REQUEST FOR PROPOSALS

Item Description: HARRIET AND SAYLES PARK & M.E. FOGARTY
GREEN SCHOOLYARDS COMPLEX

Date to be opened: June 21, 2022

Issuing Department: PARKS DEPARTMENT

QUESTIONS

- Please direct questions relative to the bidding process, how to fill out forms, and how to submit a bid (Pages 1-8) to Purchasing Agent Patti Jordan.
  - Phone: (401) 680-5264
  - Email: pjordan@providenceri.gov
    - Please use the subject line “RFP Question”
- Please direct questions relative to the Minority and Women’s Business Enterprise Program and the corresponding forms (Pages 9-13) to the MBE/WBE Outreach Director for the City of Providence, Grace Diaz
  - Phone: (401) 680-5766
  - Email: gdiaz@providenceri.gov
    - Please use subject line “MBE WBE Forms”
- Please direct questions relative to the specifications outlined (beginning on page 14) to the issuing department’s subject matter expert:
  - Megan Gardner – Landscape Architect
  - 401-248-5044
  - Mgardner@providenceri.gov

Pre-bid Conference (NON-MANDATORY)
To be held Wednesday June 8, 9:00 AM
370 Sayles St, PROVIDENCE, RI (SITE)
INSTRUCTIONS FOR SUBMISSION

Bids may be submitted up to **2:15 P.M.** on the above meeting date at the **Department of the City Clerk, Room 311, City Hall, 25 Dorrance Street, Providence.** At 2:15 P.M. all bids will be publicly opened and read at the Board of Contract Meeting in the City Council Chambers, on the 3rd floor of City Hall.

- Bidders must submit **2 copies** of their bid in sealed envelopes or packages labeled with the captioned **Item Description** and the **City Department to which the RFP and bid are related.** (On page 1)
- Communications to the Board of Contract and Supply that are not competitive sealed bids (i.e. product information/samples) should have “**NOT A BID**” written on the envelope or wrapper.
- Only use form versions and templates included in this RFP. If you have an old version of a form do not recycle it for use in this bid.
- The bid envelope and information relative to the bid must be addressed to:

  Board of Contract and Supply  
  Department of the City Clerk – City Hall, Room 311  
  25 Dorrance Street  
  Providence, RI 02903

**PLEASE NOTE:** This bid may include details regarding information that you will need to provide (such as proof of licenses) to the issuing department before the formalization of an award.

This information is **NOT** requested to be provided in your initial bid by design.

All bids submitted to the City Clerk become public record. Failure to follow instructions could result in information considered private being posted to the city’s Open Meetings Portal and made available as a public record. The City has made a conscious effort to avoid the posting of sensitive information on the City’s Open Meetings Portal, by requesting that such sensitive information be submitted to the issuing department only at their request.
BID PACKAGE CHECKLIST

Digital forms are available in the City of Providence Purchasing Department Office or online at http://www.providenceri.gov/purchasing/how-to-submit-a-bid/

The bid package MUST include the following, in this order:

- Bid Form 1: Bidder's Blank as the cover page/ 1st page (see page 6 of this document)
- Bid Form 2: Certification of Bidder as 2nd page (see page 7 of this document)
- Certificate Regarding Public Records (see page 8 of this document)
- Forms from the Minority and Women Business Enterprise Program: Based on Bidder Category. See forms and instructions enclosed (pages 9-13) or on: https://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/

*Please note: MBE/WBE forms must be completed for EVERY bid submitted and must be inclusive of ALL required signatures. Forms without all required signatures will be considered incomplete.

- Bidder’s Proposal/Packet: Formal response to the specifications outlined in this RFP, including pricing information and details related to the good(s) or service(s) being provided. Please be mindful of formatting responses as requested to ensure clarity.
- Financial Assurance, if requested (as indicated on page 5 of this document under “Bid Terms”)

All of the above listed documents are REQUIRED. (With the exception of financial assurances, which are only required if specified on page 5.)

***Failure to meet specified deadlines, follow specific submission instructions, or enclose all required documents with all applicable signatures will result in disqualification, or in an inability to appropriately evaluate bids.
NOTICE TO VENDORS

1. The Board of Contract and Supply will make the award to the lowest qualified and responsible bidder.
2. In determining the lowest responsible bidder, cash discounts based on preferable payment terms will not be considered.
3. Where prices are the same, the Board of Contract and Supply reserves the right to award to one bidder, or to split the award.
4. No proposal will be accepted if the bid is made in collusion with any other bidder.
5. Bids may be submitted on an “equal in quality” basis. The City reserves the right to decide equality. Bidders must indicate brand or the make being offered and submit detailed specifications if other than brand requested.
6. A bidder who is an out-of-state corporation shall qualify or register to transact business in this State, in accordance with the Rhode Island Business Corporation Act, RIGL Sec. 7-1.2-1401, et seq.
7. The Board of Contract and Supply reserves the right to reject any and all bids.
8. Competing bids may be viewed in person at the Department of the City Clerk, City Hall, Providence, immediately upon the conclusion of the formal Board of Contract and Supply meeting during which the bids were unsealed/opened. Bids may also be accessed electronically on the internet via the City’s Open Meetings Portal.
9. As the City of Providence is exempt from the payment of Federal Excise Taxes and Rhode Island Sales Tax, prices quoted are not to include these taxes.
10. In case of error in the extension of prices quoted, the unit price will govern.
11. The contractor will NOT be permitted to: a) assign or underlet the contract, or b) assign either legally or equitably any monies or any claim thereto without the previous written consent of the City Purchasing Director.
12. Delivery dates must be shown in the bid. If no delivery date is specified, it will be assumed that an immediate delivery from stock will be made.
13. A certificate of insurance will normally be required of a successful vendor.
14. For many contracts involving construction, alteration and/or repair work, State law provisions concerning payment of prevailing wage rates apply (RIGL Sec. 37-13-1 et seq.).
15. No goods should be delivered or work started without a Purchase Order.
16. Submit 2 copies of the bid to the City Clerk, unless the specification section of this document indicates otherwise.
17. Bidder must certify that it does not unlawfully discriminate on the basis of race, color, national origin, gender, gender identity or expression, sexual orientation and/or religion in its business and hiring practices and that all of its employees are lawfully employed under all applicable federal, state and local laws, rules and regulations. (See Bid Form 2.)
BID TERMS

1. Financial assurances may be required in order to be a successful bidder for Commodity or Construction and Service contracts. If either of the first two checkboxes below is checked, the specified assurance must accompany a bid, or the bid will not be considered by the Board of Contract and Supply. The third checkbox indicates the lowest responsible bidder will be contacted and required to post a bond to be awarded the contract.

   a) □ A certified check for $____ must be deposited with the City Clerk as a guarantee that the Contract will be signed and delivered by the bidder.

   b) ☑ A bid bond in the amount of 5% per centum (%) of the proposed total price, must be deposited with the City Clerk as a guarantee that the contract will be signed and delivered by the bidder; and the amount of such bid bond shall be retained for the use of the City as liquidated damages in case of default.

   c) ☑ A performance and payment bond with a satisfactory surety company will be posted by the bidder in a sum equal to one hundred per centum (100%) of the awarded contract.

   d) □ No financial assurance is necessary for this item.

2. Awards will be made within sixty (60) days of bid opening. All bid prices will be considered firm, unless qualified otherwise. Requests for price increases will not be honored.

3. Failure to deliver within the time quoted or failure to meet specifications may result in default in accordance with the general specifications. It is agreed that deliveries and/or completion are subject to strikes, lockouts, accidents and Acts of God.

The following entry applies only for COMMODITY BID TERMS:

4. Payment for partial delivery will not be allowed except when provided for in blanket or term contracts.

The following entries apply only for CONSTRUCTION AND SERVICE BID TERMS:

5. Only one shipping charge will be applied in the event of partial deliveries for blanket or term contracts.

6. Prior to commencing performance under the contract, the successful bidder shall attest to compliance with the provisions of the Rhode Island Worker’s Compensation Act, RIGL 28-29-1, et seq. If exempt from compliance, the successful bidder shall submit a sworn Affidavit by a corporate officer to that effect, which shall accompany the signed contract.

7. Prior to commencing performance under the contract, the successful bidder shall, submit a certificate of insurance, in a form and in an amount satisfactory to the City.
BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

BID FORM 1: Bidders Blank

1. Bids must meet the attached specifications. Any exceptions or modifications must be noted and fully explained.
2. Bidder’s responses must be in ink or typewritten, and all blanks on the bid form should be completed.
3. The price or prices proposed should be stated both in WRITING and in FIGURES, and any proposal not so stated may be rejected. Contracts exceeding twelve months must specify annual costs for each year.
4. Bids SHOULD BE TOTALED so that the final cost is clearly stated (unless submitting a unit price bid), however each item should be priced individually. Do not group items. Awards may be made on the basis of total bid or by individual items.
5. All bids MUST BE SIGNED IN INK.

Name of Bidder (Firm or Individual): ________________________________________________________________
Contact Name: _________________________________________________________________________________
Business Address: _______________________________________________________________________________
Business Phone #: ________________________________________________________________________________
E-Mail Address: __________________________________________________________________________________
Agrees to bid on (Items(s) to be bid): __________________________________________________________________

If the bidder’s company is based in a state other than Rhode Island, list name and contact information for a local agent for service of process that is located within Rhode Island: ___________________________________________________________

Please visit http://www.naics.com/search/ and identify the NAICS Code(s) for items being bid on. Enter the NAICS code(s) here or in parentheses next to each item listed immediately above: ___________________________________________________________

Delivery Date (when applicable): __________________________________________________________________________

Name of Surety Company (if applicable): ___________________________________________________________________

Total Amount in Writing*: ____________________________________________________________
Total Amount in Figures*: ____________________________________________________________

*If you are submitting a unit price bid please insert “Unit Price Bid.”

Use additional pages if necessary for additional bidding details.

____________________________________________
Signature of Representative

____________________________________________
Title
BID FORM 2: Certification of Bidder
(Non-Discrimination/Hiring)

Upon behalf of ___________________________ (Firm or Individual Bidding),

I, ___________________________ (Name of Person Making Certification),

being its ___________________________ (Title or “Self”), hereby certify that:

1. Bidder does not unlawfully discriminate on the basis of race, color, national origin, gender, sexual orientation and/or religion in its business and hiring practices.

2. All of Bidder’s employees have been hired in compliance with all applicable federal, state and local laws, rules and regulations.

I affirm by signing below that I am duly authorized on behalf of Bidder, on this ___________ day of ___________ 20___.

____________________________________
Signature of Representative

____________________________________
Printed Name
Certificate Regarding Public Records

Upon behalf of ________________________________ (Firm or Individual Bidding),
I, ________________________________ (Name of Person Making Certification),
being its ________________________________ (Title or “Self”), hereby certify an
understanding that:

1. All bids submitted in response to Requests for Proposals (RFP’s) and Requests for Qualification
   (RFQ’s), documents contained within, and the details outlined on those documents become public
   record upon receipt by the City Clerk’s office and opening at the corresponding Board of Contract
   and Supply (BOCS) meeting.

2. The Purchasing Department and the issuing department for this RFP/RFQ have made a conscious
   effort to request that sensitive/personal information be submitted directly to the issuing
   department and only at request if verification of specific details is critical to the evaluation of a
   vendor’s bid.

3. The requested supplemental information may be crucial to evaluating bids. Failure to provide
   such details may result in disqualification, or an inability to appropriately evaluate bids.

4. If sensitive information that has not been requested is enclosed or if a bidder opts to enclose the
   defined supplemental information prior to the issuing department’s request in the bidding packet
   submitted to the City Clerk, the City of Providence has no obligation to redact those details and
   bears no liability associated with the information becoming public record.

5. The City of Providence observes a public and transparent bidding process. Information required in
   the bidding packet may not be submitted directly to the issuing department at the discretion of the
   bidder in order to protect other information, such as pricing terms, from becoming public. Bidders
   who make such an attempt will be disqualified.

I affirm by signing below that I am duly authorized on behalf of Bidder, on
this ____________ day of _________________ 20 __.

____________________________________
Signature of Representative

____________________________________
Printed Name
**WBE/MBE Form Instructions**

The City of Providence actively seeks Minority and Women business enterprises to participate in bids to meet the City’s procurement needs. Pursuant to the City of Providence Code of Ordinances, Chapter 21, Article II, Sec. 21-52 (Minority and Women’s Business Enterprise) and Rhode Island General Laws (as amended), Chapter 31-14, et seq. (Minority Business Enterprise), Minority Business Enterprise (MBE) and Women’s Business Enterprise (WBE) participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is 10% of the total bid value.

The goal for Women’s Business Enterprise (WBE) participation is 10% of the total bid value.

The goal for combined MBE/WBE participation is 20% of the total bid value.

Only businesses certified with the State of Rhode Island as minority and/or women business enterprises are counted towards the City’s goals. Eligible minority or women-owned businesses are encouraged to seek certification from the State of Rhode Island Minority Business Enterprise Compliance Office at: http://odeo.ri.gov/offices/mbeco/

**Note**: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

**Bid Requirements:**

*All Bidders*: All bidders must complete and submit the *MBE/WBE Participation Affidavit* indicating whether or not they are a state-certified MBE/WBE and acknowledging the City’s participation goals. Submission of this form is required with every bid. Your bid will not be accepted without an affidavit.

*Bidders who will be subcontracting*: Bidders who will be subcontracting must submit the *Subcontractor Disclosure Form* as part of their bid submission. All subcontractors, regardless of MBE/WBE status, must be listed on this form. Business NAICS codes can be found at https://www.naics.com/search/. Awarded bidders are required to submit Subcontractor Utilization and Payment Reports with each invoice.

**Waiver Requests:**

If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box F on the Subcontractor Disclosure Form) and the prime contractor is not a Rhode Island State-certified MBE or WBE, the Bidder must complete the *MBE/WBE Waiver Request Form* for review. Waivers will be considered on a case by case basis.

No waiver will be granted unless the waiver request includes documentation that demonstrates that the Bidder has made good faith efforts to achieve the City’s stated participation goals. Waivers must be reviewed and signed by the City of Providence’s MBE/WBE Outreach Director, Grace Diaz, or her designee. Department Directors cannot recommend a bidder for award if this form is applicable and absent. If the bid does not meet the participation goals of the City of Providence and a waiver is not filed with the signature of the MBE/WBE Outreach Director or her designee, the bid will not be accepted.

