5. Color: Black
 - 6. Mounting: Surface Mount
- E. Foosball Table
 - 1. Manufacturer: Anova Furnishings
 - 2. www.anovafurnishings.com
 - 3. Model: Outdoor Concrete Foosball Table
 - 4. Color: Natural Concrete Gray
- F. Cornhole
 - 1. Manufacturer: Spruce and Gander
 - 2. www.spruceandgander.com
 - 3. Model: Corn Hole
 - 4. Color: Iron, Smooth Finish
- G. Fire Pit
 - 1. Manufacturer: Spruce and Gander
 - 2. www.spruceandgander.com
 - 3. Model: Block Infinity Fire Pit
 - 4. Color: Iron, Smooth Finish
 - 5. Size: 60" Dia x18" H
- H. Fire Pit Screen
 - 1. Manufacturer: Fire Pit Screens
 - 2. www.firepitsscreen.net
 - 3. Model: 36" round lift off dome
 - 4. Color: 304 Stainless Steel black high temperature powder coat
 - 5. Size: 12" screen center height
 - 6. Option: 6" raised welded to bottom frame
 - 7. Mounting: Anchor to fire pit with S.S. screws or bolts
- I. Trash Receptacle
 - 1. Manufacturer: Victor Stanley
 - 2. www.victorstanley.com
 - 3. Model: REN-36SDSD-EJ
 - 4. Wood: IPE
 - 5. Color: Black
 - 6. Mounting: Freestanding

J. Drinking Fountain

1. Manufacturer: Murdock Manufacturing
2. www.murdockmfg.com
3. Model: GYQ84-FRU3
4. Color: Satin Stainless Steel

2.2 FABRICATION

- A. Shop-assemble site furnishings for delivery to site in units easily handled and to permit shipment without disassembly.
- B. Ensure that work is smooth and free of edges that could snag clothing or cause injury.

PART 3—EXECUTION

3.1 EXAMINATION

- A. Quantity of units are as shown on drawings.
- B. Do not begin installation until required utilities/hook-ups, foundations and/or material surfaces have been properly prepared.
- C. If preparation is the responsibility of another Contractor/Installer, notify Landscape Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

- A. Locate all furnishings as indicated on drawings and notify Landscape Architect at least one week before mounting if field adjustments are required.
- B. Review all furnishings locations with Landscape Architect prior to final installation/mounting.
- C. Install in accordance with manufacturer's instructions.
- D. Mounting hardware is to be touched up with touch up paint from the manufacturer.
- E. All mounting fasteners to be stainless steel or hot-dip galvanized unless otherwise approved.
- F. Provide attic stock for all lpe boards (10% of total for each lpe product and manufacturer), paint touch-up kits for all painted metal and touch-up/patch kits for all special seating (1 kit per seat).

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products after Substantial Completion. Landscape Architect reserves the right to reject any repairs deemed unsuitable.
- C. Provide touch-up paint and materials to Owner after Substantial Completion.

END OF SECTION 12 93 10

**SECTION 32 14 16
UNIT PAVING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Large Pavers
- B. Paver Band

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.03 SUBMITTALS

- A. Product Data: For the following:
 - 1. Unit pavers (clay brick and concrete pavers).
 - 2. Bituminous setting materials.
 - 3. Polymeric sand joint material
 - 4. Color chart for polymeric sand available colors
- B. Samples for Verification: Full-size units of each type of unit paver indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
- C. Qualification Data: For firms and person specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.
- C. Mockups: Before installing unit pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:
 - 1. Build mockups in the location and of the size indicated, or if not indicated, as directed by Landscape Architect. Mock-ups should be a minimum of 4'x4'.
 - 2. Notify Landscape Architect 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 Landscape Architect and Owner's approval of mockups before starting unit paver installation.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Demolish and remove mockups when directed.
 - 7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Do not change source or brands of brick, mortar, or grout material during the course of the work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver mortar, grout and additive materials in manufacturer's unopened and undamaged containers with labels intact and legible. Store off the ground and protect from weather damage and deterioration.
- B. Protect aggregate during storage and construction against soiling or contamination from earth and other materials.
 - 1. Store loose granular materials in a well-drained area on a solid surface to prevent mixing with foreign materials.
- C. Protect unit pavers during shipping, storage and construction against damage, chipping, and soiling or contamination from earth and other materials.
 - 1. Cover pavers with plastic or use other packaging materials that will prevent rust marks from steel strapping.
- D. Store asphalt cement and other bituminous materials in tightly closed containers.

1.06 PROJECT CONDITIONS

- A. Establish and maintain required levels and grade elevations. Review installation procedures and coordinate paving work with other work affected by the unit paving work.
- B. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- C. Weather Limitations for Bituminous Setting-Bed: Comply with the following requirements:
 - 1. Apply asphalt adhesive when ambient temperature is above 50 deg. F and when temperature has not been below 35 deg. F for 12 hours immediately before application. Do not apply when base is wet or contains excess moisture.
 - 2. Install bituminous setting-bed only when atmospheric temperature is above 40 deg. F and when base is dry.
- D. Protect partially completed brick paving against weather damage when work is not in progress.
- E. Provide temporary barricades and warning lights as required for protection of project work and public safety.
- F. Protect adjacent work from damage, soiling and staining during paving operations.

PART 2 PRODUCTS**3.01 SIZES, COLORS, TEXTURES**

- A. Subject to compliance with requirements, provide the following products for areas as detailed on Hardscape Plans:
 - 1. Large Pavers
 - a. Basis of Design Manufacturer: Nitterhouse Masonry
Phone: 717.268.4137
Website: nitterhousemasonry.com
Style: Architectural Paver
Color: PG-27
Size: 24" x 36"
 - 2. Paver Band:
 - a. Basis of Design Manufacturer: Hanover Pavers
Phone: 800.426.4242
Website: hanoverpavers.com
Style: Traditional Prest Brick Paver
Color: Tan
Size: 4" x 8"

- B. Initial order to include 10% addition for attic stock.
- C. Contractor to coordinate attic stock storage locations with representatives from the City of Highland Heights.
- D. For radii, pavers to be field cut.

3.02 PAVER EDGE RESTRAINT

- A. Install where indicated per detail. Provide aluminum edge restraint by Permaloc or approved equal. Provide product data to Landscape Architect and Owner for review.

3.03 JOINT MATERIAL

- A. Sand for Joints: Gator XP Sand Bond, Polymeric Sand or approved equal.
- B. Color: Provide available color samples from manufacturer for color selection by Landscape Architect and Owner. Color to be coordinated with paver sample.

3.04 PAVER SEALER

- A. Per paver manufacturer recommendation.

PART 3 EXECUTION

5.01 EXAMINATION

- A. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.
- B. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

5.02 INSTALLATION, GENERAL

- A. Do not use unit pavers with chips, cracks, voids, discoloration, and other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable. Maintain half paver minimum.
- D. Joint Pattern: As indicated.
- E. Tolerances: Do not exceed 1/32 - inch unit-to-unit offset from flush (lippage) nor 1/8 - inch in 10 feet from level, or indicated slope, for finished surface of paving.

5.03 BITUMINOUS SETTING-BED APPLICATIONS

- A. Apply primer to concrete slab or binder course immediately before placing setting bed.
- B. Prepare for setting-bed placement by locating 3/4-inch deep control bars approximately 11 feet apart and parallel to one another, to serve as guides for striking board. Adjust bars to subgrades required for accurate setting of paving units to finished grades indicated.
- C. Place bituminous setting-bed where indicated, in panels, by spreading bituminous material between control bars. Strike setting bed smooth, firm, even, and not less than 3/4 inch thick. Add fresh bituminous material to low, porous spots after each pass of striking board. After each panel is completed, advance first control bar to next position in readiness for striking adjacent panels. Carefully fill depressions that remain after removing depth-control bars.
 - 1. Roll setting bed with power roller to a nominal depth of 3/4 inch while still hot. Adjust thickness as necessary to allow accurate setting of unit pavers to finished grades indicated.