**Verifying MBE/WBE Certification**

It is the responsibility of the bidder to confirm that every MBE/WBE named in a proposal and included in a contract is certified by the Rhode Island Minority Business Enterprise Compliance office. The current MBE/WBE directory is available at the State of RI MBE Office, One Capitol Hill, 2nd Floor, Providence, RI, or online at http://odeo.ri.gov/offices/mbeco/mbeco-mbe-wbe.php. You can also call (401) 574-8670 to verify certification, expiration dates, and services that the MBE/WBE is certified to provide. Note: MBE certification with the State of Rhode Island on the basis of Portuguese heritage is not currently recognized by the City of Providence's MBE program.

**Form Instructions:**

Access all bid forms from [http://www.providenceri.gov/oeo/](http://www.providenceri.gov/oeo/) or [http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/](http://www.providenceri.gov/purchasing/minority-women-owned-business-mbewbe-procurement-program/). **Download** the forms as blank PDFs. Once saved on your computer, fill them out using...
the Adobe program. The fillable PDFs must be completed in Adobe in order to be saved properly. Google Chrome and similar platforms do not allow for the forms to be saved as filled PDFs. Therefore, please download the blank forms to your computer, then fill them out and save.

**Assistance with Form Requirements**


**Contract Requirements:**

Prime contractors engaging subcontractors must submit the *Subcontractor Utilization and Payment Report* to the City Department’s Fiscal Agent with every invoice and with request for final payment. This form is not submitted as a part of the initial bid package.

For contracts with duration of less than 3 months, this form must be submitted along with the contractor's request for final payment. The form must include all subcontractors utilized on the contract, both MBE/WBE and non-MBE/WBE, the total amount paid to each subcontractor for the given period and to date. During the term of the contract, any unjustified failure to comply with the MBE/WBE participation requirements is a material breach of contract.

**Questions?**

For more information or for assistance with MBE/WBE Forms, contact the City of Providence MBE/WBE Outreach Director, Grace Diaz, at mbe-wbe@providenceri.com or (401) 680-5766.
MBE/WBE PARTICIPATION AFFIDAVIT

Item Discussion (as seen on RFP):

__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

Prime Bidder: _____________________________________________
Prime Bidder (Company) Phone Number: _______________________
Prime Bidder (Company) Zip Code: ___________

Which one of the following describes your business’ status in terms of Minority and/or Woman-Owned Business Enterprise certification with the State of Rhode Island? _____MBE _____ WBE _____Neither MBE nor WBE

By initialing the following sections and signing the bottom of this document in my capacity as the contractor or an authorized representative of contractor, I make this Affidavit:

It is the policy of the City of Providence that minority business enterprises (MBEs) and women business enterprises (WBEs) should have the maximum opportunity to participate in procurements and projects as prime contractors and vendors. Pursuant to Sec. 21-52 of the Providence Code of Ordinances and Chapter 31-14 et seq. of the Rhode Island General Laws (as amended), MBE and WBE participation goals apply to contracts.

The goal for Minority Business Enterprise (MBE) participation is 10% of the total bid value.
The goal for Women’s Business Enterprise (WBE) participation is 10% of the total bid value.
The goal for combined MBE/WBE participation is 20% of the total bid value.

I acknowledge the City of Providence’s goals of supporting MBE/WBE certified businesses. Initial ___________

If awarded the contract, I understand that my company must submit to the Minority and Women’s Business Coordinator at the City of Providence (MBE/WBE Office), copies of all executed agreements with the subcontractor(s) being utilized to achieve the participation goals and other requirements of the RI General Laws. I understand that these documents must be submitted prior to the issuance of a notice to proceed. Initial ___________

I understand that, if awarded the contract, my firm must submit to the MBE/WBE Office canceled checks and reports required by the MBE/WBE Office on a quarterly basis verifying payments to the subcontractors(s) utilized on the contract. Initial ___________

If I am awarded this contract and find that I am unable to utilize the subcontractor(s) identified in my Statement of Intent, I understand that I must substitute another certified MBE and WBE firm(s) to meet the participation goals. I understand that I may not make a substitution until I have obtained the written approval of the MBE/WBE Office. Initial ___________

If awarded this contract, I understand that authorized representatives of the City of Providence may examine the books, records and files of my firm from time to time, to the extent that such material is relevant to a determination of whether my firm is complying with the City’s MBE/WBE participation requirements. Initial ___________

I do solemnly declare and affirm under the penalty of perjury that the contents of the foregoing Affidavit are true and correct to the best of my knowledge, information and belief.

________________________________________  _____________________ ___________________
Signature of Bidder       Printed Name

________________________________________  ____________________
Company Name        Date
## SUBCONTRACTOR DISCLOSURE FORM

Fill out this form only if you WILL SUBCONTRACT with other parties. If you will not subcontract any portion of the proposed bid, do not fill out this form.

Prime Bidder: _______________________________________ Primary NAICS Code: ________________________________

Item Description (as seen on RFP): ________________________________________________________________

Please list all Subcontractors below. Include the total dollar value that you propose to share with each subcontractor and the dollar amount to be subcontracted. Please check off MBE and WBE where applicable. The directory of all state-certified MBE/WBE firms is located at www.mbe.ri.gov. Business NAICS codes can be found at https://www.naics.com/search/.

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<th>Proposed Subcontractor</th>
<th>MBE</th>
<th>WBE</th>
<th>Primary NAICS Code</th>
<th>Date of Mobilization</th>
<th>$ Value of Subcontract</th>
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A. MBE SUBCONTRACTED AMOUNT: $ 

B. WBE SUBCONTRACTED AMOUNT: $ 

C. NON MBE WBE SUBCONTRACTED AMOUNT: $ 

D. DOLLAR AMOUNT OF WORK DONE BY THE PRIME CONTRACTOR: $ 

E. TOTAL AMOUNT OF BID (SUM OF A, B, & C): $ 

F. PERCENTAGE OF BID SUBCONTRACTED TO MBEs AND WBEs. (Divide A by D and multiply result by 100). % 

Please read and initial the following statement acknowledging you understand. If the percentage of the total amount of the bid being awarded to MBE or WBE vendors is less than 20% (Box F) and the prime contractor is NOT a Rhode Island State-certified MBE or WBE, you must fill out the MBE/WBE WAIVER REQUEST FORM for consideration by City of Providence MBE/WBE Outreach Director. Initial ________

Signature of Prime Contractor ____________________________ Printed Name ____________________________ Date Signed __________
MBE/WBE WAIVER REQUEST FORM
Fill out this form only if you are subcontracting and did not meet the 20% MBE/WBE participation goal. State-certified MBE or WBE Prime Bidders are NOT REQUIRED to fill out this form.

Submit this form to the City of Providence MBE/WBE Outreach Director, Grace Diaz, at mbe-wbe@providenceri.gov, for review prior to bid submission. This waiver applies only to the current bid which you are submitting to the City of Providence and does not apply to other bids your company may submit in the future.

Prime Bidder: __________________________________________________
Company Trade: __________________________________________________
Item Discussion (as seen on RFP):
____________________________________________________________________________________________________
____________________________________________________________________________________________________________
________________________________________________________________________________________

To receive a waiver, you must list the certified MBE and/or WBE companies you contacted, the name of the primary individual with whom you interacted, and the reason the MBE/WBE company could not participate on this project.

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<tr>
<th>MBE/WBE Company Name</th>
<th>Individual’s Name</th>
<th>Company Trade</th>
<th>Why did you choose not to work with this company?</th>
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I acknowledge the City of Providence’s goal of a combined MBE/WBE participation is 20% of the total bid value. I am requesting a waiver of ______ % MBE/WBE (20% minus the value of Box F on the Subcontractor Disclosure Form). If an opportunity is identified to subcontract any task associated with the fulfillment of this contract, a good faith effort will be made to select MBE/WBE certified businesses as partners.

Signature of Prime Contractor __________________________________________ Printed Name __________________________ Date Signed ____________
Signature of City of Providence MBE/WBE Outreach Director __________________________________________
Printed Name of City of Providence MBE/WBE Outreach Director __________________________ Date Signed ____________
SUPPLEMENTAL INFORMATION

If the issuing department for this RFP determines that your firm’s bid is best suited to accommodate their need, you will be asked to provide proof of the following prior to formalizing an award.

An inability to provide the outlined items at the request of the department may lead to the disqualification of your bid.

This information is **NOT** requested to be provided in your initial bid that you will submit to the City Clerk’s office by the “date to be opened” noted on page 1. This list only serves as a list of items that your firm should be ready to provide on request.

All bids submitted to the City Clerk become public record. Failure to follow instructions could result in information considered private being posted to the city’s Open Meetings Portal and made available as a public record.

You must be able to provide:

- Business Tax ID will be requested after an award is approved by the Board of Contract and Supply.
- Proof of Insurance
BID FORM 3: Supplemental Bid Form

To whom it may concern:

1. The undersigned, having familiarized (himself) (themselves) (itself) with the HARRIET & SAYLES PARK & MARY E. FOGARTY GREEN SCHOOLYARDS COMPLEX bid affecting the cost of work, and with the Contract Documents (which includes the Invitation for Bids, Instructions to Bidders, Form of Bid Bond, Form of Agreements, form of Non-Collusive Affidavit, Addenda (if any), Drawings, Technical Specification, Form of Surety Bond(s); as prepared by the Providence Parks Department, and on file in the office of the City Clerk 3rd Floor, City Hall, Providence, RI 02903, hereby proposes to furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services including utility and transportation services, and to perform such other required work for the HARRIET & SAYLES PARK & MARY E. FOGARTY GREEN SCHOOLYARDS COMPLEX and such other required and incidental work, complete, all in accordance with the above listed documents and for the unit prices for work in-place for the following items and quantities.

2. In submitting this Bid, the bidder understands that the right is reserved by The Providence Parks Department to reject any and all Bids, If written notice of acceptance of this Bid is mailed, telegraphed or delivered to the undersigned within (90) days after the opening thereof, or at any time thereafter before this Bid is withdrawn, the undersigned agrees to execute and deliver an Agreement in the prescribed form and furnish the required bond within (10) days after the Agreement is presented to him/her for signature.

Herewith in accordance to the instructions to Bidders.

3. Attached hereto is an affidavit in proof that the undersigned has not colluded with any person in respect to this Bid or any bids for the Contractor for which this Bid is submitted. Also attached is a Statement of Bidder’s Qualifications.

4. Application unit prices are contained in the Agreement (established as the result of either a Unit Price Bid or a Supplemental Schedule of Unit Prices), the City of Providence may order the Contractor to proceed with desired changes in the work, the value of such changes to be determined by the measured quantities involved and the application unit prices specified in the Contract.

6. The City of Providence reserves the right to determine the lowest responsible Bidder based on past experience with the City and/or recommendations by City and/or state agencies with an interest in this procurement. The City reserves the right to award the project to the appropriate bidder in the best interest of the City of Providence.

CERTIFICATION OF NON-SEGREGATED FACILITIES

The Bidder certifies that he/she does not maintain or provide for his/her employees any segregated facilities at any of his establishments, and that he/she does not permit his/her employees to perform their services at any location, under his/her control, where segregation facilities are maintained. The Bidder agrees that a breach of this certification will be a violation of the Equal Opportunity Clause in any contract resulting from acceptance of this Bid. As used in this certification, term “segregation facilities” means any waiting rooms, work rooms, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employee which are segregated by explicit directive or are in fact segregated on basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The Bidder agrees that (except where he/she has obtained identical certification from proposed subcontractors for specific time periods) he/she will obtain identical certification from proposed subcontractor prior to the award of subcontracts exceeding $10,000.00 which are not exempt from provisions of the Equal Opportunity Clause, and that he/she will retain such certifications in his/her files.

DATE ________________________________, 20___

Name of Bidder and Official Address:   Name of Authorized Representative (Contact):
_____________________________________________  __________________________________
_____________________________________________  __________________________________
_____________________________________________  ________________________________
By ________________________________  (Signature)
Title ________________________________

E-Mail: ________________________________  Phone: ________________________________

Bidder shall indicate, in space provided,
the earliest possible Project Start-up Date:_________________________________________________, 20___

ADDENDA: The undersigned acknowledges receipt of the following Addenda, if any, and has included the provisions thereof in this Bid (If Any):

<table>
<thead>
<tr>
<th>Addendum No.</th>
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Sub-Contractors (If Any):

Name: ____________________________________________  Scope of Work: ________________________________________________ MBE / WBE
Name: ____________________________________________  Scope of Work: ________________________________________________ MBE / WBE
Name: ____________________________________________  Scope of Work: ________________________________________________ MBE / WBE
HARRIET & SAYLES PARK & MARY E. FOGARTY GREEN SCHOOLYARDS COMPLEX

BASE BID: Harriet and Sayles Park and Mary E. Fogarty Green Schoolyards Complex project comprises a partnership between the Providence Parks Department and the Healthy Communities Office to benefit the local community and that of the Mary E. Fogarty Elementary School. The site comprises 2.17 acres and is located at the intersections of Harriet and Sayles Streets in Lower South Providence. All work directly adjacent to the school to not interfere with their operations.

The City of Providence is seeking qualified contractors to perform the following scope of work that shall include but is not limited to: site preparation for demolition including all erosion control measures, removal and disposal of existing play structures, water park features, fencing and ballfield infrastructure including irrigation lines, and cement and bituminous concrete; Furnish and install irrigation system, playground equipment, splashpad features, piping, manifold and drain lines, outdoor classroom elements and site furnishings, custom wood elements and native boulders; cast in place concrete seat wall planter with boulders, deliver and install playground equipment supplied by Owner, furnish and install Engineered Wood Fiber mulch, pre-cast concrete curbing, concrete unit pavers, bituminous and concrete walks, poured in place surfacing and moguls, welded wire mesh fencing and gates, and native tree, shrub and ground cover plantings.

ADD ALTERNATES include: Furnish and Install 4” cement concrete walkways throughout project

In addition to stating the Total Base Bid, the bidder shall state Unit Prices for related work listed under each bid item which represents the work items included in the Total Base Bid. The Unit Prices are quoted for computing adjustments to the Base Bid prior to Contract award, as well as during the course of construction, based upon extra work ordered by the City or for work countermanded, reduced or omitted by the City in order to stay within the Project budget.

Base Bid Items and Unit prices are to be Completed prices to be added or deducted on the basis of quantities of work involved, for each item in place in the unit indicated.