2. Apply neoprene-modified asphalt adhesive to cold setting bed by squeegeeing or troweling. If troweled on, use trowel with serrations not exceeding 1/16 inch. Proceed with setting of paving units only after adhesive is dry to the touch.
- D. Place pavers carefully by hand in straight courses, maintaining accurate alignment and uniform top surface. Protect newly laid pavers with plywood panels on which workers can stand. Advance protective panels as work progresses, but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of pavers. If additional leveling of paving is required, and before treating joints roll paving with power roller after sufficient heat has built up in the surface from several days of hot weather.
- E. Joint Treatment: Place unit pavers with hand-tight joints. Fill joints with a polymeric sand/cement mix by sweeping over paved surface until joints are filled.

5.04 REPAIR, CLEANING AND PROTECTION

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
- B. Cleaning: Remove excess sand/cement mix from exposed paver surfaces; wash and scrub clean.

END OF SECTION 32 14 16

**SECTION 32 18 17
SYNTHETIC TURF**

PART 1 GENERAL

1.01 SUMMARY

- A. The work of this Section consists of the provision of all materials, labor and equipment and the like necessary and/or required for the complete execution of the synthetic turf work in the Dog Park for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:
 - 1. Provide all synthetic turf as designated in these specifications.
- B. The Synthetic Turf Contractor shall:
 - 1. Provide any and all fine grading as may be necessary or incidental to placement of the synthetic turf, if the Synthetic Turf Contractor disturbs the subbase. Refer to Tree Preservation Specifications and requirements when installing synthetic turf under existing trees.
 - 2. Install a complete synthetic turf system per manufacturer's recommendations.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 02 4101 - "Tree Preservation"
- C. Section 31 2000 - "Earthwork"
- D. Section 33 4100 - "Storm Utility Drainage"

1.03 SUBMITTALS

- A. See Administrative Requirements, for submittal procedures.
- B. The following information must be submitted by the Synthetic Turf Contractor prior to installation.
 - 1. Provide the following experience information:
 - a. An affidavit that the Synthetic Turf Contractor has been in business for at least 5 years.
 - b. A list of five (5) installations of the specific synthetic turf specified, providing specific contacts and telephone numbers.
 - c. A list of three (3) projects by the manufacturer's supervisor who will supervise this project. The supervisor is the person on-site everyday responsible for the daily supervision of the installation crew.
 - 2. Provide evidence direct from the turf manufacturer stating the installer is certified by the manufacturer to install this type of synthetic turf.
 - 3. Standard printed specifications of the synthetic turf system that is being installed.
 - 4. Installation process and requirements for the crushed stone drainage base and any condition that may limit the artificial turf installation or affect quality of installation.
 - 5. Details for all required nailers and connectors.
 - 6. Temperature/climatic conditions limiting quality of installation.
 - 7. Submit an affidavit attesting that the synthetic turf material to be installed meets the requirements defined in the manufacturer's currently published specifications, and any modifications outlined in these technical specifications prior to the commencement of any work.
 - 8. Samples: Provide one, 12 inch x 12 inch minimum sample of the exact synthetic turf that is specified for this project. The sample(s) must be submitted and approved by the Landscape Architect, prior to installation. At completion of the project, the samples may be used as a comparison to judge the quality of the installed product.
 - 9. Material safety data sheets on all individual components of the product being installed.

10. Provide a letter stating the Synthetic Turf Contractor reviewed the crushed stone drainage base specification and accepts the specification as correct. Upon completion of the crushed stone drainage base and prior to installation of synthetic turf recreational field, the Synthetic Turf Contractor will provide a letter accepting the installed crushed stone drainage base and stating it is suitable.
 11. Attenuation Data: If critical fall height is required, attenuation test results shall be submitted by the installer to the Owner prior to installation of the surface. The results shall be submitted on letterhead of the independent testing lab. Impact attenuation results shall comply with ASTM 1292 for the critical fall height of the equipment.
- C. The following information shall be submitted after completion of the specified work.
1. A warranty to the Owner that covers defects in materials and workmanship of the turf for a period of eight (8) years from the date of Contract Closeout. The Synthetic Turf Contractor must verify that the on-site representative has inspected the installation and that the work conforms to the manufacturer's requirements.
 2. The manufacturer's warranty shall include general wear and damage caused from UV degradation. The warranty shall specifically exclude vandalism, and acts of God beyond the control of the Owner or manufacturer.
 3. The Synthetic Turf Contractor shall provide an additional warranty (separate from the manufacturer's warranty) to the Owner that covers defects in the installation workmanship, and further warrant that the installation was done in accordance with both the manufacturer's recommendations as well as any written directives from the manufacturer's representative on-site.
 4. Separate warranty shall be a three-year insured/bonded warranty.
 5. Written maintenance requirements for Owner's reference/use.

1.04 QUALITY ASSURANCE

- A. Comply with the following:
1. The Synthetic Turf Contractor must be experienced in the manufacture and installation of this specific type of synthetic turf system and meet the following requirements:
 - a. Have been in business for at least five (5) years.
 - b. Have five (5) installations, of the specified material, in the last three (3) years.
 2. The Synthetic Turf Contractor must provide competent workmen skilled in this specific type of synthetic turf installation. The designated Supervisor on the project must be experienced and have installed a minimum of three (3) synthetic turf installations of the specified material. The manufacturer shall have a representative on site to accept the installation and warranty compliance.
- B. Maintain one copy of the latest edition of ASTM F 1487 and CPSC Pub. No. 325 at project site.
- C. Prequalified Installer: Forever Lawn Kentuckiana, 10319 IN-32, Charlestown, IN 47111, 502.379.1180, www.foreverlawn.com/kyin/

PART 2 PRODUCTS

2.01 SYNTHETIC TURF SURFACE

- A. The synthetic turf in the bocce ball court and gathering area shall be as per the Synthetic Turf manufacturer specifications; where discrepancies exist, they shall be brought to the attention of the Owner or Landscape Architect prior to Bidding and Installation.
- B. Manufacturers:
1. Basis of Design: Synthetic Turf by Forever Lawn Kentuckiana, 10319 IN-32, Charlestown, IN 47111, 502.379.1180, www.foreverlawn.com/kyin/
 2. Type: Playground Grass, Bocce Grass Court, and Fusion Elite, per plan.
 3. Colors: Green

2.02 NAILER

- C. The synthetic turf contractor will provide all necessary nailers to attach the synthetic turf system. All sides of the turf area shall be attached to the nailer, as shown in the contract documents. All necessary padding and turf shall cover the nailer and curb.
- D. The type of nailer board shall be per manufacturer's recommendations. The board must be able to form the smooth geometries detailed in the contract documents. The edges shall be smooth arcs.
- E. All nailer fasteners shall be stainless steel.
- F. Nailer with no concrete perimeter curb shall have rebar spaced every 4' on center minimum and placed where they do not damage the roots of existing trees.

2.03 CRUSHED AGGREGATE BASE

- G. Aggregate base shall be #8 aggregate, angular, no fines, material per ODOT CMS 703.

PART 3 EXECUTION

3.01 GENERAL

- A. Install in accordance with manufacturer's instructions.
- B. Only factory-trained technicians, skilled in the installation of synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake the placement of the system.
- C. Synthetic Turf Contractor shall be responsible for verifying final grade prior to synthetic turf installation. If any discrepancies are discovered, Synthetic Turf Contractor is to repair base material, including subgrade if necessary, as required to be consistent with grading plan.

3.02 EXAMINATION AND ACCEPTANCE

- A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part of the Work of this Contract, any defects affecting installation. Verify that all sub-base, drainage, and leveling is complete prior to installation.
- B. The surface to receive the synthetic turf shall be inspected by the installer, and prior to the beginning of installation, the Installer must accept in writing the sub-base surface planarity and compaction. The surface must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.
- C. The compaction of the aggregate base shall be 95%, according to the Modified Proctor procedure (ASTM D1557), and the surface tolerance shall not exceed 0-1/4 inch over 10 feet and 0-1/2" from design grade.
- D. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.03 INSTALLING THE SYNTHETIC TURF

- E. Install in accordance with manufacturer's instructions. The Turf Contractor shall strictly adhere to the installation procedures outlined under this section. Any variance from these requirements must be accepted in writing, by the manufacturer's on-site representative, and submitted to the University, verifying that the changes do not in any way affect the warranty.
- F. The carpet rolls are to be installed directly over the properly prepared aggregate base. Extreme care should be taken to avoid disturbing the aggregate base, both in regard to compaction and planarity. Synthetic Turf contractor is responsible for necessary elevation repairs to aggregate.
- G. The full width rolls shall be laid out across the turf area. Utilizing standard manufacturer's recommendations on glue and taped seams, each roll shall be attached to the next.