All Work Included in this Project Shall be Completed for the lump sum of:

___________________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________________

Dollars ($__________________________________), TOTAL BASE BID

CONTINGENCY: (+$20,000)____________________________________) Dollars

BASE BID WITH CONTINGENCY:

___________________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________________

($__________________________________) Dollars

BIDDER: _______________________________
ADD ALTERNATES:

1. Furnish and install 4” concrete walkway paving

_______________________________________________ LS $__________

price in writing

UNIT PRICES:

1. Remove and Dispose CL Fence, posts and footings

_______________________________________________ LF $__________

price in writing

2. Remove and Dispose CL Gates and footings

_______________________________________________ EA $__________

price in writing


_______________________________________________ LS $__________

price in writing

4. Remove and Dispose bases; Deliver infield mix to Roger Williams Park Bike Track

_______________________________________________ LS $__________

price in writing

5. Remove and Dispose dugout benches and footings.

_______________________________________________ LS $__________

price in writing

6. Remove and Dispose rubber play surface

_______________________________________________ LS $__________

price in writing

BIDDER: _______________________________
7. Remove and Dispose all play equipment

_______________________________________________  LS  $ ____________

price in writing

8. Remove and Dispose (4) benches and footings

_______________________________________________  LS  $ ____________

price in writing

9. Remove and Dispose water play features, all piping, couplings and manifold- saw cut conc floor to allow for new piping as per plan

_______________________________________________  LS  $ ____________

price in writing

10. Remove and Dispose concrete splash pad - Complete

_______________________________________________  LS  $ ____________

price in writing

11. Strip and dispose of turf, remove, screen per specification and amend topsoil - per Ton

_______________________________________________  TN  $ ____________

price in writing

12. Remove and Dispose Bituminous Concrete

_______________________________________________  TN  $ ____________

price in writing

13. Remove and Dispose existing playground sand to 12” depth

_______________________________________________  CY  $ ____________

price in writing

14. Remove and Dispose all existing irrigation piping, valves and heads

_______________________________________________  LS  $ ____________

price in writing

BIDDER: _______________________________
15. Furnish and Install Temporary Tree Protection

__________________________________________   EA   $___________

price in writing

16. Furnish and Install Silt Sock Erosion Control – per Linear Foot

__________________________________________   LF   $___________

price in writing

17. Furnish and Install Catch Basin Sediment Trap

__________________________________________   EA   $___________

price in writing

18. Furnish and Install 6’ Temporary Fence- Per Linear Feet

__________________________________________   LF   $___________

price in writing

19. Furnish and Install Concrete tide pool with river stone and Goric Winder- hand pump -Complete

__________________________________________   LS   $___________

price in writing

20. Furnish and Install Vortex- Hop Starfish #VOR7254 - Complete

__________________________________________   EA   $___________

price in writing

21. Furnish and Install Vortex- Snake No. 2 #VOR7214 - Complete

__________________________________________   EA   $___________

price in writing

22. Furnish and Install Vortex- Vortex Water Bloom #1 VOR0322 - Complete

__________________________________________   EA   $___________

price in writing

23. Furnish and Install Vortex Seaweed No. 1 #VOR7779 - Complete

__________________________________________   EA   $___________

price in writing

BIDDER: _______________________________
24. Furnish and Install Vortex Bamboo Rain No. #VOR7730- Complete

_______________________________________________ EA $__________________ price in writing

25. Furnish and Install Vortex Helio No. 3 #VOR7238 - Complete

_______________________________________________ EA $__________________ price in writing

26. Furnish and Install Vortex Manifold - Complete

_______________________________________________ EA $__________________ price in writing

27. Furnish and Install Vortex Bollard Activator No 3 #VOR0611 - Complete

_______________________________________________ EA $__________________ price in writing

28. Furnish and Install 4” Concrete walkway with base– per square foot

_______________________________________________ SF $__________________ price in writing

29. Furnish and Install 2” Bituminous Concrete Pavement – per square foot

_______________________________________________ SF $__________________ price in writing

30. Furnish and Install Concrete Unit Paver banding on mortar setting base – per square foot

_______________________________________________ SF $__________________ price in writing

31. Furnish and Install Engineered wood fiber mulch

_______________________________________________ CY $__________________ price in writing

BIDDER: ________________________________
32. Furnish and Install 6” pre-cast concrete curb per Linear Foot

_______________________________________________ LF $________

price in writing

33. Furnish and Install pre-cast concrete transition curb per Linear Foot

_______________________________________________ LF $________

price in writing

34. Furnish and Install Poured in Place Safety Surfacing

_______________________________________________ SF $________

price in writing

35. Furnish and Install Poured in Place berms

_______________________________________________ LS $________

price in writing

36. Furnish and Deliver to RWP Maintenance Facility one 3’x18” bag each color Poured in Place beads

_______________________________________________ EA $________

price in writing

37. Furnish and Install 18” boulder Seat Wall per Linear Foot

_______________________________________________ LF $________

price in writing

Furnish and Install Exposed Aggregate Concrete Seat wall Planter with Boulders

_______________________________________________ FSF $________

price in writing

38. Furnish and Install Complete Irrigation System as Specified - Per Lump Sum

_______________________________________________ LS $________

price in writing

39. Furnish and Install Kompan Hexagon Pull-Up #FSW20801

_______________________________________________ LS $________

price in writing

BIDDER: _______________________________
BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

40. Furnish and Install Kompan Combi Steps #FSW21900

_______________________________________________  LS  $______________  
price in writing

41. Furnish and Install Kompan Combi 1 #FSW10101

_______________________________________________  LS  $______________  
price in writing

42. Furnish and Install Kompan Parallel Bars #FSW20100

_______________________________________________  LS  $______________  
price in writing

43. Furnish and Install Kompan Giant Dome (Venus) with Sunshade #COR86700 and #CRE86700

_______________________________________________  LS  $______________  
price in writing

44. Furnish and Install Playworld Single Post (2) bay swings with (4) belt seats #ZZXX0818

_______________________________________________  EA  $______________  
price in writing

45. Furnish and Install Playworld Single Post (2) bay swings with (2) belt seats and (2) Bucket seats #ZZXX0818

_______________________________________________  EA  $______________  
price in writing

46. Furnish and Install Earthscape Log Pile 3.1

_______________________________________________  LS  $______________  
price in writing

47. Furnish and Install Berliner Eddie.01 #90260101

_______________________________________________  EA  $______________  
price in writing

BIDDER: _______________________________

________________________________________
48. Furnish and Install Berliner Cosmo S.05 #90.111.050  
_______________________________________________ EA $__________  
price in writing

49. Furnish and Install Berliner Freeride #90260802  
_______________________________________________ EA $__________  
price in writing

50. Furnish and Install Berliner Access Whirl#CA20003  
_______________________________________________ EA $__________  
price in writing

51. Deliver and Install Berliner Palmetto Saucer #95.190.578  
_______________________________________________ EA $__________  
price in writing

52. Furnish and Install Robinia Log Steps  
_______________________________________________ LS $__________  
price in writing

53. Furnish and Install Loop Line #140  
_______________________________________________ EA $__________  
price in writing

54. Furnish and Install Loop Arc #137  
_______________________________________________ EA $__________  
price in writing

55. Furnish and Install Hardwood Live edge log bench – length varies  
_______________________________________________ LF $__________  
price in writing

BIDDER: _______________________________
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
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<tbody>
<tr>
<td>56.</td>
<td>Furnish and Install (4 gauge) 4’ Height welded wire mesh fence</td>
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<td></td>
<td><em>price in writing</em></td>
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<tr>
<td>57.</td>
<td>Furnish and Install (4 gauge) 5’ Height Welded Wire Mesh Fence</td>
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<td><em>price in writing</em></td>
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<tr>
<td>58.</td>
<td>Furnish and Install 12’ Wide Service Gates</td>
<td></td>
<td></td>
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<td></td>
<td><em>price in writing</em></td>
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<tr>
<td>59.</td>
<td>Furnish and Install 5’ Wide Gate (4 GA WWM)</td>
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<td></td>
<td><em>price in writing</em></td>
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<tr>
<td>60.</td>
<td>Furnish and Install Native Boulders sized at: &lt; 30”x36”</td>
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<td></td>
<td><em>price in writing</em></td>
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<tr>
<td>61.</td>
<td>Furnish and Install Native Boulders sized at: 36”–42”</td>
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<td><em>price in writing</em></td>
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<tr>
<td>62.</td>
<td>Furnish and Install Native Boulders sized at: &gt; 42”–48”</td>
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<td><em>price in writing</em></td>
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<tr>
<td>63.</td>
<td>Furnish and Install Dumor 6’ benches model #61-892 S4S EE (or approved equal)-</td>
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<td><em>price in writing</em></td>
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<tr>
<td>64.</td>
<td>Furnish and Install Dumor 8’ ADA picnic table model # 67-079-68-1 S4S EE – (or approved equal) - surface mount</td>
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<td><em>price in writing</em></td>
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BIDDER: _______________________________
65. Furnish and Install Cary Co. 55 gal trash receptacles with dome lid on 30”x30”x4” concrete pad Model #26BTR5/ETR55/DL32

_______________________________________________ EA $________________
price in writing

66. Furnish and Install 2.5-3” Acer rubrum – October Glory’

_______________________________________________ EA $________________
price in writing

67. Furnish and Install 7-8’ Amelanchier canadensis- ‘Trazam’- multi-stem clump

_______________________________________________ EA $________________
price in writing

68. Furnish and Install 2.5-3” Cedrus atlantica ‘Glaucu’

_______________________________________________ EA $________________
price in writing

69. Furnish and Install 2.5-3” Crataegus viridis ‘Winter King’

_______________________________________________ EA $________________
price in writing

70. Furnish and Install 2.5-3” Ostrya virginiana

_______________________________________________ EA $________________
price in writing

71. Furnish and Install 2.5-3” Ulmus americana ‘Princeton’

_______________________________________________ EA $________________
price in writing

72. Furnish and Install #3 Hydrangea serrata ‘Tiny tuff stuff’

_______________________________________________ EA $________________
price in writing

73. Furnish and Install #3 Ilex glabra ‘Shamrock’

_______________________________________________ EA $________________
price in writing

BIDDER: ______________________________
74. Furnish and Install #3 Clethra alnifolia ‘Crystalina’

_______________________________________________ EA $_________________

price in writing

75. Furnish and Install #3 Rhododendron x laetevirens

_______________________________________________ EA $_________________

price in writing

76. Furnish and Install #3 Viburnum trilobum ‘Bailey compact’

_______________________________________________ EA $_________________

price in writing

77. Furnish and Install #1 Eupatorium purpureum ‘Little Joe’

_______________________________________________ EA $_________________

price in writing

78. Furnish and Install #1 Rudbekia fulgida

_______________________________________________ EA $_________________

price in writing

79. Furnish and Install #1 Echinacea purpea ‘Magnus’

_______________________________________________ EA $_________________

price in writing

80. Furnish and Install #1 Amsonia tabernae ‘Blue Ice’

_______________________________________________ EA $_________________

price in writing

81. Furnish and Install #1 Phlox div. ‘Blue Moon’

_______________________________________________ EA $_________________

price in writing

82. Furnish and Install #1 Tiarella ‘Brandywine’

_______________________________________________ EA $_________________

price in writing

BIDDER: _____________________________
83. Furnish and Install #1 Aster o. “October Skies”

_______________________________________________ EA $______________

*price in writing*

84. Furnish and Install #1 Geranium maculatum

_______________________________________________ EA $______________

*price in writing*

85. Furnish and Install #1 Eragrostis spectabilis

_______________________________________________ EA $______________

*price in writing*

86. Furnish and Install #1 Aster o. “October Skies”

_______________________________________________ EA $______________

*price in writing*

87. Furnish and Install #1 Schizachyrium scoparium

_______________________________________________ EA $______________

*price in writing*

88. Furnish and Install #1 Asclepias syriaca

_______________________________________________ EA $______________

*price in writing*

89. Furnish and Install Hydroseed Mix as specified (Complete) – Per Square Foot

_______________________________________________ EA $______________

*price in writing*

90. Furnish and Install 3/4” screened loam (Complete in place) - per Cubic Yard

_______________________________________________ CY $______________

*price in writing*

91. Furnish and Install structural soil in planter (Complete in place) - per Cubic Yard

_______________________________________________ CY $______________

*price in writing*

BIDDER: _______________________________
Please note that the list above is not intended to include all items required to complete the base bid scope of work but can and shall be used to adjust the contract prior to or after award – in the best interest of the City of Providence.

**BID DOCUMENTS:**

The complete set of Bid Documents consists of the Bid Form, Technical Specifications, Minority Participation Forms, and the following Drawings:

**DRAWINGS:**

- L1- COVER
- L2 NOTES
- L3 EXISTING CONDITIONS PLAN
- L4 DEMOLITION PLAN
- L5 GRADING AND UTILITIES PLAN A
- L6 GRADING AND UTILITIES PLAN B
- L7 IRRIGATION PLAN
- L8 LAYOUT PLAN A
- L9 LAYOUT PLAN B
- L10 MATERIALS PLAN A
- L11 MATERIALS PLAN B
- L12 PLANTING PLAN A
- L13 PLANTING PLAN B
- L14 CONSTRUCTION DETAILS
- L15 CONSTRUCTION DETAILS
- L16 CONSTRUCTION DETAILS
- L17 CONSTRUCTION DETAILS
- L18 CONSTRUCTION DETAILS
- L19 CONSTRUCTION DETAILS
- L20 CONSTRUCTION DETAILS
- L21 CONSTRUCTION DETAILS
- L22 CONSTRUCTION DETAILS
  - VORTEX PLUMBING & ELECTRICAL PLAN

**TECHNICAL SPECIFICATION:**

- 011000 GENERAL REQUIREMENTS
- 015639 TEMPORARY TREE AND PLANT PROTECTION
- 024119 SELECTIVE DEMOLITION
- 031000 CONCRETE FORMING AND ACCESSORIES
- 032000 CONCRETE REINFORCING
- 033000 CAST-IN-PLACE CONCRETE
- 116800 PLAY FIELD EQUIPMENT AND STRUCTURES
- 116800.10 SPLASHPAD PLAY EQUIPMENT
- 311000 SITE CLEARING
BoD of Contract and Supply
City of Providence, Rhode Island

- 312000 Earth Moving
- 312316.13 Trenching
- 312500 Erosion and Sedimentation Controls
- 321216 Asphalt Paving
- 321313 Concrete Paving
- 321413 Precast Concrete Unit Paving
- 321600 Precast Concrete Curb
- 321816.13 Playground Protective Surfacing
- 323116.10 Ornamental Welded Wire Fences and Gates
- 323253 Stone Retaining Walls
- 323300 Site Furnishings
- 328400 Planting Irrigation
- 329113 Soil Preparation
- 329119 Landscape Grading
- 329200 Turf and Grasses
- 329300 Plants
- 334200 Stormwater Conveyance