- H. Turf to be fastened to nailer board with stainless steel staples. Spacing of staples per manufacturer's recommendation to ensure a tight and secure connection.
- I. Coordinate all work with Certified Arborist to minimize negative impacts to existing trees.

3.04 CLEANING

- J. Protect installed synthetic turf from subsequent construction operations.
- K. Do not permit traffic over unprotected floor surface.
- L. Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.
- M. All usable remnants of new material shall become the property of the Cincinnati Park Board.
- N. The Contractor shall keep the area clean throughout the project and clear of debris.
- O. Surfaces, recesses, enclosures, etc. shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

3.05 FINISHING

- P. Final Groom: The synthetic turf contractor will complete the final grooming of the surface. The final grooming shall consist of four passes by grooming equipment in each of the four directions. This process will ensure that the surface is available and safe for use.
- Q. Final Inspection: The synthetic turf contractor will conduct a final inspection of the sports surface with the Owner, general contractor, and Landscape Architect. During this inspection the entire surface shall be inspected. The synthetic turf contractor shall rectify any concerns regarding the surface to the general contractor.
- R. Upon Substantial Completion, provide owner with repair kits for each type of synthetic turf from the manufacturer.

END OF SECTION 32 18 17

SECTION 32 91 00**PLANTING PREPARATION****PART 1—GENERAL****1.1 SUMMARY**

- A. Work Included: Furnishing, preparation and placing of soil associated with disturbed or new vegetated areas.
- B. Furnish all labor, materials, facilities, transportation, testing and services to complete all construction and installation of all soil types and related Work as shown on the Drawings and specified herein.

1.2 RELATED SECTIONS AND DIVISIONS

- A. Applicable provisions of Division 1 shall govern Work in this section.
- B. Section 31 00 00 – Earthwork.
- C. Section 31 23 33 – Trenching and Backfilling.
- D. Section 32 92 23 – Sodding.
- E. Section 32 93 00 - Exterior Plants.
- F. Submittals are included in Section 01 33 00.

1.3 REFERENCES

- A. The publications listed below form a part of this Specifications to the extent referenced. The publications are referred to in the text by the basic designation only.
 1. ASTM D4427-92 – Standard Classification of Peat Samples by Laboratory Testing
 2. ASTM C136 – Sieve Analysis of Fine & Coarse Aggregates
 3. ASTM D3665 – Random Sampling of Construction Materials
 4. ASTM D2487-00 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 5. ASTM D854-02 – Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
 6. ASTM D2974-00 – Standard Test Methods for Moisture, Ash and Organic Matter of Peat and Other Organic Soils
 7. ASTM F1632-02 – Standard Test Method for Particle Size Analysis and Sand Shape Grading of Golf Course Putting Greens and Sports Field Rootzone Mixes
 8. ASTM F1647-02 – Standard Test Methods for Organic Matter Content of Putting Greens and Sports Field Root Zone Mixes (Method A & B)

- B. USDA Soil Texture Classification

Soil Particle	Size Range
Sand	0.075mm to < 2.0mm
Silt	0.075 mm to 0.002 mm
Clay	< 0.002mm

- C. Compost Maturity Index, California Compost Quality Council: June 2001

1.4 DEFINITIONS

- A. When used within this specification, the following definitions shall apply:
1. Owner's Testing Agency: An independent laboratory, with the experience and capability to conduct the testing indicated and that specializes in USDA agricultural soil testing, planting soil mixes, and the types of tests to be performed.
 2. Finish Grade: Elevation of finished surface of a planting mix.
 3. Subgrade: Surface or elevation of subsoil remaining after completing excavation or backfill of soils or other materials immediately beneath the planting mix.
 4. Compost: An organic material that has been aerobically composted and stabilized from feedstocks such as green waste (yard debris) or other suitable organic materials.
 5. Hardscape: All structural and fixed items such as concrete, cut stone, paving materials, lighting fixtures, benches and other fabricated items.
 6. Debris: Elements including, but not limited to, concrete, concrete masonry, wood, excavated rock and rock fragments, rubble, overburden soils, abandoned utility structures, trash, refuse, and litter.

1.5 SUBMITTALS

- A. Conform to requirements of applicable Division One and Division Two Specifications, General Conditions and Special Provisions.
- B. Bidder Qualifications: Contractor shall be actively and directly engaged in constructing natural grass and establishing planting beds for a period of five (5) or more years. Provide proof of three (3) such installations that have been in use for three (3) or more years. See 1.6A for Contractor qualification requirements and submit documentation to support those qualifications.
1. Any Contractor not able to meet the above requirement shall submit a statement of considerations that may qualify them as a qualified bidder. Items include, but are not limited to:
 - a. Description of similar type construction experience with names and phone numbers of client contact, date of installation, etc.
 - b. Resumes of personnel to be used on project.
 - c. Listing of type of equipment to be used on construction.
 2. Projected Schedule: Contractor shall submit a proposed schedule for the project. Planting windows should be taken into account for project schedule. See Section 32 93 00 Exterior Plants and Section 32 92 23 Sodding and Seeding for specified sections.
 3. The Landscape Architect shall review this information for acceptance or rejection of the proposed Contractor.
- C. Pre-Construction Soils Analysis: Prior to construction the Contractor shall submit the following to the Owner and Landscape Architect prior to ordering:
1. Soil composition, nutrient and pH analysis by a qualified soil-testing laboratory for test criteria listed in Section 2 for all soil types. A minimum of two (2) samples from each different soil area and type and from each on-site stockpile source and imported soil source is required. The laboratory analysis criteria for the accepted submittals will become the baseline for the acceptance or rejection of materials submitted during the quality control phase of the project during Construction.
 2. Report suitability of soils for plant growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce a satisfactory soil for each planting type (turf, perennials, natives, woody plant material, etc.).
 3. Submit samples a minimum of eight (8) weeks prior to the anticipated date of the start of soil installation.
 4. Location of source(s) of the material and past use of each of the source(s) shall be provided with the submittal for review.

- D. Testing During Construction: If there appears to be any change in soil material from point of supply and/or pre-construction soil analysis to on-site installation, the Owner and Landscape Architect reserve the right to require an in-situ soil test of the imported soil at the cost of the Contractor. If this shall be enforced, the following protocol shall be followed: Contractor shall submit a one-gallon sample of each different soil type in situ at the proper location and depth as indicated in the Drawings to the physical testing laboratory. These samples will then be compared with the approved material from the Pre-Construction baseline testing.
1. Payment for all testing is the responsibility of the Contractor. Any test which must be repeated on materials that have failed to meet Specifications or are as a result of shortages will be borne by the Contractor. The Contractor shall submit copies of all submittal forms and testing results from the testing laboratory to the Landscape Architect and Owner.
- E. Approved Testing Agents: The following firm is an acceptable testing agency for the various components. Other laboratories will need approval for material testing prior to testing.
1. Brookside Labs Inc.
 2. 200 White Mountain Dr
 3. New Bremen, Ohio 45869
 4. 419-977-2766
 5. www.blinc.com
- F. All soil analysis testing shall be performed on the most current, up-to-date samples of soils being prepared for use on the current project and within six (6) months of installation.
1. Test reports must include: date issued, project title and names of Contractor and supplier, location of material source and testing laboratory name, address and telephone number with name(s) as applicable of laboratory contact.
 2. Out-of-date or previous testing results from out-of-date stockpiles or previous supplier sources are not acceptable.
- G. Soil analysis requirement applies to all soil types within this project, including import soils and onsite soils.
- H. Submit product data on all pre-manufactured soil mixes and product literature showing certified chemical analysis of all soil amendments.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: The installer shall be a firm having at least five (5) years of experience of a scope similar to that required for the Work, including the preparation, mixing and installation of soil mixes to support planting.
1. The bidders list for Work under this section shall be approved by the Landscape Architect.
 2. Installer Field Supervision: When any Topsoil, Planting Soil, or Bioretention Soil Work is in progress, installer shall maintain, on-site, an experienced full-time supervisor who can communicate in English with the Landscape Architect.
 3. Installer's field supervisor shall have a minimum of five (5) years' experience as a field supervisor installing soil, shall be trained and proficient in the use of field surveying equipment to establish grades and can communicate in English with the Landscape Architect.
 4. The installer's crew shall be experienced in the installation of planting soil and plantings and interpretation of planting plans and soil installation plans.
 5. Submit references of past projects and employee training certifications that support that the Contractors meet all of the above installer qualifications and applicable licensures.
- B. Soil testing laboratory qualifications: An independent laboratory, with the experience and capability to conduct the testing indicated and that specializes in USDA agricultural soil testing, planting soil mixes, and the types of tests to be performed.