Additional Information Required With Bid:

- Qualifications to Perform Work – See Form Below for Information Required
- Minority Participation Forms – 10% MBE / 10 % WBE Goal on this Project
- Addenda (If Any) - Must Be Acknowledged on Bid Form
- Product Information for Items Submitted as ‘Or Equal’ to Specified Materials

Provisions of this Project:

- Upon the Issuance of the Award from the Board of Contract – the City shall issue a Contract to be executed by the City and the vendor incorporating the bid specifications. All Provisions of the Specifications are binding.
- Any Permits Required by the City of Providence and/or State of Rhode Island Shall be Obtained by the Vendor – Permit Fees by the City of Providence Shall be Waived – the State ADA Fee Must be Paid
- The Davis Bacon Act Applies (HUD Projects) – Prevailing Wages Must Be Paid for On Site Hours – On-Site Interviews will be Conducted During the Project – Employees Shall be Advised of the Prevailing Wage Rates Prior to Mobilization on Site
- Certified payrolls Must be Submitted With Pay Requests Including Monthly Utilizations Form
- Performance and Payment Bonds (If Required) Must be Submitted within 10 Days of Award or Bid Bond Will be Forfeited
- An Insurance Certificate Shall be Submitted to the City Within 10 Days of Award
- A Copy of the Vendors Contractor’s License Must be Submitted within 10 Days of Award
- All On-Site Personnel Shall be Licensed (If Required) and Shall have Proof of All Licenses Required by the State of Rhode Island to Perform the Work Required
- Pay Requests Must be Submitted on Approved AIA Billing Documents (City will Provide if Needed)
BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

- All Subcontractors Shall be Listed on the Bid Form – All Insurance & Payroll Requirements Apply
  - General Contractor Shall be the Insurance Certificate Holder and the City Shall be Named as ‘Additionally Insured’ with Respect to Liability Insurance
- A Submittal Log Must be Submitted within 10 Days of Award

CLOSE OUT DOCUMENTS:

- Prior to Final Payment the Vendor Shall Provide the Following:
  - Copies of Permits Signed off and Approved (If Any)
  - Operating Manuals and Warranties Shall Be Transferred and/or Delivered
  - Full and Completed As-Built Drawings in AutoCad Format Shall be Submitted for Approval
  - Training Shall be Provided to City Personnel (If Required)
  - Certification by Manufactures Representative (If Required)

QUALIFICATIONS:

Qualifications will be evaluated on the basis of similar project experience for:

a. Completion of at least 3 similar projects within the past five years.
b. Size and dollar value of similar completed projects.
c. Contractor’s performance with similar projects. (references will be checked)
d. Relevant experience of individuals assigned to the project.

Questions regarding this bid package shall be submitted via e-mail to Patti Jordan at pjordan@providenceri.gov and Megan Gardner, Design Team Manager at mgardner@providenceri.gov, no later than five (5) working days before the bid opening date.

Megan Gardner is the project contact and can be reached at 401.248.5044

This project qualifies for prevailing wages per the Prevailing Wages Statute or the Davis Bacon Act (HUD). Certified payrolls will need to be submitted to the owner for all hours worked on site for this project. The Wage Decision for this project shall be as recorded on the Bid Date and is available on the RI Department of Labor website.

Federal Labor Standards
U.S. Department of Housing & Urban Development

Applicability

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

A.1. (i) Minimum Wages. All laborers and mechanics employed or working up on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction of development of the project) will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of labor which is
attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers of mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification or work actually performed, without regard to skill, excepts as provided in 29 CFR Part 5.5 (a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer’s payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conforming under 29 CFT part 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

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

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

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

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

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

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

3. (i) Payrolls and basic records. Payrolls and basic record relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonable anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) or the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-34 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), Government Printing Office, Washington, Dc 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 20 CFR Part 5.5(a)(3)(i) and that such information is correct and complete;

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

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

(c) The weekly submission of a property executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph AA.3. (ii)(b) of this section.

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code. (iii)
contractor of subcontractor shall make the records required under paragraph A.3. (i) of this section available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.

4. (i) Apprentices and Trainees. Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprentice program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the age determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman’s hourly rate) specified in the contractor’s or subcontractor’s registered program shall be observed. Every apprentice must be paid not less than the rate specified in the registered program for the apprentice’s level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less that the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid not less than the rate specified in the approved program for the trainee’s level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirement of Executive Order 11246, as amended, and 29 CFR Part 30.

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

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

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

8. Compliance with Davis-Bacon and Related Act Requirements. All ruling and interpretations of the Davis-Bacon and Related Act contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

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

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

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

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

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

B. Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms “laborers” and “mechanics” include watchmen and guards.

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

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) or this paragraph, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum
of $25 for each calendar day on which such individual was required or permitted to work in excess of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages for liquidated damages. HUD or its designees shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold of cause to be withheld from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidates damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety

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

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

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

Questions regarding this bid shall be sent via e-mail Megan Gardner at mgardner@providenceri.gov. Questions and responses will be sent to all bidders.
BOARD OF CONTRACT AND SUPPLY
CITY OF PROVIDENCE, RHODE ISLAND

TECHNICAL SPECIFICATIONS – Appendix A
General Decision Number: RI20220001 05/06/2022

Superseded General Decision Number: RI20210001

State: Rhode Island

Construction Types: Building, Heavy (Heavy and Marine) and Highway

Counties: Rhode Island Statewide.

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)  HEAVY, HIGHWAY AND MARINE CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

<table>
<thead>
<tr>
<th>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</th>
<th>Executive Order 14026 generally applies to the contract.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.</td>
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</table>

<table>
<thead>
<tr>
<th>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</th>
<th>Executive Order 13658 generally applies to the contract.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.</td>
</tr>
</tbody>
</table>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.
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* ASBE0006-006 12/01/2021

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<tbody>
<tr>
<td>$37.80</td>
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HAZARDOUS MATERIAL HANDLER
(Includes preparation, wetting, stripping, removal scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems).

<table>
<thead>
<tr>
<th>ASBE0006-008 09/01/2021</th>
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<tbody>
<tr>
<td>Rates</td>
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Asbestos Worker/Insulator
Includes application of all insulating materials, protective coverings, coatings & finishes to all types of mechanical systems.

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<tr>
<th>BOIL0029-001 01/01/2021</th>
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BOILERMAKER

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Bricklayer, Stonemason, Pointer, Caulker & Cleaner

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Marble Setter, Terrazzo Worker & Tile Setter

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Marble, Tile & Terrazzo Finisher

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<th>CARP0330-001 01/01/2021</th>
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<tbody>
<tr>
<td>Rates</td>
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<tr>
<td>$37.80</td>
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</tbody>
</table>

CARPENTER (Includes Soft
Floor Layer) .................. $ 39.72  28.66
Diver Tender ................. $ 40.72  28.66
DIVER ........................ $ 51.47  28.66
Piledriver ..................... $ 39.72  28.66
WELDER ....................... $ 40.72  28.66

FOOTNOTES:

When not diving or tending the diver, the diver and diver
tender shall receive the piledriver rate. Diver tenders
shall receive $1.00 per hour above the pile driver rate
when tending the diver.

Work on free-standing stacks, concrete silos & public utility
electrical power houses, which are over 35 ft. in height
when constructed: $.50 per hour additional.

Work on exterior concrete shear wall gang forms, 45 ft. or
more above ground elevation or on setback: $.50 per hour
additional.

The designated piledriver, known as the ""monkey": $1.00 per
hour additional.

----------------------------------------------------------------
CARP1121-002 01/06/2020

Rates Fringes
MILLWRIGHT.................... $ 39.07  29.15
----------------------------------------------------------------
ELEC0099-002 06/02/2021

Rates Fringes
ELECTRICIAN ................... $ 43.61  54.71%
Teledata System Installer..... $ 32.71  12.57%+14.93

FOOTNOTES:

Work of a hazardous nature, or where the work height is 30
ft. or more from the floor, except when working
OSHA-approved lifts: 20% per hour additional.

Work in tunnels below ground level in combined sewer outfall:
20% per hour additional.

----------------------------------------------------------------
ELEV0039-001 01/01/2022

Rates Fringes
ELEVATOR MECHANIC ........... $ 56.91  36.885+a+b

FOOTNOTES:

A. PAID HOLIDAYS: New Years Day; Memorial Day; Independence
   Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday
   after Thanksgiving Day; and Christmas Day.

B. Employer contributes 8% basic hourly rate for 5 years or
   more of service of 6% basic hourly rate for 6 months to 5
   years of service as vacation pay credit.
ENGI0057-001 12/01/2021

Operating Engineer: (power plants, sewer treatment plants, pumping stations, tunnels, caissons, piers, docks, bridges, wind turbines, subterranean & other marine and heavy construction work)

GROUP 1 ..................... $ 43.55 
GROUP 2 ..................... $ 41.55 
GROUP 3 ..................... $ 37.17 
GROUP 4 ..................... $ 34.32 
GROUP 5 ..................... $ 40.60 
GROUP 6 ..................... $ 31.40 
GROUP 7 ..................... $ 25.40 
GROUP 8 ..................... $ 37.25 
GROUP 9 ..................... $ 41.17 

a. BOOM LENGTHS, INCLUDING JIBS:

150 feet and over + $ 2.00
180 feet and over + $ 3.00
210 feet and over + $ 4.00
240 feet and over + $ 5.00
270 feet and over + $ 7.00
300 feet and over + $ 8.00
350 feet and over + $ 9.00
400 feet and over + $10.00

a. PAID HOLIDAYS:
New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, Christmas Day. a: Any employee who works 3 days in the week in which a holiday falls shall be paid for the holiday.

a. FOOTNOTES:
Hazmat work: $2.00 per hour additional.
Tunnel/Shaft work: $5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, lighters, boom trucks and derricks

GROUP 2: Digging machine, Ross Carrier, locomotive, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, graders, front end loader (3 yds. and over), vibratory hammer & vacuum truck, roadheaders, forklifts, economobile type equipment, tunnel boring machines, concrete pump and on site concrete plants.

GROUP 3: Oilers on cranes.

GROUP 4: Oiler on crawler backhoe.

GROUP 5: Bulldozer, bobcats, skid steer loader, tractor, scraper, combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile-powered sweeper (3-yd. capacity), 8-ft. sweeper minimum 65 HP).
GROUP 6: Well-point installation crew.

GROUP 7: Utility Engineers and Signal Persons

GROUP 8: Heater, concrete mixer, stone crusher, welding machine, generator and light plant, gas and electric driven pump and air compressor.

GROUP 9: Boat & tug operator.

----------------------------------------------------------------

* ENGI0057-002 05/01/2022

Rates Fringes

Power Equipment Operator
(highway construction projects; water and sewerline projects which are incidental to highway construction projects; and bridge projects that do not span water)

GROUP 1..................$ 36.70 29.25+a
GROUP 2..................$ 31.40 29.25+a
GROUP 3..................$ 25.40 29.25+a
GROUP 4..................$ 31.98 29.25+a
GROUP 5..................$ 35.68 29.25+a
GROUP 6..................$ 35.30 29.25+a
GROUP 7..................$ 30.95 29.25+a
GROUP 8..................$ 32.33 29.25+a
GROUP 9..................$ 34.28 29.25+a

a. FOOTNOTE: a. Any employee who works three days in the week in which a holiday falls shall be paid for the holiday.


POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Digging machine, crane, piledriver, lighter, locomotive, derrick, hoist, boom truck, John Henry's, directional drilling machine, cold planer, reclaimer, paver, spreader, grader, front end loader (3 yds. and over), vacuum truck, test boring machine operator, veemere saw, water blaster, hydro-demolition robot, forklift, economobile, Ross Carrier, concrete pump operator and boats

GROUP 2: Well point installation crew

GROUP 3: Utility engineers and signal persons

GROUP 4: Oiler on cranes

GROUP 5: Combination loader backhoe, front end loader (less than 3 yds.), forklift, bulldozers & scrapers and boats

GROUP 6: Roller, skid steer loaders, street sweeper

GROUP 7: Gas and electric drive heater, concrete mixer, light plant, welding machine, pump & compressor

GROUP 8: Stone crusher
GROUP 9: Mechanic & welder

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ENGI0057-003 12/01/2021

BUILDING CONSTRUCTION

<table>
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<th>Rates</th>
<th>Fringes</th>
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<td>28.25+a</td>
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<td>28.25+a</td>
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a. BOOM LENGTHS, INCLUDING JIBS:

150 ft. and over: + $2.00
180 ft. and over: + $3.00
210 ft. and over: + $4.00
240 ft. and over: + $5.00
270 ft. and over: + $7.00
300 ft. and over: + $8.00
350 ft. and over: + $9.00
400 ft. and over: + $10.00


a. FOOTNOTE: Hazmat work: $2.00 per hour additional.
  Tunnel/Shaft work: $5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, lighters, boom trucks and derricks.