- C. All on-site, delivered, and installed soils shall conform to the approved submittals sample color, texture, and approved test analysis.
 - 1. If soil conditions appear to change during installation, the Owner or Landscape Architect may request samples of the delivered or installed soil be tested for analysis to confirm the soil conforms to the approved material. This would be in addition to the required in-situ soil tests.
 - 2. All testing shall be performed by the same soil lab that performed the original soil testing.
 - 3. Any soil that fails to meet the above criteria, if requested by the Owner or Landscape Architect, shall be removed and new soil installed.
- D. Soil compaction testing: Following installation or modification of soils, the acceptable compaction level shall be within the range of 75-85% by standard proctor method.

1.7 SITE CONDITIONS

- A. It is the responsibility of the Contractor to be aware of all surface and subsurface conditions, and to notify the Landscape Architect, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with Work until unsatisfactory conditions have been corrected.
 - 1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Landscape Architect in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Landscape Architect of such conditions, they shall remain responsible for plant material under the warrantee clause of the Specifications.
- B. Planting areas construction operations shall not be conducted under the following conditions:
 - 1. Freezing weather
 - 2. High winds
 - 3. Excessively wet conditions

1.8 DELIVERY, STORAGE, AND HANDLING

- A. General:
 - 1. Handle and store all products of this section in such a manner as to protect them from damage at all times.
 - 2. Storage of products on-site shall be coordinated by the Contractor in an orderly manner so as not to unnecessarily impede the Work or reasonable use of the project site.
- B. Fertilizers:
 - 1. Deliver in original, unopened containers with original labels intact and legible which state the guaranteed chemical analysis.
- C. Bulk Material:
 - 1. Coordinate delivery and storage of bulk material with Landscape Architect.
 - 2. Confine materials to neat piles in areas acceptable to Landscape Architect.

1.9 GUARANTY

- A. All Work executed and all materials provided under or used under this section shall be guaranteed to be free of defects and poor workmanship for a period of one (1) year after final acceptance.
- B. Repair all defective materials and Work as acceptable to the Landscape Architect during guaranty period.

PART 2-PRODUCTS

2.1 MATERIALS

- A. Topsoil: Existing soil can be reused for all turf areas if it meets the following criteria. The following performance criteria is to be used for imported topsoil and topsoil as part of specified planting soil mix:

1. A loamy, friable mineral soil essentially free from heavy or stiff clay lumps, stones, cinders, concrete, brick, roots, sticks brush, litter, plastics, metals, refuse or other deleterious materials in accordance with ASTM D 5286-92. The soil shall be free of herbicides, petroleum-based materials, or other substances of a hazardous or toxic nature which may inhibit plant growth. The soil shall be free of noxious weeds, seeds or vegetative parts of weedy plants that cannot be selectively controlled in the planting. Location of source(s) of the material and past use of each of the source(s) shall be provided with the submittal for review.
2. The soil shall be taken from the A horizon of a well-drained site and have a USDA soil texture classification of clay loam to loam within the allowable limits in the chart below. The organic content and particle size distribution shall be the result of natural soil formation. The topsoil shall have the following particle size distribution:

USDA Particle Name	Size (MM)	Allowable limit
Gravel	2.00 - 4.75	less than 5%
Sand	0.05 - 2.00	25 - 45 %
Silt	0.002 - 0.05	25 - 40 %
Clay	minus 0.002	15 - 30 %

- a. The topsoil shall meet the following Specifications. Perform the following tests and submit test reports showing the following criteria are met:
 - i. The USDA soil texture as defined above.
 - ii. pH range: 5.5 – 7.8
 - iii. Organic Matter (OM): 3 - 6%
 - iv. Soluble Salts: < 1.5 mmhos/cm
 - v. Available Nitrogen (N): OM levels: 3 – 8%
 - vi. Available Phosphorus (P): (using Bray test): 20 – 70 ppm (using Olsen test): 10 - 40 ppm
 - vii. Available Potassium (K): 150 – 300 ppm
 - viii. Available Calcium (Ca): pH levels: 5.5 – 7.5
 - ix. Available Magnesium (Mg): 60 – 300 ppm
 - x. Available Sulfur (S): 5 – 20 ppm
 - xi. CEC: pH levels: 5.5 – 7.5
 - xii. C:N: 10:1 to 20:1
- b. Provide certification from the supplier that the topsoil does not contain any toxic substances harmful to plant growth.
- c. Off-site (borrowed) topsoil meeting the criteria shown above must be used for the planting mix and their source or location communicated to the Landscape Architect.
- d. Soil nutrient/pH analysis to be performed by an agronomic soil testing agency; apply & incorporate any recommended fertilizers or soil amendments to achieve proper growing

conditions. Testing for topsoil suitability to meet these Specifications is the responsibility of the Contractor. Results to be supplied to Landscape Architect and Owner.

- a. Topsoil from the site may be used if it meets the above requirements. Additional topsoil shall be provided as required by Drawings and Specifications. Topsoil stockpiled from the site shall be tested and amended per the recommendations of the testing agency to meet the above requirements.
- B. Soil for Planting Beds and Trees
 - 1. Evans Supersoil or approved equal.
 - a. Evans Landscaping
 - b. 513-271-1119
 - c. 4229 Round Bottom Rd.
 - d. Cincinnati, OH 45244-1629
 - e. <https://www.evanslandscaping.com/product/supersoil/>
 - f. Depth: per plan
- C. Topsoil Supply & Sources
 - a. Adequate quantities of topsoil materials shall be provided to attain, after compaction and natural settlement, all design finish grades. Verify quantities for placement as specified to suit site conditions.
 - b. Stockpiles should be no more than six (6) feet in height to prevent anaerobic conditions within the pile.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows: Any application of lime recommended by Contractor must be substantiated by lab tests results approved by Landscape Architect.
 - 1. Class: Class T, with a minimum 99 percent passing through No. 8 (2.36-mm) sieve and a minimum 75 percent passing through No. 60 (0.25-mm) sieve.
 - 2. Class: Class O, with a minimum 95 percent passing through No. 8 (2.36-mm) sieve and a minimum 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 99 percent passing through No. 6 (3.35-mm) sieve and a maximum 10 percent passing through No. 40 (0.425-mm) sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 30-35 percent iron and 30-50 percent sulfur and supplied by a commercial fertilizer supplier.
- 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.

- J. Hydrogel: "Soil Moist"™ Hydro by JRM Chemical Inc. (1-800-962-4010) or approved equal. Applied and mixed according to manufacturer's recommendations.

2.3 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 3/4-inch (19-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 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 3.1 to 5.0.
- 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 at least 0.15 lb. (2.4 kg) of ammonium nitrate or 0.25 lb (4 kg) of ammonium sulfate per cubic foot (cubic meter) of loose sawdust or ground bark.
- E. Manure: Well-rotted, unbleached, 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.

2.4 FERTILIZER

- A. Do not apply any fertilizer other than compost to any area to be installed with plant plugs.
- B. Containing fifty percent of the elements derived from organic source; of proportion necessary to eliminate and deficiencies of topsoil, as indicated in analysis.
- C. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.
- D. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- E. 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.
- F. 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.
- G. Calcium nitrate: Agricultural grade containing 15-½ percent nitrogen.

2.5 HERBICIDE

- A. Pre-Emergent Herbicide: Granular type, Treflan or equal, to be applied at a rate per manufacturer's recommendation.

2.6 MULCHES

- A. Organic Mulch: Free from deleterious materials, locally harvested and produced, and suitable as a top dressing of trees and shrubs, all planting beds and tree plantings not in pavement shall be top dressed with 2" of approved hardwood mulch.

2.7 MISCELLANEOUS PRODUCTS

- A. Anti-desiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

PART 3-EXECUTION

3.1 SITE EXAMINATION

- A. Prior to installation of soils, examine site to confirm that existing conditions are satisfactory for the Work of this section to proceed.
 - 1. Confirm that the subgrade is at the proper elevation and compacted as required.
 - 2. Confirm that the surface of all areas to be filled with planting soils are free of construction debris, refuse, compressible or biodegradable materials, stones greater than two (2) inches in diameter, soil crusting films of silt or clay, and/or standing water. Remove unsuitable material from the site.
 - 3. Confirm no adverse drainage conditions are present.
 - 4. Confirm that no conditions are present which are detrimental to plant growth.
 - 5. Confirm that utility Work has been completed per the Drawings.
 - 6. Confirm that irrigation Work, which is shown to be installed below prepared soil levels, has been completed.
- B. If unsatisfactory conditions are encountered, notify the Landscape Architect immediately to determine corrective action before proceeding.

3.2 COORDINATION WITH PROJECT WORK

- A. The Contractor shall coordinate with all other Work that may impact the completion of the Work.
- B. Prior to the start of Work, prepare a detailed schedule of the Work for coordination with other trades.

3.3 INSTALLATION

- A. Sequencing of Work to Prevent Compaction
 - 1. All equipment utilized to install or grade planting soils shall be wide track or balloon tire machines rated with a ground pressure of 4 psi or less. All grading and soil delivery equipment shall have buckets equipped with 6" long teeth to scarify any soil that becomes compacted.
 - 2. Phase Work such that equipment to deliver or grade soil does not have to operate over previously installed soils. Work in rows of lifts the width of the extension of the bucket on the loader. Install all lifts in one row before proceeding to the next. Work out from the furthest part of each bed from the soil delivery point to the edge of each bed area.
 - 3. Where possible, place large trees first and fill planting soil around the root ball.

4. Where travel over installed soil is unavoidable, limit paths of traffic to reduce the impact of compaction in planting soil. Where possible, use plywood, steel or other approved sheeting as directed by Landscape Architect to protect soils beneath from compaction. Comply with the paragraph "Compaction Reduction" (section 3.03 B) in the event that soil becomes over compacted.
 5. The depths and grades shown on the Drawings are the final grades after settlement and shrinkage of the installed soils. The Contractor shall install all soils at a higher level to anticipate this reduction in soil volume. A minimum settlement of approximately 10-15% of the soil depth is expected.
 6. Maintain moisture conditions within the planting soils during installation or modification to allow for satisfactory compaction. Suspend operations if the soil becomes wet. Apply water if the soil is overly dry.
 7. Provide adequate equipment to achieve consistent and uniform compaction of the planting soils. Use the smallest equipment that can reasonably perform the task of spreading and compaction.
 8. DO NOT pass motorized equipment over previously installed and compacted soil except as authorized below.
 - a. Light weight equipment such as trenching machines or motorized wheelbarrows is permitted to pass over finished soil Work.
 - b. If Work after the installation and compaction of soil compacts the soil to levels greater than desired, follow the requirements of the paragraph "Over-Compaction Reduction" below.
- B. In performing this Work, Contractor shall avoid damage to any existing structures or features of the park or features under construction, such as drainage and irrigation systems. The Contractor at their own expense shall repair any such damage.
- C. Over-Compaction Reduction
1. Any soil that becomes compacted to a greater density than specified herein shall be dug up and reinstalled. See paragraph 1.6D "Soil-Compaction Testing" for acceptable compaction levels. This requirement includes compaction caused by other Sub-Contractors after the soil is installed and approved.
 2. Surface roto-tilling shall not be considered adequate to reduce over compaction at levels 6" or greater below finished grade.
- D. Topsoil & Planting Soil Mix Installation
1. 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.
 2. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas. Roll and rake, remove ridges, and fill depressions to meet finish grades.
 3. Protect structures, utilities, sidewalks, pavements, other facilities, and lawns and existing exterior plants from damage caused by soil installation operations.
- E. Planting soil mixes throughout the planting areas on-site shall then be carefully smoothed and compacted to the finished grade by alternately raking, watering, and rolling. The planting areas shall then be checked for irregularities and adjusted to a uniform grade. Compaction of the planting mixes shall be within the range of 85% to 90% and shall be tested via nuclear methods by the Geo-technical Engineer on the site during construction.
- F. Prevent contamination or mixing of planting soil mixes and subgrade soil material. Remove contaminated materials as directed by the Landscape Architect. Materials trucked into the site must be done in such a manner as not to alter the subgrade and/or damage drainage and irrigation ditches and systems. Materials shall be handled in a fashion to prevent the mixing of other soil and materials with the planting soil mixes.
1. Place topsoil during dry weather and on dry unfrozen subgrade.

2. Spread topsoil and rake until smooth.
3. Manually spread topsoil around trees, plants, and hardscapes to prevent damage.
4. While spreading topsoil, remove foreign materials, weeds and undesirable plants and their roots. Remove stones larger than 1" in any dimension. Legally dispose of all removed items off site property.
5. Grade topsoil to eliminate rough, low, or soft areas and to ensure positive drainage. Finished grade shall be within plus or minus 0.1 feet of the elevation shown on the Drawings.
6. Leave stockpile area and site clean and raked, ready to receive landscaping.
7. Soil type shall be placed to thicknesses, elevations, and locations as shown on the construction Drawings and details or as otherwise called out in the Specifications.

END OF SECTION 32 91 00

SECTION 32 92 23

SODDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Fertilizing.
- D. Sod and hydromulch installation

1.2 RELATED REQUIREMENTS

- A. Section 02 41 01 - Tree Preservation
- B. Section 31 00 00 – Earthwork
- C. Section 32 91 00 - Planting Preparation
- D. Section 32 93 00 - Exterior Plants

1.3 DEFINITIONS

- A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.4 REFERENCE STANDARDS

- A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; Turfgrass Producers International; 2006.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Certification: Submit certification of grass species and location(s) of sod source(s).
- C. Sod type(s): Provide data sheet(s) on contractor recommended sod for all turf types indicated on drawings to Landscape Architect.
- D. Submit manufacturers recommended installation process for all turf types.

1.6 QUALITY ASSURANCE

- A. Sod Producer: Company specializing in sod production and harvesting with minimum five years' experience on projects of similar size and scope, and certified by the State of Kentucky.
- B. Installer Qualifications: Company approved by the sod producer.

1.7 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of fertilizer and herbicide mixture.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sod on pallets in good condition to be approved by Landscape Architect. Protect exposed roots from dehydration.
- B. Do not deliver more sod than can be laid within 24 hours.

PART 2 - PRODUCTS

2.1 SOD

- A. Provide sod uniform pad sizes with maximum 5% deviation in either length or width. Broken pads or pads with uneven ends will not be acceptable. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10% of pad will be rejected.
- B. Certified turfgrass sod conforming to TPI specifications (or as identified here) for machine cut thickness, size, strength, moisture content, and mowed height, and free of weeds, stones, burned or bare spots, and undesirable native grasses. Provide viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.
- C. Soil thickness: Nominal 1/2 inch
- D. Sod to be well-rooted blend of turf type tall fescues (fine leaf fescues) comprised of three varieties. The turf shall be of sufficient density so that no surface soil is visible when mowed to a height of 1.5". Maximum mowing height is 2.0".
- E. Sod Mixture:
 - 1. Blue Grass: 10 percent.
 - 2. Fine Leaf Fescue Grass: 90 percent.
- F. Harvesting Sod:
 - 1. Machine cut sod and load on pallets in accordance with TPI Guidelines.
 - 2. Cut sod in area not exceeding 1 sq yd (1 sq m), with minimum 1/2 inch (13 mm) and maximum 1 inch (25 mm) topsoil base.
- G. Topsoil: See topsoil requirements in the drawings and specifications.
- H. Fertilizer: Recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.
- I. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.2 SOURCE QUALITY CONTROL

- A. Provide analysis of topsoil fill under provisions of Section 01 4000.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

- C. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

2.3 MULCH

- A. Hydromulch: Wood fiber type Applegate Mulch Wood-Lok BFM (www.applegatemulch.com) or approved equal.
 - 1. Hydromulch shall consist of long strands of virgin wood fibers made from fresh cut, clean whole wood chips, with extra holding power of a high strength, non-toxic, hydrocolloid-based binder. Hydromulch shall not dissolve or disperse when rewetted.
 - 2. The hydromulch system shall spray on like mulch and form a blanket that adheres to the soil and shall be 100% biodegradable. The hydromulch shall be green in color to allow visual of even application.
 - 3. Hydromulch shall have the following components:
 - a. Moisture content: 12% (+/- 3%)
 - b. Organic matter (oven dried basis): 99.3% (+/- 0.2%)
 - c. Ash content (oven dried basis): 0.7% (+/- 0.2%)
 - d. pH @ 3% concentration: 4.8% (+/- 0.5%)
 - e. Water holding capacity (per 100 grams oven dry fiber): min 1,250 grams
 - f. Color: Green
 - g. Tackifier content (based on total weight): 10%
 - 4. Pre-approved supplier:
 - a. Applegate Mulch, Model: Wood-Lok BFM, Webberville, MI 48892, (800) 627-7536, www.applegatemulch.com
 - b. Equals will be considered on a pre-approved basis only.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this section.