GROUP 2: Digging machine, Ross carrier, locomotive, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, front end loader (3 yds. and over), vibratory hammer and vacuum truck

GROUP 3: Telehandler equipment, forklift, concrete pump & on-site concrete plant

GROUP 4: Fireman & oiler on cranes

GROUP 5: Oiler on crawler backhoe

GROUP 6: Bulldozer, skid steer loaders, bobcats, tractor, grader, scraper, combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile powered sweeper (3 yds. capacity), 8-ft. sweeper (minimum 65 hp)

GROUP 7: Well point installation crew

GROUP 8: Heater, concrete mixer, stone crusher, welding machine, generator for light plant, gas and electric driven
pump & air compressor

IRON0037-001 09/16/2021

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LABO0271-001 05/30/2021

BUILDING CONSTRUCTION

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LABORER

GROUP 1..................$ 33.55   26.15
GROUP 2..................$ 33.80   26.15
GROUP 3..................$ 34.30   26.15
GROUP 4..................$ 34.55   26.15
GROUP 5..................$ 35.55   26.15

LABORERS CLASSIFICATIONS

GROUP 1: Laborer, Carpenter Tender, Mason Tender, Cement Finisher Tender, Scaffold Erector, Wrecking Laborer, Asbestos Removal [Non-Mechanical Systems]
GROUP 2: Asphalt Raker, Adzemen, Pipe Trench Bracer, Demolition Burner, Chain Saw Operator, Fence & Guard Rail Erector, Setter of Metal Forms for Roadways, Mortar Mixer, Pipelayer, Riprap & Dry Stonewall Builder, Highway Stone Spreader, Pneumatic Tool Operator, Wagon Drill Operator, Tree Trimmer, Barco-Type Jumping Tamper, Mechanical Grinder Operator
GROUP 3: Pre-Cast Floor & Roof Plank Erectors
GROUP 4: Air Track Operator, Hydraulic & Similar Self-Powered Drill, Block Paver, Rammer, Curb Setter, Powderman & Blaster
GROUP 5: Toxic Waste Remover

LABO0271-002 05/30/2021

HEAVY AND HIGHWAY CONSTRUCTION

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LABORER

COMPRESSED AIR

Group 1..................$ 53.45   24.15
Group 2..................$ 50.98   24.15
Group 3..................$ 40.50   24.15

FREE AIR

Group 1..................$ 44.05   24.15
Group 2..................$ 43.05   24.15
Group 3..................$ 40.50   24.15

LABORER

Group 1..................$ 33.55   24.15
Group 2..................$ 33.80   24.15
Group 3..................$ 34.55   24.15
Group 4..................$ 27.05   24.15
Group 5..................$ 35.55   24.15
OPEN AIR CAISSON,
UNDERPINNING WORK AND
BORING CREW

Bottom Man.................$ 39.55  24.15
Top Man & Laborer...........$ 38.60  24.15

TEST BORING
Driller....................$ 40.00  24.15
Laborer....................$ 38.60  24.15

LABORER CLASSIFICATIONS

GROUP 1: Laborer; Carpenter tender; Cement finisher tender; Wrecking laborer; Asbestos removers [non-mechanical systems]; Plant laborer; Driller in quarries

GROUP 2: Adzeperson; Asphalt raker; Barcotype jumping tamper; Chain saw operators; Concrete and power buggy operator; Concrete saw operator; Demolition burner; Fence and guard rail erector; Highway stone spreader; Laser beam operator; Mechanical grinder operator; Mason tender; Mortar mixer; Pneumatic tool operator; Riprap and dry stonewall builder; Scaffold erector; Setter of metal forms for roadways; Wagon drill operator; Wood chipper operator; Pipelayer; Pipe trench bracer

GROUP 3: Air track drill operator; Hydraulic and similar powered drills; Brick paver; Block paver; Rammer and curb setter; Powderperson and blaster

GROUP 4: Flagger & signaler

GROUP 5: Toxic waste remover

LABORER - COMPRESSED AIR CLASSIFICATIONS

GROUP 1: Mucking machine operator, tunnel laborer, brake person, track person, miner, grout person, lock tender, gauge tender, miner: motor person & all others in compressed air

GROUP 2: Change house attendant, powder watchperson, top person on iron

GROUP 3: Hazardous waste work within the ""HOT"" zone

LABORER - FREE AIR CLASSIFICATIONS

GROUP 1: Grout person - pumps, brake person, track person, form mover & stripper (wood & steel), shaft laborer, laborer topside, outside motorperson, miner, conveyor operator, miner welder, heading motorperson, erecting operator, mucking machine operator, nozzle person, rodperson, safety miner, shaft & tunnel, steel & rodperson, mole nipper, concrete worker, form erector (wood, steel and all accessories), cement finisher (this type of work only), top signal person, bottom person (when heading is 50' from shaft), burner, shield operator and TBM operator

GROUP 2: Change house attendant, powder watchperson

GROUP 3: Hazardous waste work within the ""HOT"" zone

----------------------------------------------------------------
PAIN0011-005 06/01/2021

https://alpha.sam.gov/wage-determination/RI20220001/5
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PAIN0011-006 06/01/2021

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FOOTNOTES:

SWING STAGE: $1.00 per hour additional.

PAID HOLIDAYS: Labor Day & Christmas Day.

PAIN0011-011 06/01/2021

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PAIN0035-008 06/01/2011

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PLAS0040-001 06/03/2019

BUILDING CONSTRUCTION

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FOOTNOTE: Cement Mason: Work on free swinging scaffolds under 3 planks width and which is 20 or more feet above ground and any offset structure: $.30 per hour additional.

PLAS0040-002 07/01/2019

HEAVY AND HIGHWAY CONSTRUCTION

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PLAS0040-003 07/01/2019

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**HEAVY AND HIGHWAY CONSTRUCTION**

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**FOOTNOTES:**


B. Employee who has been on the payroll for 1 year or more but less than 5 years and has worked 150 Days during the last year of employment shall receive 1 week's paid vacation; 5 to 10 years - 2 weeks' paid vacation; 10 or more years - 3 week's paid vacation.

C. Employees on the seniority list shall be paid a one hundred dollar ($100.00) bonus for every four hundred (400) hours worked, up to a maximum of five hundred dollars ($500.00)

All drivers working on a defined hazard material job site shall be paid a premium of $2.00 per hour over applicable rate.
TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Pick-up trucks, station wagons, & panel trucks

GROUP 2: Two-axle on low beds

GROUP 3: Two-axle dump truck

GROUP 4: Three-axle dump truck

GROUP 5: Four- and five-axle equipment

GROUP 6: Low-bed or boom trailer.

GROUP 7: Trailers when used on a double hook up (pulling 2 trailers)

GROUP 8: Special earth-moving equipment, under 35 tons

GROUP 9: Special earth-moving equipment, 35 tons or over

GROUP 10: Tractor trailer

----------------------------------------------------------------

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

================================================================

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

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

----------------------------------------------------------------

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

Union Average Rate Identifiers

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

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

------------------------------------------------------------------------------------------------------------------

WAGE DETERMINATION APPEALS PROCESS

https://alpha.sam.gov/wage-determination/RI20220001/5

12/13
1.) Has there been an initial decision in the matter? This can be:

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

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

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

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

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

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

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

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

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

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

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<th>Section Title</th>
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<td>GENERAL REQUIREMENTS</td>
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**DIVISION 33 - UTILITIES**

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END OF TABLE OF CONTENTS
SECTION 010000 - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 All work done under this Contract shall also be in conformance with the Drawings and these Supplemental Technical Specifications.

A. SCOPE OF WORK

1. The general summary of work to be done under this contract consists of, but shall not be limited, to the following as shown in the Contract Documents:

B. WORK COVERED BY CONTRACT DOCUMENTS

C. The Contractor shall execute the scope of work indicated on Plans and Specifications to enhance the use and operations of the site as shown within the project limits.

1. Furnish and install temporary fencing in active construction zones.
2. Furnish and install silt sack and erosion control compost filter socks for erosion and sedimentation control.
3. Repair or replace any existing site amenities, conditions, walkways, or fencing disturbed or damaged during site improvements.
4. Remove and dispose playground equipment, above grade splashpad features, piping and manifold, site furnishings, ball field fencing and benches, bit conc. walkways and cement concrete splashpad, chain link fencing and gates.
5. Furnish and install playground equipment and specified safety surfacing.
6. Furnish and install outdoor fitness equipment and specified safety surfacing.
7. Furnish and install splash pad features, piping couplings and manifold.
8. Furnish and install outdoor classroom furnishings on specified surfacing.
9. Furnish and install custom wood elements and native boulders.
10. Furnish and install pre-cast concrete curbing with reveal.
11. Furnish and install concrete paving in splashpad
12. Furnish and install concrete unit paver banding.
13. Furnish and install bituminous concrete walkway and paving.
14. Furnish and install poured in place surfacing and berms.
15. Furnish and install welded wire mesh fencing and gates.
16. Furnish and install trees, shrubs and ground covers.

D. Work shall be as specifically indicated, shown or described in the Drawings, Technical Specifications, and other Contract Documents.

E. WORK UNDER ADD ALTERNATE

1. The following items of Work described will be addressed as an Add Alternate. All work incorporated with the items and any and all incidental to the items shall be accounted for.
F. PROJECT INFORMATION

1. OWNER
   a. City of Providence Parks Department Roger Williams Park Dalrymple Boathouse, 1000 Elmwood Avenue, Providence, RI 02907, Telephone: 401.680.7200
   b. Superintendent of Parks: Wendy Nilsson
2. OWNER’S REPRESENTATIVE
   a. Megan Gardner, Landscape Architect, mgardner@providenceri.gov, 401.680.7243

1.2 PROJECT LOCATION

A. 370 Sayles Street, Providence, RI 02907

PART 2 - PRODUCTS

2.1 CONTRACTOR USE OF PREMISES

A. The Contractor’s use of premises shall be within the limits shown on the Drawings and as defined in the Standard Form of Agreement, for the performance of the Work.
   1. The Contractor shall maintain vehicular access and utility service to the abutting properties at all times throughout the course of the construction.
   2. The Contractor shall assume full responsibility for security of all materials and equipment on the site, including those of the subcontractors.
   3. If directed by the Owner’s Representative, the Contractor shall relocate or move any stored items that interfere with operations of the Owner.
   4. The Contractor may elect to obtain (at no cost to the Owner) additional storage or work areas off-site if needed to perform the work.

2.2 OWNER OCCUPANCY REQUIREMENTS

A. The Owner (City) anticipates that site inclusive of all on-site amenities beyond the Limit of Work will remain open throughout the course of construction.

B. Contractor shall provide the Owner’s Representative with a written plan describing the sequences and durations anticipated for the execution of the Work.

2.3 MOBILIZATION, SITE PREPARATION, & DEMOLITION

A. THE WORK SPECIFIED IN THIS SECTION INCLUDES:
   1. Mobilization of all personnel and equipment;
   2. Preparing the construction site for construction operations;
   3. Materials to be removed and legally disposed of off site.
4. When applicable, verifying and utilizing survey control points as shown on the Drawings
5. Protecting existing site features to remain, such as fences, trees, shrubs and grassed areas
   outside the limit of work.
6. Protecting underground and overhead utilities and other existing facilities from damage.
7. Where applicable, provisions for site access and of traffic control.
8. At cessation of site improvement operations: Site clean-up
9. De-mobilization of all personnel and equipment.

2.4 CONSTRUCTION STAGING/STOCKPILE AREAS

A. Staging areas within the Park is permitted as shown on the Plans with the prior consent of and
   coordination with the Owner.

B. Restoration of the site to pre-existing condition shall be the sole responsibility of the Contractor.

2.5 MATERIALS AND EQUIPMENT:

A. Materials to be Removed and Stockpiled.
   1. Materials directed to be removed and stockpiled shall be removed, transported to and
      stacked in a location directed by the Owner’s Representative. All materials shall be neatly
      stacked as directed.
   2. If the Owner’s Representative determines that any part of the materials identified to be
      stockpiled are unsuitable for re use on the site or by the Owner elsewhere, such materials
      shall be evaluated for legal disposal by Owner's Representative and Contractor.

B. Signs: Conform to requirements of Temporary Facilities and Controls.

C. Temporary Site Protection: Temporary chain-link fence, if so desired shall be furnished, installed
   and maintained at no additional cost to the Owner. At the completion of all work at the site, the
   Contractor shall remove all temporary fencing and restore the site to its original condition at no
   additional cost to the Owner.

2.6 TEMPORARY CONSTRUCTION FACILITIES AND UTILITIES

A. Make arrangements with the Owner's Representative for storage of materials and equipment in
   designated locations at the construction site. If staged on site, materials shall be secured from
   vandalism and or theft.

B. Plastic construction fence or snow fencing if installed shall be maintained in good condition.
   Provide barricades, barrels, fencing and/or other barriers around excavations and trenches as
   required for safety. Upon completion, temporary fencing shall be removed and the affected area
   restored to existing conditions.
2.7 SITE MAINTENANCE

A. Control dust from Contractor operations in accordance with specified dust control measures.

B. Maintain the Site during construction in a manner that will not obstruct use on neighborhood streets. Proceed with the work in an orderly manner, maintaining the construction site free of debris and unnecessary equipment or materials.

C. Legally dispose of all debris, rubbish, hazardous materials, oil, and grease in accordance with local ordinances.

D. Maintain safety and security of the construction site and any stockpiled or staged materials or equipment if left on site.

2.8 TRAFFIC CONTROL

A. For all of his operations, the Contractor shall provide appropriate traffic control in accordance with, TEMPORARY FACILITIES AND CONTROLS. The purposes of the traffic control are 1) to ensure that operations in the project area are performed in a safe and orderly manner, and 2) to minimize the impact of truck and equipment traffic and noise on adjacent homes near the project area. The Contractor shall be responsible for obtaining any and all required permits and approvals.

B. Police Details, if required by the City, shall be paid directly to and coordinated with Providence Public Safety by the Owner.

2.9 DEMOBILIZATION

A. Contractor shall be responsible for site security and safety at all times. Upon substantial completion of the work, Contractor shall remove all excess materials, equipment, construction debris, temporary facilities and construction measures (fencing, signs, barriers, etc.) from the project area, and shall leave the site in suitable condition for full occupancy and use by the Owner. The sedimentation and erosion controls installed as part of the Work may not necessarily be removed at this time (see below).

B. The Owner’s Representative shall be the sole judge of whether the site has been suitably cleaned.

C. Upon suitable stabilization of all disturbed “erodible” areas (e.g. acceptable level of grass growth in loamed and seeded areas, mulch applied and stable in planting areas, etc.), contractor shall remove and legally dispose of all sedimentation and erosion control measures (silt fence, hay bales, catch basin inserts, etc.). See Section 024119 Selective Demolition, 329200 Turf and Grasses and 329300 Plants for directives and procedures.
PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. The construction site entrance shall be as indicated on the plans. The Owner will provide access to any locked gates. Any tracked debris from the site present on adjacent roadways shall be removed and the roads swept daily to remove any excess mud, dirt, or rock originating from the site. Trucks hauling material shall be covered and equipped with gates that prevent material from falling out. If present, catch basins within 100 feet of site entry and exit locations shall be protected with inlet sediment control devices and maintained for the duration of the work.

B. Identify, clearly mark and protect all survey monuments, temporary bench marks as well as any adjacent contractors’ work and facilities (if applicable). Repair or replacement shall be at Contractor’s sole expense if damaged by Contractor.

C. Protect existing culverts, sewers, and all other utilities including gas, telecommunications, electricity, and water. Repair or replace at Contractor’s sole expense if damaged by Contractor.

D. Utilize or install drum or sawhorse barricades or backfill all open excavations, holes, trenches, and depressions occurring at construction sites or occurring as part of this work.

3.2 CHANGE ORDER PROCEDURE

A. DESCRIPTION

1. The Contractor shall comply with this procedure in the process of giving notification of change and preparing and submitting a proposal for adjustment due to a desired, perceived, or actual change in the work. Changes in the work, or period of performance of the work, may be directed in writing by the Owner's Representative or may be requested by the Contractor. In either case, payment for work accomplished under a modification may not be made until a formal contract modification, incorporating the change into the contract, has been issued and executed. Therefore, it is incumbent upon the Contractor to comply fully with this procedure and to expedite the resolution of changes.