3.2 PREPARATION

- A. Prepare subgrade in accordance with Section 31 0000.
- B. Place planting soil in accordance with Section 31 9100.

3.3 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 48 hours before laying sod.
- D. Mix thoroughly into upper 2 inches (50 mm) of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.4 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.

- B. Lay sod immediately after delivery to site to prevent deterioration.
- C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches (300 mm) minimum. Do not stretch or overlap sod pieces.
- D. Where new sod adjoins existing grass areas, align top surfaces.
- E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch (13 mm) below top of hard surface.
- F. Water sodded areas immediately after installation. Saturate sod to 4 inches (100 mm) of soil.
- G. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.5 MAINTENANCE

- A. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition and well rooted, is free of weeds, and does not have any signs of insect infestation or disease that may have been transported from the growing source.
- B. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches (65 mm). Do not cut more than 1/3 of grass blade at anyone mowing.
- C. Water to prevent grass and soil from drying out.
- D. Roll sod surface to remove irregularities.
- E. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- F. Immediately replace sod to areas that show deterioration or bare spots.
- G. Maintenance period shall end after acceptance by Landscape Architect. Sod shall have an extended 90 day warranty after acceptance in first growing season against infection of disease and insects.

END OF SECTION 32 92 23

SECTION 32 93 00

EXTERIOR PLANTS

PART 1—GENERAL

1.1 SECTION INCLUDES

- A. Preparation of plant beds and holes for plants
- B. Exterior Plants: Trees, shrubs, groundcover, bulbs, and perennials
- C. Boulders and Landscape Stone
- D. Backfill Soils and Soil Amendments
- E. Mulches

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- B. Section 02 41 01 - Tree Preservation
- C. Section 31 00 00 – Earthwork
- D. Section 32 91 00 - Planting Preparation
- E. Section 32 92 23 –Sodding
- F. This Work shall be performed in all areas required by the Drawings or directed by the Landscape Architect, applying to exterior plants as outlined in Part 2 of this Section.

1.3 DEFINITIONS

- A. Balled and Burlapped Stock: Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size is subject to meeting ANSI Z60.1 limitations for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum laced as recommended by ANSI Z60.1.
- B. Balled and Potted Stock: Exterior plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is subject to meeting ANSI Z60.1 limitations for type and size of tree or shrub required.
- 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 kind, type, and size of exterior plant required.
- D. Finish Grade: Surface or elevation of soil remaining after topsoil/planting mix has been spread to the specified depth on Drawings.

- E. Topsoil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- F. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Certificates: For each type of manufactured product, signed by product 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.
- C. Qualification Data: Statement of Landscape Installer qualifications in performing urban park landscape installations of similar size/scope with a minimum of ten (10) years' experience and provide proof of five (5) or more successful examples of similar projects within the Louisville Metropolitan region.
- D. Material List: Provide list of each landscape material (trees, shrubs, perennials, groundcover, bulb, seed) and identify intended type and nursery source.
- E. Soil Test Reports: Reports of on-site and imported soil and list of proposed amendments, including application rates, for each type of planting.
- F. Planting Schedule: Indicate expected delivery and installation dates for each type of landscape Work, during seasons identified for such Work.
- G. Maintenance Instructions: Typewritten recommended seasonal procedures to be established by Owner for maintenance of exterior plants during a calendar year. Include recommendations for care of trees, shrubs, perennials, and turfgrass to promote healthy, vigorous growth and avoid susceptibility to disease. Submit before expiration of required maintenance periods.
- H. Soil Amendment and Fertilizer Certification: Manufacturers' statements for soil amendments and fertilizer materials certifying that products conform to specified requirements.
- I. Topsoil Certification: If topsoil is needed from an off-site source, before delivery of topsoil, submit written statement giving location of properties from which topsoil is to be obtained, names and addresses of Owners, depth to be stripped, and crops grown during the past two (2) years.
- J. Tree Certification: Signed statement by nursery certifying that plants conform to specified requirements.
- K. Sod Certification: Signed statement by sod producer certifying that sod conforms to specified requirements. Include name, address, and telephone number of sod producer.
- L. Photographs of Trees: Submit images within fourteen (14) days of proposed field inspections of each plant species of each size and each quality grade clearly showing the full range of variations between the grades. Trees may be tagged by the Landscape Architect and Owner at nursery.
 - 1. Scale: Include a yardstick in each photograph to provide scale.
 - 2. Background: Ensure form and condition of plant is clear from background. Photographs of tree canopies that are bound with twine are not acceptable.
 - 3. Identification: Provide the following information:

- a. Name of Project and Owner
 - b. Name and address of grower
 - c. Date photograph was taken
 - d. Species name and quality grade
 - e. Date tree was dug or will be dug
- M. Photographs of Landscape Stone Material
 - 1. Contractor shall submit photos to the landscape architect of sample color, size, and character of landscape stone. Landscape stone shall be free of mud and gravel at time of photo.
- N. Topsoil Analysis: Contractor shall 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. A minimum of two (2) samples from each different soil area and from each imported soil source is required.
 - 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 a satisfactory topsoil.
 - 2. Submit soil analyses to Landscape Architect for review prior to soil preparation.
 - 3. Soil analysis requirement applies to all soils and conditions within this project, including import soils and on-grade soils.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer with ten (10) years' experience (minimum) who have completed urban park Work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment. Qualified landscape installer must provide five (5) or more successful installations of similar size and scope.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when exterior 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. Provide consistent quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock." Trees and shrubs that are proposed to be in groupings shall be selected for consistent form and character.
- D. 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 (150 mm) above ground for trees up to 4-inch (100-mm) caliper size, and 12-inches (300 mm) above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.
- E. Observation: Landscape Architect 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. Landscape Architect 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 Landscape Architect of sources of planting materials ten (10) days in advance of delivery to site.
- F. Allowance for losses: Grow or locate additional plants to ensure that the contract quantities shall be achieved after normal production losses from natural causes, breakage, natural random

non-conformities, transplant shock and/or delivery damage. Replace any plants that are damaged, fail, or are rejected.

- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver exterior plants freshly dug. Keep plants moist.
- B. Do not prune trees and shrubs before delivery, except as approved by Landscape Architect. 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.
- C. Handle planting stock by root ball while supporting the stem.
- D. Deliver trees and shrubs after preparations for planting have been completed and install immediately. If planting is delayed more than six (6) hours after delivery, set exterior 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 exterior plants stored on-site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.
- E. Package Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

1.7 COORDINATION

- A. Planting Installation Schedule: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Deciduous and Evergreen Material: March 1st to May 30th or September 15 to December 15th
 - 2. Herbaceous Material: March 1st to May 30th or September 15- October 31
 - 3. Bulbs: September 15- December 15
 - 4. Other planting times may be considered with prior approval; if the plant material is dormant, or if plant material has been dug during dormancy and has been maintained in a holding area for at least 2 weeks and not more than six (6) weeks without signs of wilting, scorching or other signs of stress.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit. Planting will not be permitted if sufficient soil moisture is absent, if soil is too wet/muddy, or if ground is frozen.
- C. Coordination with Lawns: Plant trees and shrubs after finish grades are established and before planting lawns, unless otherwise acceptable to Landscape Architect.
- D. When planting trees and shrubs after lawns, protect lawn areas and promptly repair damage caused by planting operations.