3.3 CHANGE SUBMITTALS

A. When requested, the Contractor shall submit the following to the Owner's Representative in accordance with the Submittals procedures described in these specifications:

1. Proposal cover letter on Contractor's letterhead;
2. Detailed price proposal;
3. Drawings or other explanatory data; and
4. Time extension statement with justification if any time extension is requested.
3.4 COMPLIANCE

A. The Contractor shall take such measures as needed to assure familiarity and compliance by its staff with these procedures. If change proposals are incomplete, unclear, or ambiguous or are not supported by adequate documentation, the data will be returned and the Contractor shall resubmit or supplement the proposal as requested by the Owner’s Representative. Delay resulting from the Contractor's noncompliance with this procedure shall not in itself constitute the basis for an extension in the time of performance under the contract.

3.5 PROCESSING CHANGES INITIATED BY THE OWNER’S REPRESENTATIVE

A. The Owner’s Representative will initiate changes only in writing. The Owner will sign any Request for Proposal (RFP). This will establish an Extra Work Order (EWO) number, by which the change will be identified until such time as it may be incorporated into the contract by formal Change Order (CO).

B. The Contractor may or may not be authorized to proceed with the changed work pending resolution of changes in the contract price or time of performance. If the work described in the RFP becomes critical to the timely performance of the Contractor's work, a written request for a Notice to Proceed must be forwarded to the Owner immediately. The Owner will issue any Notice to Proceed. This unilateral modification to the contract may be subject to further negotiation regarding price and time for completion.

C. Payment for changed work, covered by an authorized modification, will not be made until a notice to proceed covering the changed work has been executed.

D. The Contractor shall prepare and submit its proposal for change to include at a minimum:

1. A cover letter referencing the EWO number and citing the attachments, if any, which constitute the Contractor's total proposal.
2. A detailed price proposal showing labor, construction equipment, and material quantities and prices at the lowest practical level of each element of the work.
3. Any drawings, sketches, catalog cuts, samples, certifications, or other data required to be submitted by the Owner’s Representative that is required to fully document
4. A statement of the proposed change in the time of completion of the contract, together with all required justification for such a change.
5. A statement to the effect that there is "no change in price and/or time of completion of the work under this contract as a result of this proposed change", if that is the case.

E. The Owner may accept the Contractor's proposal without negotiation. Alternatively, upon receipt of a proposal which is satisfactory in form, the Owner’s Representative may require negotiation with the Contractor to arrive at a fair and equitable change in the contract price and time of completion. Upon agreement, a contract modification will be issued by the Owner for Contractor's execution.
3.6 PROCESSING CHANGES INITIATED BY THE CONTRACTOR

A. Should the Contractor feel that a change to the work under the contract, or to the contract itself, is necessary or desirable, it shall propose such a change to the Owner's Representative. This proposed change shall include a clear and concise description of the proposed change, along with that information cited in above.

B. Within a reasonable time, the Owner’s Representative will review the Contractor's proposal and determine if the proposed change is in the Owner's best interest. If so, Contractor will be advised of this and a an EWO number will be assigned to Contractor's proposal.

3.7 EXECUTING CHANGED WORK

A. The Contractor is cautioned not to proceed with the work described in a proposed change until it is authorized to do so in writing by the Owner's Representative.

3.8 TERMINATIONS AND DELAYS

A. Termination of Contract: If the Contractor or any of his/her subcontractors refuses or fails to prosecute the work with such diligence as will insure its completion within the time specified in these Contract Documents, or as modified, as provided for in these Contract Drawings, or violates any other Provisions of this Contract, the Local Public Agency, Local Public Agency, City, by written notice to the Contractor, may terminate the Contractor’s right to proceed with the Work. Upon such termination, the City of Providence may take over the work and prosecute the same to completion, by contract or otherwise, and the Contractor and his/her sureties shall be liable to the City of Providence for any additional cost incurred by the City of Providence in its completion of the work and they shall also be liable to the City of Providence for liquidated damages for any delay in the completion of the work as provided below. work and they shall also be liable to the City of Providence for liquidated damages for any delay in the completion of the work as provided below. Project work must commence 30 days after award of Contract or as mutually agreed upon by the Contractor and the Owner. The Contractor is required to submit a Work Schedule including all items included in the scope of work. The Work Schedule shall mirror the Schedule of Values which should be in chronological order. Both items are identified in the standard Pre-Bid and Pre-Construction Meeting Minutes as required. The work shall be continuous and the Contractor shall staff the project appropriately to meet the agreed upon work schedule. De- Mobilization from the project, prior to completion, must be agreed upon in writing by the Owner.

3.9 INSPECTION OF WORK

A. DESCRIPTION
1. Work included in this Section consists of periodic observation of construction of the project. The Contractor's work shall be monitored periodically by the Owner's Representative.

2. The Owner's Representative presence on site or construction observation work is inspectional in nature and will not include supervision or direction of the actual work of the contractor.

3. In no event will the Owner's Representative be responsible or liable for the contractor’s use or administration of personnel, machinery, staging, or other temporary or precautionary construction, safety precautions or procedures, or for compliance by the contractor with the provisions, terms, or specifications of the contract. Observation services provided by the Owner's Representative are solely for the benefit of the Owner.

4. The Contractor shall keep the Owner's Representative informed concerning the work status and projected work schedule through regular communications.

5. The Contractor shall not cover any work related to the required field visits until one of the following occurs:
   a. The Contractor is authorized by the Owner's Representative to proceed after the field visit.
   b. The field visit is re-scheduled by the Owner's Representative to a later construction event.
   c. The field visit is waived in writing by the Owner's Representative.

6. The Contractor shall request a Final Inspection seven calendar days in advance of the planned completion date. After review of the Notice of Completion, the Owner's Representative may reject the Notice for cause or schedule the Final Inspection. The Owner's Representative will perform its Final Inspection on all phases of the work and develop a comprehensive punch list, which will be provided to the Contractor.

7. The Final Inspection will be scheduled when the punch list items discovered during the Final Inspection have been corrected. If discovered, the Owner's Representative may add new items to the punch list at this inspection.

8. The Contractor is advised that the Owner's Representative will not accept the work until the Owner's Representative determines Substantial Completion has been achieved. Therefore, to minimize its risk, the Contractor should schedule its work to be substantially complete in time to allow the Final Inspection and punch list work to occur in advance of the Project Close Out Date. Due to the construction time period and the anticipated weather conditions, substantially complete will be defined as the completion of construction for all item and the temporary stabilization of all disturbed areas, excluding planting and final seeding. Planting and final seeding is to occur during the time periods specified.

9. Nothing in this Section shall be construed to limit the Owner's Representative right to inspect the work at any time.

3.10 CONSTRUCTION SCHEDULES

A. DESCRIPTION

1. Work included in this Section consists of preparation, submittal, and updating of the project.
3.11 CONSTRUCTION SCHEDULE

A. Submit the following to the Owner’s Representative in accordance with the Submittals Section. Submittals are for the record or approval as indicated.

1. The proposed construction schedule shall be submitted for approval within five (5) calendar days after receipt of Notice to Proceed.
2. Submit contract Weekly Summary Reports to the Owner’s Representative for the record at weekly site meeting at request by the Owner.
3. Submit construction progress schedule including a two week look ahead as back up to progress invoices.

B. The construction schedule shall show all work activities for completion of the work to be performed under this contract and will reflect Contractor's general sequential approach to the work. The construction schedule will be in a bar chart format. The minimum level of detail (number of activities) shall include the activities described in the Schedule of Values and the Scope of the Work. The construction schedule shall demonstrate completion of all work within the period of performance of the contract in a reasonable and achievable manner.

3.12 PERIODIC SCHEDULE UPDATES

A. The Contractor shall support monthly payment requests with an approved construction schedule marked to indicate progress. Submit updated schedule as necessary.

B. When in the opinion of the Owner’s Representative changes in the work occur that significantly affect the schedule, the Contractor shall submit a revised construction schedule for approval. The revised construction schedule shall be submitted within 10 calendar days after it is requested by the Owner’s Representative. The current approved construction schedule shall be used as a baseline for progress reporting.

C. Acts of God: Claims for additional compensation for ‘Acts of God’ will be reviewed by the Owner. It is the Contractor’s responsibility to secure the work site daily and failure to provide adequate provisions to do so may result in repairs to the site at the Contractor’s expense. Documented ‘Acts of God’ such as the state issuing a ‘State of Emergency’ may result in the Owner’s authorization to proceed repair funded by the Owner. No work shall proceed without written authorization by the Owner.

3.13 SUBMITTAL PROCEDURES

A. DESCRIPTION

1. This Specification Section covers the preparation and submission of all work plans, drawings, samples, manufacturer's literature and brochures, installation instructions, and operation and maintenance manuals as specified herein and in the various sections of these Specifications.
2. A Submittal Schedule shall be submitted for approval within five (5) calendar days after receipt of Notice to Proceed.
3.14 DRAWINGS

A. The term "drawings" as used herein includes ‘Shop Drawings’ as required for fabrication, erection and installation, layout, and setting of proposed improvements; lists or schedules of materials and catalogues and brochures; performance and test data; and all other drawings and descriptive data pertaining to materials and methods of construction as may be required to show that the materials, equipment, or systems and the positions thereof conform to the requirements of the Contract Documents.

B. Where specified and if so directed by the Owner’s Representative provide shop drawings that are accompanied by design computations.

C. Sheet sizes of drawings shall not exceed 24 in. by 36 in. The title block on all drawings shall bear the name of the Owner, the name of the project, and the project location.

D. The Contractor's drawings shall be submitted electronically in PDF format to the Owner’s Representative for review and approval.

E. The Contractor shall maintain a complete set of construction drawings at the jobsite, clearly marked to reflect as-built conditions. Upon completion of the work, the Contractor shall submit these Record Drawings to the Owner’s Representative.

F. The Owner’s Representative will review drawings and schedules only for conformance with the design of the Project and for compliance with the Contract Documents and Contract Drawings. The Contractor shall make any and all updates and corrections required by the Owner’s Representative.

G. Drawings shall be reviewed and returned within ten (10) working days of receipt of drawings at jobsite. Drawings and all supporting data, catalogs, or similar information shall be prepared by the Contractor or his suppliers and subcontractors but shall be submitted as instruments of the Contractor.

H. The Owner’s Representative review of drawings will be of a general nature and shall not relieve the Contractor from responsibility for errors and omissions of any sort, for deviations from Drawings or Specifications, or for conflict with the work of others that may result from such deviations. The Owner’s Representative review of drawings will not relieve the Contractor of responsibility to complete the work in accordance with the requirements of the Contract Documents.

I. After Notice of Award, the Contractor shall submit a Submittal Schedule to the Owner’s Representative. The Contractor's schedule shall be brought up to date from time to time to show the latest changes, omissions, and additions. The Schedule will be based on the Contractor's Construction Schedule and will show when the Contractor will submit the drawings and when he/she expects them to be returned so that construction activities shown on the Construction Schedule are not interrupted. There will be a minimum of three weeks between these two activities. Specific methods and routines for handling drawing reviews shall be established in advance within the general framework of the Contract Documents.
J. Work for which the Contractor's submittals are required shall not be started until the submittals have been reviewed and accepted in writing by the Owner's Representative. Any revision by the Contractor of a previously accepted submittal must be accepted in writing by the Owner’s Representative before implementation.

3.15 SAMPLES

A. The Contractor shall, at his or her expense, furnish the Owner’s Representative with samples of the various materials as specified in these Specification and Drawings. Samples shall be delivered to the office of the Owner’s Representative at the Contractor’s expense.

3.16 PRODUCT DATA

A. The Contractor shall submit to the Owner’s Representative all required Material Safety Data Sheets (MSDS) and all Product Data Sheets and any other relevant product information for all items identified in the Technical Specifications and Drawings. All data shall be furnished by the Contractor in accordance with the approved schedule.

B. SUBMITTAL LOG

1. Contractor to provided the following information:
   a. An I.D. number for each item
   b. Specification Section, Paragraph Number and Line Item Number (ie. 321313 / 1.3 / A)
   c. Item Name
   d. Description of the Item
   e. Date Submitted
   f. Status: Approved / Approved As Noted / Rejected
   g. Sub-Contractor (If any) providing the material
   h. Comments

3.17 QUALITY CONTROL DESCRIPTION

A. This Section provides the requirements for Contract quality control (QC) pertaining to the Work, including:

1. QC of products and workmanship;
2. Manufacturer’s instructions; and
3. Manufacturer’s certificates and field services.

3.18 WORKMANSHIP

A. The Contractor shall comply with industry standards of the region, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
B. The Contractor shall provide suitably-qualified personnel to produce work of specified quality.

C. The Contractor shall secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

D. The Contractor shall provide materials to match approved samples.

3.19 MANUFACTURER'S INSTRUCTIONS

A. The Contractor shall require compliance with instructions in full detail, including each step in sequence. Should instructions conflict with the Contract Documents, the Contractor shall request clarification from the Owner’s Representative before proceeding.

3.20 MANUFACTURER'S CERTIFICATES

A. When required in individual Specifications sections, the Contractor shall submit manufacturer's certificates, in duplicate, certifying that products meet or exceed specified requirements.

3.21 TESTING LABORATORY SERVICES (NIC)

A. Not Utilized in this Contract

B. (Modify as Required)

3.22 MANUFACTURER'S FIELD SERVICES

A. When required by the manufacturer or Owner’s Representative, the Contractor shall have the manufacturer provide a qualified representative to observe field conditions, conditions of surfaces and installation, and quality of workmanship as applicable and to make written report of observations and recommendations to the Owner’s Representative.

3.23 AUTHORITY OF OWNER’S REPRESENTATIVE

A. The Owner’s Representative will decide all questions that may arise as to the quality and acceptability of materials furnished. All questions that may arise as to the interpretation of the Contract Drawing and Specifications shall be determined by the Owner’s Representative.

B. The Owner and Owner’s Representative shall not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, and the Owner’s Representative will not be responsible for the Contractor's failure to perform the work in accordance with the Contract Documents.

C. The Owner’s Representative will not be responsible for the acts or omissions of the Contractor or any subcontractors, of the agents or employees of any Contractor or subcontractor, or of any other persons at the site or otherwise performing any of the work.
3.24 COORDINATION OF DRAWINGS AND SPECIFICATIONS

A. The Contractor shall take no advantage of any apparent error or omission in the Contract Drawings or Specifications. In the event the Contractor discovers such a discrepancy, error or omission, he shall immediately notify the Owner’s Representative. After review and consultation with the Owner’s Representative the Owner’s Representative will issue clarifications, provide interpretations and make such corrections as may be deemed necessary for the Contractor to proceed with fulfilling the intent of the Contract Drawings and Specifications.

B. When general reference is made on the Contract Drawings or within the Specifications to any cited Standard Specifications, it shall refer to the current edition of such Specifications or the latest revision thereof or interim Specifications adopted and in effect on the date of Effective Date of Agreement. In the event of a conflict between the Contract Drawings and the specifications, the Owner’s Representative shall be notified to provide a clarification to the Contractor.

3.25 COOPERATION WITH UTILITIES

A. The Contractor 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 practical.

B. Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be crossed, relocated or adjusted are to be moved by the Contractor or its designated agents, except as otherwise noted on the Contract Drawings. In the case of utility lines, the Contractor shall coordinate with the respective utilities for their removal and relocation.

C. Attention is directed to the possible existence of underground facilities not known to the Owner’s Representative or in a location different from that which is shown on the Contract Drawings. The Contractor shall take steps to ascertain the exact location of all underground facilities prior to doing work that may damage such facilities or interfere with their service.

3.26 INDEPENDENT TESTING AND INSPECTION (NIC)

A. Not Applicable under this Contract

3.27 REQUIREMENTS

A. The requirements for sampling and testing or inspection are specified in the Specifications and Drawings. The Contractor shall maintain a complete and up-to-date file of all quality control documentation at the jobsite.
3.28 MATERIAL AND EQUIPMENT

A. DESCRIPTION

1. This Specification Section includes the requirements for the transportation, handling, storage, and protection of materials and equipment as specified herein and in the various Sections of these Specifications. This Section also addresses the procedure for Contractor-proposed product substitutions.

3.29 MANUFACTURER REQUIREMENTS

A. In general, the Contractor shall receive, handle, and store materials and equipment in accordance with manufacturer's recommendations and in a manner which will protect such items from damage or deterioration.

B. GENERAL

C. Products include the material, equipment, and systems used on this Project. Comply with the Specifications, Drawings and referenced standards as minimum requirements.

3.30 TRANSPORTATION AND HANDLING

A. The Contractor shall receive, handle, and store materials and equipment supplied by him/her in a manner that will protect such items from damage or deterioration in accordance with procedures provided by product manufacturers and the Owner.

B. Promptly inspect the shipments to assure that the products comply with requirements, the quantities are correct, and the products are undamaged.

3.31 STORAGE AND PROTECTION

A. Materials and equipment shall be stored off the ground on blocking or pallets and shall be covered for protection from vandalism and weather damage.

B. Materials and equipment shall be stored, tested, and cleaned prior to use, in accordance with the Specification and all specific manufacturers’ requirements. Damaged or nonconforming items shall be removed immediately to a separated storage area for expeditious removal from site.

C. The Contractor shall provide a secure outside storage area in the vicinity of the site.

3.32 SUBSTITUTIONS

A. Substitutions will be considered only when a product becomes unavailable due to no fault of the Contractor or when deemed appropriate by the Owner’s Representative.
B. Document each request with complete data substantiating the compliance of the proposed substitution with the Contract Documents.

C. The requested substation proposed constitutes a representation that the Contractor:
   1. Has investigated the proposed product and determined that it meets or exceeds, in all respects, the specified product.
   2. Will provide the same warranty for substitution as for the specified product.
   3. Will coordinate installation and make other changes which may be required for the Work to be complete in all respects.
   4. Waives claims for additional costs which may subsequently become apparent.

D. Substitutions will be considered when they are indicated or implied on shop drawings or product data submittals without separate written request, or when acceptance will require substantial revision of the Contract Documents.

E. The Owner’s Representative will determine acceptability of the proposed substitution, and will notify the Contractor of acceptance or rejection in writing within a reasonable time. Only one request for the substitution will be considered for each product. When substitution is not accepted, the Contractor shall provide the specified product.

3.33 REJECTED MATERIALS AND DEFECTIVE WORK

A. Materials furnished by the Contractor and rejected by the Owner’s Representative as unsuitable or not in conformity with the specifications shall forthwith be removed from the job-site and work area by the Contractor, and shall not be made use of elsewhere in the work.

B. Any errors, defects, or omissions in the execution of work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good by and at the expense of the Contractor and in a manner satisfactory to the Owner or Owner’s Representative.

C. The Contractor shall reimburse the Owner for any expense, losses or damages incurred in consequence of any defect error, omission or act of the Contractor or his employees, as determined by the Owner’s Representative, occurring previous to the final payment.

3.34 PROJECT CLOSEOUT

A. DESCRIPTION

1. This Section specifies administrative and procedural requirements for the project closeout including, but not limited to:
   a. Project record document (As-Built drawings) submittal. Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most
capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
b. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Upon completion of work, submit record drawings to the Owner’s Representative.

2. Record Specifications
a. Maintain one complete copy of the Project Manual, including addenda. Mark these documents to show substantial variations in actual Work performed in comparison with the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data. Upon completion of the Work, submit record Specifications.

3. Test Results
a. Not Applicable for this project

4. REMOVAL OF PROTECTION
a. Remove temporary protection and facilities installed for protection of the Work during construction. Fencing and erosion and sediment control measures and best management practices can be removed after permanent measures have been established.

3.35 WARRANTIES

A. DESCRIPTION

1. This Section specifies general administration and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers’ standard warranties on products and special warranties.
   a. Refer to the General Conditions for terms of the Contractor’s special warranty of workmanship and materials;
   b. General closeout requirements are included in Section “Project Closeout”; and
   c. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the specifications and Drawings.

2. Disclaimers and Limitations
   a. Manufacturer’s disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

B. DEFINITIONS

1. Standard Warranties
   a. Standard product warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
2. Special Warranties
   a. Special warranties are written required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

C. WARRANTY REQUIREMENTS

1. Related Damages and Losses
   a. When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for corrections of warranted Work.

2. Reinstatement of Warranty
   a. When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

3. Replacement Cost
   a. Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner’s Representative has benefited from use of the Work through a portion of its anticipated useful service life.

4. Owner’s Recourse
   a. Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights and remedies.

5. Rejection of Warranties
   a. The Owner’s Representative reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents. The Owner’s Representative reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to counter sign such commitments are willing to do so.
   b. All warranties shall be submitted to the Owner in accordance with conditions of the Contract and the Submittals.

D. WARRANTY PERIOD

1. All warranties required by the Contract documents shall commence on the date of Final Acceptance
SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 311000 "Site Clearing" for removing existing trees and shrubs.

1.3 DEFINITIONS

A. (DBH): Diameter breast height; diameter of a trunk as measured by the average of the smallest and largest diameters at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground.

B. Plant-Protection Zone: Area surrounding individual trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PRE-CONSTRUCTION MEETINGS

A. Pre-construction Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
   a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
   b. Arborist's responsibilities.
   c. Coordination of Work and equipment movement with the locations of protection zones.
   d. Trenching by hand or with air spade within protection zones.
e. Field quality control and maintenance.

f. Coordination by Parks Department City Forester and Forestry crews.

1.5 ACTION SUBMITTALS

A. Contractor shall arrange site visit with City Forester prior to mobilization to determine the scope of pruning by the Parks Department Forestry Division or Contractor as indicated on the drawings.

1.6 QUALITY ASSURANCE

A. Arborist Qualifications: Licensed arborist in jurisdiction where Project is located.

1.7 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill Soil: Stockpiled soil mixed with planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.

1. Mixture: Well-blended mix of two parts stockpiled soil to one part planting soil.

B. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements:

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate...
tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches apart.

a. Height: 72 inches.
b. Color: High-visibility orange, nonfading.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.2 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Owner's Representative. Install one sign on protection-zone fencing. Sign to read "Tree Protection Zone - Do not Disturb". Sign to be printed on 24"x 36" white panel with black lettering at a minimum of 3" height lettering.

C. Maintain protection zones free of trash.

D. Maintain protection-zone fencing in good condition as acceptable by Owner's Representative and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by Owner's Representative if a root buffer effective against soil compaction is constructed as directed by Owner's Representative. Maintain root buffer so long as access is permitted.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.
B. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

C. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover and wrap with dampened burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil or as directed by Owner's Representative.

3.4 ROOT PRUNING

A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. No roots larger than two (2) inches in diameter may be cut without permission of the City Forester. Cuts must be made with hand-pruner, handsaws, or chainsaws.
3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."

B. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.5 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by Owner's Representative unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.
3.6 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Owner's Representative.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Owner's Representative. Replacement trees to be equal to the total diameter of mature tree by multiple equal diameter specimens.

B. Trees: Remove and replace trees that are damaged during construction operations that Owner's Representative determines are incapable of restoring to normal growth pattern.

1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 4" or smaller in caliper size.
2. Large Trees: Provide multiple trees of 3-3.5" caliper size to equal total diameter of tree being replaced.
   a. Species: As determined by Owner's Representative.
3. Plant and maintain new trees as specified in Section 329300 "Plants."

C. Soil Aeration: Where directed by Owner's Representative, aerate surface soil compacted during construction. Aerate to loosen soil 10 feet beyond drip line and no closer than 36" to tree trunk with air spade.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 015639
SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General Requirements, apply to this
      Section.

1.2 SUMMARY
   A. Section Includes:
      1. Demolition and removal of selected site elements.

1.3 DEFINITIONS
   A. Remove: Detach items from existing construction and legally dispose of them off-site unless
      indicated to be salvaged or reinstalled.
   B. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise
      indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP
   A. Unless otherwise indicated, demolition waste becomes property of Contractor.
   B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and
      their contents, commemorative plaques and tablets, and other items of interest or value to Owner
      that may be uncovered during demolition remain the property of Owner.
      1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PRECONSTRUCTION MEETINGS
   A. Preconstruction meeting: Conduct meeting at Project site.
      1. Inspect and discuss condition of construction to be selectively demolished.
1.6 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
   1. Before selective demolition, Owner will remove the following items:
      a. surface mounted and freestanding trash receptacles.

B. Notify Owner's Representative of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. If suspected hazardous materials are encountered, do not disturb; immediately notify Owner's Representative. Hazardous materials will be removed by Owner under a separate contract.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

3.2 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

B. Remove temporary barricades and protections where hazards no longer exist.

3.3 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
2. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner's Representative, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Bituminous Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.
SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General Requirements, apply to this Section.

1.2 SUMMARY
A. Section Includes:
   1. Form-facing material for cast-in-place concrete.
   2. Shoring, bracing, and anchoring.

1.3 DEFINITIONS
A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.4 PRECONSTRUCTION MEETINGS
A. Preconstruction Conference: Conduct conference at Project site.
   1. Review the following:
      a. Special inspection and testing for field quality control.
      b. Construction, movement, contraction, and isolation joints
      c. Forms and form-removal limitations.
      d. Shoring and reshoring procedures.
      e. Anchor rod and anchorage device installation tolerances.

1.5 ACTION SUBMITTALS
A. Product Data: For each of the following:
   1. Exposed surface form-facing material.
   2. Concealed surface form-facing material.
   3. Form ties.
4. Form-release agent.

1.6 QUALITY ASSURANCE

A. Mockups: Formed surfaces to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.

1. Subject to compliance with requirements, approved mockups may become part of the completed Work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
   a. Plywood, metal, or other approved panel materials.
   b. Exterior-grade plywood panels, minimum three-ply, one smooth side sufficiently thick to sustain loads suitable for concrete forms, complying with DOC PS 1, and as follows:
      1) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
2.3 WATERSTOP

A. Flexible Rubber Waterstops: U.S. Army Corps of Engineers CRD-C 513, [with factory-installed metal eyelets], for embedding in concrete to prevent passage of fluids through joints, with factory fabricated corners, intersections, and directional changes.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>
2. Profile: [Flat dumbbell with center bulb] [Flat dumbbell without center bulb] [Ribbed with center bulb] [Ribbed without center bulb] [As indicated] <Insert profile>.
3. Dimensions: [4 inches by 3/16 inch thick] [6 inches by 3/8 inch thick] [9 inches by 3/8 inch thick] <Insert dimensions>; nontapered.

B. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops [with factory-installed metal eyelets], for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals, with factory fabricate corners, intersections, and directional changes.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>
2. Profile: [Flat dumbbell with center bulb] [Flat dumbbell without center bulb] [Ribbed with center bulb] [Ribbed without center bulb] [As indicated] <Insert profile>.
3. Dimensions: [4 inches by 3/16 inch thick] [6 inches by 3/16 inch thick] [6 inches by 3/8 inch thick] [9 inches by 3/16 inch thick] [9 inches by 3/8 inch thick] <Insert dimensions>; nontapered.

C. Flexible PVC Waterstops: U.S. Army Corps of Engineers CRD-C 572, [with factory-installed metal eyelets], for embedding in concrete to prevent passage of fluids through joints, with factory fabricate corners, intersections, and directional changes.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>
2. Profile: [Flat dumbbell with center bulb] [Flat dumbbell without center bulb] [Ribbed with center bulb] [Ribbed without center bulb] [As indicated] <Insert profile>.
3. Dimensions: [4 inches by 3/16 inch thick] [6 inches by 3/8 inch thick] [9 inches by 3/8 inch thick] <Insert dimensions>; nontapered.

D. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

E. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer-modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>
2.4 RELATED MATERIALS


B. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

C. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.

C. Limit concrete surface irregularities as follows:
   1. Surface Finish-1.0: ACI 117 Class D, 1 inch.
   2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.
   1. Minimize joints.
   2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
   1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
   2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.

1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Landscape Architect prior to forming openings not indicated on Drawings.

L. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Landscape Architect.
3. Place joints perpendicular to main reinforcement.

M. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

N. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

O. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Clean embedded items immediately prior to concrete placement.
3.3 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 FIELD QUALITY CONTROL

A. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 031000
SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Steel reinforcement bars.

1.2 PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at Project site.

1.3 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT
A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed billet steel.

2.2 FABRICATING REINFORCEMENT
A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." and in accordance with requirements of ACI 318 and ACI 315.

PART 3 - EXECUTION

3.1 PREPARATION
A. Protection of In-Place Conditions:
   1. Do not cut or puncture vapor retarder.
   2. Repair damage and reseal vapor retarder before placing concrete.
B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
C. Accurately place reinforcing steel in accordance with approved drawings. Thoroughly clean reinforcement of any coating which would reduce bonding. Do not splice reinforcement at points of maximum stress. Stagger splices in adjacent bars and provide a minimum overlap of 30-bar diameters at splices.