- E. Coordinate planting operations with the locations of underground utilities, Contractor is to contact the utility location service. Contractor is to coordinate Work with other trades and with the general Contractor to protect private underground utilities in the area. Contractor is responsible for the repair or replacement of any utilities.
- F. Landscape Contractor is responsible for verifying all required topsoil is in place before the planting operation commences. Plant material may have to be removed due to insufficient topsoil for no additional cost.
- G. Coordination with Landscape Architect: Unless noted, tree locations, shrub, groundcover, and bulb/perennial/annual bed locations are approximate. Contractor shall stake as indicated below:
 - 1. Trees: Stake out all tree locations in field using colored flags for each different tree species for review by the Landscape Architect prior to excavation. Landscape Architect reserves the right to adjust plants to exact location in the field.
 - 2. Shrubs, groundcover, and perennial/annual beds: Bed layouts shall be staked for review by Landscape Architect prior to installation. Landscape Architect reserves the right to adjust plants to exact location in the field. Do not disturb root zones or existing trees for planting bed preparation.
 - 3. Boulders: Contractor shall stake boulders according to design intent on Drawings. Landscape Architect to review boulder placement and orientation of individual boulders.

1.8 WARRANTY

- A. Special Warranty: Warrant the following exterior plants, for the warranty period indicated, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, or incidents that are beyond Contractor's control.
 - 1. Warranty Period for Trees and Shrubs: Two (2) years from date of Substantial Completion.
 - 2. Warranty Period for Ground Cover, and Perennials: One (1) year from date of Substantial Completion.
- B. Remove dead exterior plants immediately. Replace immediately unless required to plant in the succeeding planting season.
- C. Replace exterior plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period as directed by Landscape Architect.
- D. A limit of one (1) replacement of each exterior plant will be required, except for losses or replacements due to failure to comply with requirements.
- E. There will be no exceptions to the warranty. Contractor accepts responsibility for all materials specified unless objections to a source or species is raised by the Contractor to the Landscape Architect before commencement of the Work. This includes all project planting conditions.

1.9 MAINTENANCE

- A. Trees and Shrubs: Maintain for the following maintenance period by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings.
 - 1. Maintenance Period for General Landscape Planting: One (1) year - At that time, the Owner will accept responsibility for maintenance.

- B. All plant material shall be maintained in a healthy and growing condition and must be replaced with plant material of similar variety and size if damaged, destroyed, or removed.

1.10 PROJECT CONDITIONS

- A. Coordinate excavation and plant installation with location of above grade and underground utilities, which will avoid damage.
 - 1. Hand-excavate as required.
 - 2. Maintain grade stakes until removal is mutually agreed upon by parties concerned. Contractor is liable for the repair of any utility damaged by their Work at no additional costs to the Owner.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before planting.
- C. Erosion Control: All erosion control matting to be installed before seeding begins. See construction manager for all sediment and erosion control.
- D. Utilities: Determine location of aboveground and underground utilities and perform Work in a manner which will avoid damage. Hand-excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned. Contractor is liable for the repair of any utility damage by their Work at no additional cost.
- E. Landscaped areas shall be kept free of trash, litter, and weeds at all times during construction.
- F. Existing Trees: Install new plants under or adjacent to existing trees without causing damage to the existing trees (trunk, canopy, roots). Do not till to prepare beds under trees and refer to special planting details in the Drawings for planting methods to limit disturbance. Adjust layout as necessary to avoid roots as approved by the Landscape Architect.

1.11 ENVIRONMENTAL CONDITIONS

- A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.
- B. Do not install plants when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

PART 2—PRODUCTS

2.1 TREE 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. Plant material should be selected from material grown in like hardiness zone to the project.
 - 1. Trees should have one main straight leader limbed to the height specified in the planting schedule, a well-balanced crown, and height and caliper as indicated in planting schedule.
 - 2. Branching Height: As noted in the Plant Schedule.
- B. Grade: Provide trees of sizes and grades complying with ANSI Z60.1 for type of trees required. Trees of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.

- C. Label at least one (1) tree of each variety and caliper with a securely attached waterproof tag bearing legible designation of botanical and common name.
- D. If formal arrangements or consecutive order of trees is shown, select stock for uniform character, height and spread, and number label to assure symmetry in planting.
- E. Tree Root Union: Trees will not be accepted if the Tree Root Union has been buried. Trees must be harvested that have had the tree root union uncovered prior to digging. Root ball size must meet standards, shaving off excess soil from root ball after digging of tree will not be accepted. Failure to comply with this requirement is cause for rejection of affected plant material.

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.
 - 1. Provide balled and burlapped trees.
 - 2. Branching Height: One-third to one-half of tree height.
- B. Small 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: as noted on the Drawings.
 - 2. Provide balled and burlapped trees.
- C. Multistem 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: Clump.
 - 2. Provide balled and burlapped trees.

2.3 DECIDUOUS SHRUBS

- A. Form and Size: Deciduous 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.
- B. Label at least one (1) shrub of each variety with a securely attached, waterproof tag bearing legible designation of botanical and common name.

2.4 GROUNDCOVER PLANTS

- A. Groundcover: Provide groundcover of species indicated, established and well-rooted in pots or similar containers, and complying with ANSI Z60.1.

2.5 PLANTS

- A. Perennials and Grasses: See pot sizes specified in plant schedule; Provide healthy, field-grown plants from a commercial nursery, of species and variety shown on plan.

PART 3-EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive exterior plants for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SITE PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior 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 exterior planting. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before planting. Make minor adjustments as required.
 - 1. Unless noted, tree locations on Drawings are approximate. Contractor shall stake out all tree locations in the field using colored flags for each different tree species for review by Landscape Architect prior to excavation. Landscape Architect reserves the right to adjust plants to exact location in field.
- D. Apply anti-desiccant to trees and shrubs using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
 - 1. If deciduous trees or shrubs are moved in full leaf, spray with anti-desiccant at nursery before moving and again two weeks after planting.

3.3 PREPARATION OF TREE, SHRUB, & GROUNDCOVER AREAS

- A. In areas where new plantings are within existing tree dripline, no site preparation that will damage or expose roots should be done. See landscape Drawings for these locations. Remove undesirable materials and excavate area only enough to install shrub and use native topsoil to backfill.
- B. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Remove foreign materials, weeds, and undesirable plants and their roots. Remove contaminated subsoil. Remove stones larger than 1" in any dimension. Remove sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- D. Scarify subsoil to a depth of 8" where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.
- E. Finish grades of all landscape areas shall be 1" below adjacent curb or pavement. In areas where 2" mulch is to be applied finish soil grades shall be 2" below adjacent curb or pavement, mulch surface shall be flush with adjacent curb or pavement.
- F. Spread topsoil to the depth indicated on plans and 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.

1. Spread approximately one-half the thickness of topsoil over loosened subgrade. Mix thoroughly into top 4" of subgrade. Spread remainder of topsoil.
- G. After topsoil is spread, apply soil amendments and fertilizer on surface and thoroughly blend topsoil.
 1. Delay mixing fertilizer with topsoil if planting will not proceed within a few days.
 2. Mix lime (if needed) with dry soil before mixing fertilizer.
- H. Apply pre-emergent herbicide to all planting beds prior to plant installation. Follow manufacturer's recommendations on application. Do not apply pre-emergent herbicide to areas where plugs will be installed.
- I. Dig pits and beds for shrubs 6" larger than plant root system and at least 6' in diameter for trees.
- J. Restore planting beds if eroded or otherwise disturbed after finish grading and before planting.

3.4 TREE AND SHRUB INSTALLATION

- A. Excavation
 1. In areas where new plantings are within existing tree dripline excavate area only enough to install shrub and use native topsoil to backfill.
 2. 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.
 - a. Excavate approximately two (2) times as wide as ball diameter for balled and burlapped/container-grown stock.
 - b. Excavate at least 12" wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 - c. If drain tile is shown or required under planted areas, excavate to top of porous backfill over tile.
 3. Subsoil removed from excavations may be used as backfill.
 4. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 - a. Hardpan Layer: Drill 6" diameter holes into free-draining strata or to a depth of ten (10) feet, whichever is less, and backfill with free-draining material.
 5. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.
- B. Planting
 1. Plant Placement: Plant spacing is as indicated on 'Plant Schedule' unless otherwise noted. It is the Contractor's responsibility to provide full coverage in all planting areas as specified in the plant schedule remarks.
 - a. Align and equally space in all directions all trees, shrubs, groundcover, bulbs, and plugs as noted in the Drawings.
 2. Set balled and burlapped stock plumb and in center of pit or trench with top of root crown 2" (50 mm) above adjacent finish grades.
 - a. Remove burlap, rope, container and/or wire baskets from top 1/3rd of root balls and partially from sides, but do not remove from burlap 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.
 - b. Place topsoil 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 topsoil.

3. Dish and tamp top of backfill to form a 3" high saucer around the rim of the pit. Do not cover top of root ball with backfill.
 4. Wrap trees of 2" caliper and larger with trunk-wrap tape. Start at base of trunk and spiral cover trunk to height of first branches. Overlap wrap, exposing half the width, and securely attach without causing girdling. Inspect tree trunks for injury, improper pruning, and insect infestation; take corrective measures required before wrapping.
 5. Chafing Guards: Remove guards as soon as the tree can stand alone, about 3 months or longer if needed.
- C. Pruning
1. Prune, thin, and shape trees and shrubs as directed by Landscape Architect according to standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.

3.5 GROUNDCOVER INSTALLATION

- A. Set out and space ground cover and plants as indicated on planting plans.
- B. Dig holes large enough to allow spreading of roots and backfill with planting soil.
- C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- E. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.6 CLEANUP AND PROTECTION

- A. During exterior planting, keep adjacent pavement and construction clean and Work area in an orderly condition. In particular, protect porous hardscape areas from dirt, silt, and mulch.
- B. Protect exterior 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 exterior planting.

3.7 OBSERVATION AND ACCEPTANCE

- A. Observation: A field verification must be completed by the Landscape Architect of performance of landscape Work defined by Contract Documents. Observation visits may be made by the Landscape Architect at any time throughout the landscape installation.
- B. Substantial Acceptance: The acknowledgement by the Landscape Architect that the landscape Work defined by the plans and Specifications is substantially complete. The Landscape Architect shall provide the Contractor with a written punch list indicating items to be corrected or completed by the Contractor within two (2) weeks of notification.
 1. Substantial Acceptance site review is requested by the Contractor when they believe that the landscape installation meets all the requirements of the plans and Specifications.
 2. If the project is found to be substantially complete by the Landscape Architect, then Substantial Acceptance will be acknowledged by the Landscape Architect in the punch list.

- C. Final Acceptance: Following substantial acceptance, the date of the Final Acceptance shall be when the Owner and the Landscape Architect verify on site that all the items on the punch list have been completed and/or corrected by the Contractor.

3.8 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 32 93 00

SECTION 32 94 10
LANDSCAPE STONE

PART 1—GENERAL

1.01 SUMMARY

- A. Landscape Stone.

1.02 RELATED SECTIONS AND DIVISIONS

- A. Applicable provisions of Division 1 shall govern work in this Section.
- B. Section 31 23 16 – Excavation, Trenching, Backfilling and Grading
- C. Section 32 91 00 - Planting Preparation
- D. Section 32 92 23 – Sodding
- E. This work shall be performed in all areas required by the drawings or directed by the Landscape Architect.

1.03 PAYMENT

- A. Payment for furnishing and installation of landscape stone type 1 – 7 shall be paid by the unit price bid per ton.

1.04 DEFINITIONS

- A. Finish Grade: Surface or elevation of soil remaining after topsoil has been spread to the specified depth on drawings.

1.05 SUBMITTALS

- A. See Section 01 33 00 – Submittal for submittal procedures.
- B. Product Data: For each type of product indicated.
- C. Product Certificates: For each type of manufactured product, signed by product 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. Qualification Data: Statement of landscape Installer qualifications in performing landscape stone installations with a minimum of five (5) years experience and provide proof of five or more successful landscape examples to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, photographs of completed projects, names and address of Architects/Engineers and Owners, and other information specified. See "Quality Assurance" article in this section for additional Contractor requirements.
- E. Material List: Provide list of each landscape stone and identify intended type and source.
- F. Maintenance Instructions: Typewritten recommended seasonal procedures to be established by Owner for maintenance of landscape stone during a calendar year.
- G. Photographs of Stone Material
 - 1. Contractor shall submit photos to the Landscape Architect of sample color, size and character of boulders and stone steps. Stones shall be free of mud and gravel at time of photo.
 - 2. Contractor to provide representative samples of each type of stone

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape stone installer with five years experience (minimum) who have completed landscape work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment. Qualified landscape installer must provide five or more successful landscape installations.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
- B. Provide consistent quality, size, and variety of landscape stone indicated.
- C. Observation: Landscape Architect may observe stone either at place of origin or at site before placement for compliance with requirements for size, uniformity, color, type and quality.
 - 1. Notify Landscape Architect of sources of landscape stone material 10 days in advance of delivery to site.
- D. Allowance for losses: Replace any stone that is damaged or rejected.
- E. Pre-installation Conference: Conduct conference at Project site prior to work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall carefully transport and handle stone to avoid marring, scratching, chipping or breaking. Damaged stone will be rejected at the job site.

1.08 COORDINATION

- A. Coordination with Planting: Install stone before plant material and seeding installations to prevent plant material damage.
- B. Stone installer is responsible for verifying stone foundations meet drawing requirements prior to stone placement.

- C. Stone installer is responsible for verifying all finished grade in area of stone locations.

1.09 WARRANTY

- A. There will be no exceptions to the warranty. Contractor accepts responsibility for all materials specified.

PART 2– PRODUCTS

2.01 GENERAL

- A. Landscape Stone shall be free from structural defects, such as seams of shale, and have a similar durability to riprap (See Section 35 42 37 2.02 A).

2.02 BOULDERS:

- A. Color: Predominately gray with brown and tan highlights
- B. Size: 24"-48" length; on 6" AASHTO NO. 67 sub-base
- C. Basis of Design: Semco Outdoors Glacial Granite Boulders

2.03 STONE STEPS:

- A. Color: Predominately gray with brown and tan highlights
- B. Size: 5"-8" thick x 12"-18" depth x 36" length; on 12" AASHTO NO. 67 sub-base
- C. Basis of Design: Semco Outdoors Canyon Gray

PART 3– EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive landscape stones for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SITE PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by stone installation.
- 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. All stone shall be cleaned prior to placing or installing mastic for stones that will be stacked.

- D. Stacked stones are to be stable and fixed without movement - High strength grout between stones may be required.
- E. Hold back grout or epoxy from the edge of stones

3.03 CLEANUP AND PROTECTION

- A. During landscape stone installation, keep adjacent paving and construction site clean and work area in an orderly condition.
- B. Protect landscape stone from damage due to landscape operations, operations by other Contractors and trades, and others.

3.04 OBSERVATION AND ACCEPTANCE

- A. Observation: a field verification must be completed by the Landscape Architect of performance of landscape work defined by Contract Documents. Observation visits may be made by the Landscape Architect at any time throughout the landscape installation.
- B. Substantial Acceptance: the acknowledgement by the Landscape Architect that the landscape work defined by the plans and specifications is substantially complete. The Landscape Architect shall provide the Contractor with written punch list indicating items to be corrected or completed by the Contractor within two (2) weeks of notification.
 - 1. Substantial Acceptance site review is requested by the Contractor when he/ she believes that the landscape installation meets all the requirements of the plans and specifications.
 - 2. If the project is found to be substantially complete by the Landscape Architect, then Substantial Acceptance will be acknowledged by the Landscape Architect in the punch list.
- C. Final Acceptance: following substantial acceptance, the date of the Final Acceptance shall be when the Owner's Representative and the Landscape Architect verify on site that all the items on the punch list have been completed and/or corrected by the Contractor.

3.05 DISPOSAL

- A. Disposal: Remove surplus material and legally dispose of them off Owner's property.

3.06 MAINTENANCE

- A. After installation, Contractor is responsible for ensuing stone stability and movement until substantial completion. No stone should rock or move after placement.

END OF SECTION 32 94 10

BID FORMS

The bid forms are not available online. The bid forms are available only by purchasing a set of plans and specifications at the location indicated in the Legal Notice – Invitation to Bid.