D. Securely saddle tie intersections. Rigidly secure reinforcement in place

E. Secure reinforcing, anchor bolts, inserts etc. rigidly in place prior to pouring concrete.

F. All rebar shall be cold bent

G. Where reinforcing is shown continuous thru construction joints, Form Savers dowel bar splice devices or diamond dowel systems may be utilized, as per plans. Drilling and insertion of 18” #4 rebar splices with epoxy adhesive is permitted.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Install welded-wire reinforcement in longest practicable lengths.

   a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches.
2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 INSTALLATION TOLERANCES

A. Comply with ACI 117.

END OF SECTION 032000
SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General Requirements apply to this
      Section.

1.2 SUMMARY
   A. Section includes cast-in-place concrete, including formwork, concrete materials, mixture design,
      placement procedures, and finishes.
   B. Related Requirements:
      1. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS
   A. Cementitious Materials: Portland cement alone or in combination with one or more of the
      following: blended hydraulic cement, 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.

1.4 PRE CONSTRUCTION MEETINGS
   A. Pre-construction Conference: Conduct conference at Project site .
      1. Before submitting design mixtures, review concrete design mixture and examine
         procedures for ensuring quality of concrete materials. Require representatives of each
         entity directly concerned with cast-in-place concrete to attend, including the following:
            a. Concrete Subcontractor.
         2. Review concrete repair procedures, and concrete protection.

1.5 ACTION SUBMITTALS
   A. 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.
B. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Landscape Architect.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Admixtures.
2. Form materials and form-release agents.
3. Fiber reinforcement.

1.7 QUALITY ASSURANCE

A. Mockups: Cast concrete formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.

1. Build panel approximately 100 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Architect.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. Structural 1, B-B or better; mill oiled and edge sealed.
      b. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.


D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

2.3 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, Type I.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source.
   1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

E. Water: ASTM C 94/C 94M and potable.

2.4 FIBER REINFORCEMENT

A. Carbon-Steel Fiber: ASTM A 820/A 820M, Type 1, cold-drawn wire, deformed, minimum of [1.5 inches] [2 inches] [2.4 inches] <Insert dimension> long, and aspect ratio of [35 to 40] [45 to 50] [60 to 65] <Insert ratio>.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

B. Carbon-Steel Fiber: ASTM A 820/A 820M, Type 2, cut sheet, deformed, minimum of [1.5 inches] [2 inches] [2.4 inches] <Insert dimension> long, and aspect ratio of [35 to 40] [45 to 50] [60 to 65] <Insert ratio>.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

C. Synthetic Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, [1/2 to 1-1/2 inches] [1 to 2-1/4 inches] <Insert dimensions> long.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

D. Synthetic Micro-Fiber: Fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, [1/2 to 1-1/2 inches] [1 to 2-1/4 inches] <Insert dimensions> long.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

E. Synthetic Macro-Fiber: Polyolefin macro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, [1 to 2-1/4 inches] <Insert dimensions> long.

1. <Click here to find, evaluate, and insert list of manufacturers and products.>

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Water: Potable.

C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B, dissipating.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B, nondissipating.
2.6 RELATED MATERIALS
   
   A. Reglets: Fabricate reglets of not less than 0.022-inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
   
   B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.7 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.
   
   B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
   
   C. Admixtures: Use admixtures according to manufacturer's written instructions.
      1. Use water-reducing admixture in concrete, as required, for placement and workability.
      2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
      3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
      4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS
   
   A. Footings: Normal-weight concrete.
      1. Minimum Compressive Strength: 4000 psi 3000 psi at 28 days.
      2. Maximum W/C Ratio: \[0.50\] \[0.45\] \[0.40\] <Insert number>.
      3. Slump Limit: 4 inches, plus or minus 1 inch.
      4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
      5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

2.9 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.

PART 3 - EXECUTION

3.1 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 Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. 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.

3.2 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 public view.
3.3 FINISHING FLOORS AND SLABS

A. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restreighten 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.
2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed [1/4 inch] [3/16 inch] [1/8 inch].

B. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.4 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. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. 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, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

END OF SECTION 033000
SECTION 116800 - PLAY FIELD EQUIPMENT AND STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General Requirements, apply to this Section.

1.2 SUMMARY
   A. Section includes playground equipment as follows:
      1. Freestanding playground equipment.
      2. Composite playground equipment.

1.3 DEFINITIONS
   A. Definitions in ASTM F1487 apply to Work of this Section.

1.4 PRECONSTRUCTION MEETING
   A. Preconstruction Meeting: Conduct at Project site.

1.5 ACTION SUBMITTALS
   A. Product Data: For each type of product.
   B. Shop Drawings: For each type of playground equipment.
      1. Include plans, elevations, sections, and attachment details.
      2. Include fall heights and use zones for playground equipment, coordinated with the critical-height values of protective surfacing specified in Section 321816.13 "Playground Protective Surfacing."
   C. Samples for Initial Selection: For each type of exposed finish.
      1. Manufacturer's color charts.
      2. Include Samples of accessories involving color selection.
1.6 INFORMATIONAL SUBMITTALS
   A. Qualification Data: For Installer, and testing agency.
   B. Product Certificates: For each type of playground equipment.
   C. Material Certificates: For the following items:
      1. Shop finishes.
      2. Wood-Preservative Treatment: Include certification by treating plant that states type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
   D. Sample Warranty: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For playground equipment and finishes to include in maintenance manuals.

1.8 QUALITY ASSURANCE
   A. Manufacturer Qualifications: A firm whose playground equipment components have been certified by IPEMA's third-party product certification service.

1.9 WARRANTY
   A. Special Warranty: Manufacturer agrees to repair or replace components of playground equipment that fail in materials or workmanship within specified warranty period.
      1. Failures include, but are not limited to, the following:
         a. Structural failures.
         b. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
      2. Warranty Period: as per manufacturer and varies from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   A. The following playground equipment and components shall have the IPEMA Certification Seal:
   B. Playworld Single post (2) bay swings with (4) belt seats #ZZXX0818
      1. Playworld Single post (2) bay swings with (2) belt seats and (2) bucket seats #ZZXX0818
3. Berliner Eddie.01 #90260101
4. Berliner Cosmo S.05 #90.111.050
5. Berliner Freeride #90260802
6. Berliner Access Whirl #90.261.200
7. Berliner Palmetto Saucer #95.190.578 - deliver and install only
8. Earthscape Log pile #3.1 - Oak
9. Kompan Giant Dome with Sunshade #COR86700 (Venus) and #CRE86700 (Midnight Blue)
10. Kompan Combi 1 #FSW10101- color to be Medium Green
11. Kompan Parallel Bars #FSW20100 color to be Night Sky Blue
12. Kompan Pull Up Station #FSW20801 - color to be Night Sky Blue
13. Kompan Combi Steps #FSW21900- color to be Light Blue

2.2 PERFORMANCE REQUIREMENTS

A. Safety Standard: Provide playground equipment according to ASTM F1487.

2.3 MATERIALS

A. Aluminum: Material, alloy, and temper recommended by manufacturer for type of use and finish indicated.

B. Steel: Material types, alloys, and forms recommended by manufacturer for type of use and finish indicated, hot-dip galvanized.

C. Stainless-Steel Sheet: Type 304; finished on exposed faces with No. 2B finish.

D. Wood: Oak, surfaced smooth on all sides and all edges rounded.

E. Opaque Plastics: Color impregnated, UV stabilized, and mold resistant.

F. Suspension Chain and Fittings: ASTM A467/A467M, Class CS, 4/0 or 5/0, welded-straight-link coil chain; hot-dip galvanized; with commercial-quality, hot-dip galvanized or zinc-plated steel connectors and swing or ring hangers.

G. Suspension Cable: Manufacturer's standard hot-dip galvanized zinc-plated cable; with commercial-quality, hot-dip galvanized or zinc-plated steel connectors and swing or ring hangers.

H. Post Caps: Cast aluminum or color-impregnated, UV-stabilized, mold-resistant polyethylene or polypropylene; color to match posts.

I. Platform Clamps and Hangers: Cast aluminum or zinc-plated steel, not less than 0.105-inch-nominal thickness.

J. Hardware: Manufacturer's standard; commercial-quality; corrosion-resistant; hot-dip galvanized steel and iron, stainless steel, or aluminum; of a vandal-resistant design.
K. Fasteners: Manufacturer's standard; corrosion-resistant; hot-dip galvanized or zinc-plated steel and iron, or stainless steel; permanently capped; and theft resistant.

2.4 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment: Pressure-treat wood products according to AWPA U1 and the following:

1. Use preservative chemicals acceptable to authorities having jurisdiction and containing no arsenic or chromium. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials. See Manufacturer's Recommendations.
2. Kiln-dry lumber and plywood after treatment to a maximum moisture content, respectively, of 19 and 15 percent. Do not use materials that are warped or do not comply with requirements for untreated materials.

2.5 CAST-IN-PLACE CONCRETE

A. Concrete Materials and Properties: Dry-packaged concrete mix complying with ASTM C387/C387M and mixed at site with potable water, according to manufacturer's written instructions, for normal-weight concrete with minimum 28-day compressive strength of 4000 psi, 4-inch slump, and 3/4-inch- maximum-size aggregate.

2.6 IRON AND STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils. Comply with coating manufacturer's written instructions for pretreatment, applying, and baking.

B. PVC Finish: UV-stabilized, mold-resistant, slip-resistant, matte-textured, dipped or sprayed-on PVC finish, with flame retardant added, and with minimum dry film thickness of 80 mils. Comply with coating manufacturer's written instructions for pretreatment and application.

2.7 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Bright, Cold-Rolled, Unpolished Finish: No. 2B.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for earthwork, subgrade elevations, surface and subgrade drainage, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading required for placing playground equipment and protective surfacing is completed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions for each equipment type unless more stringent requirements are indicated. Anchor playground equipment securely, positioned at locations and elevations indicated.

1. Maximum Equipment Height: Coordinate installed fall heights of equipment with finished elevations and critical-height values of protective surfacing. Set equipment so fall heights and elevation requirements for age group use and accessibility are within required limits. Verify that playground equipment elevations comply with requirements for each type and component of equipment.

B. Post and Footing Excavation: Excavate holes for posts and footings as indicated in firm, undisturbed or compacted subgrade.

C. Post Set with Concrete Footing: Comply with Section 033000 "Cast-in-Place Concrete" ACI 301 for measuring, batching, mixing, transporting, forming, and placing concrete.

1. Set equipment posts in concrete footing. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at the correct angle, alignment, height, and spacing.
   a. Place concrete around posts and vibrate or tamp for consolidation. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

2. Embedded Items: Follow equipment manufacturer's written instructions and drawings to ensure correct installation of anchorages for equipment.

3. Finishing Footings: Smooth top, and shape to shed water.

END OF SECTION 116800
SECTION 116800.10 - SPLASHPAD PLAY EQUIPMENT

PART 1 - GENERAL

1.1 PRODUCT CONSTRUCTION

A. The aquatic play products shall be suitable for installation in municipal and commercial aquatic facilities and public play areas.

B. Products shall be specifically designed for the use by children and adults and follow the ASTM F2461-09 norm. In addition, products shall be manufactured by a company that has at least five (5) years of experience in the design and engineering of children’s aquatic play areas.

C. Any aquatic play product belonging to a new product line or series should demonstrate meeting the effective norm or show the conformity and resistance of the prescribed materials if it is proposed equivalency. The contractor or manufacturer must demonstrate meeting specifications by providing technical documents and drawings to be included in their bid proposal.

D. Play Products: All aquatic play products installed above and below grade shall be manufactured from 304/304L stainless steel. The anchoring system and associated fastening hardware shall be manufactured from 304/304L stainless steel. Rigid centricast fiber reinforced (FRP) and/or molded fiberglass, PVC, filament wound tubing, Galvanized Steel, or Aluminum shall not be utilized for any above or below grade play product structures.

E. Mounting and Assembly Hardware: All hardware and anchoring systems shall be 304/304L stainless steel. All Play Products and Ground Spray systems shall include an integrated anchoring and leveling system facilitating installation and a flush surface finish. Exposed and accessible hardware shall be tamper resistant, requiring a special tool for removal to deter vandalism and theft.

F. Spray nozzles, caps and heads: Shall be manufactured from C360 brass and shall use tamper resistant tools for installation and removal. PVC, Nylon, and Delrin™, shall not be utilized. All grade level play products are to be furnished with appropriate winterization caps.

G. Polished Finish: All stainless steel above ground features shall have a high-luster polished finish.

H. Material for Paneling, Signage, Water Deflection, and Toe Guards: All Polyethylene, Polyurethane, Elastomers, and Seeflow Polymers used for paneling, signage or water deflection shall be resistant to chlorinated water and be ultraviolet stabilized to inhibit sunlight fading.

I. Safety & Craftsmanship: All accessible edges shall be machined to a rounded finish. All welds shall be watertight, buffed smooth, or polished to a non-visible finish and factory pressure tested. Accessible nozzles and spray heads shall be recessed to ensure a completely safe play environment with no pinch points, head entrapments or protrusion hazards. All products shall be designed in accordance with ASTM F1487, ASTM F-2461 and CSA Z614-98 regulations for public playgrounds.
J. Lexan Polymer: The Lexan Polymer shall be specially selected for aquatic play products and shall have the following characteristics: translucent, highly resistant to shock and impact, vandalism and must be non-flammable. The polymer shall present dimensional stability a high resistance towards chemical products, ultra violets rays and be transparent presenting crystal clear surface throughout.

K. H. SeeFlow Polymer: The SeeFlow Polymer shall be specially selected for aquatic play products and shall have the following characteristics: translucent, highly resistant to shock and impact, vandalism and must be non-flammable. The polymer shall present dimensional stability a high resistance towards chemical products, ultra violets rays and be transparent presenting crystal clear surface throughout.

1.2 PLAY PRODUCT INSTALLATION

A. When applicable, templates shall be supplied to facilitate the installation of embedded anchoring equipment.

B. All play products shall have electrical grounding studs incorporated into their associated anchoring equipment. All play products shall be grounded by the installer per local codes.

C. All installation conduit wiring including electrical supply panel, PVC connections, piping, elbows, tees, play product assembly if required and other items relating to the installation shall be supplied by the general contractor.

D. Drawings and Instructions: Product drawings and installation manuals shall be supplied by the manufacturer for ease of installation.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All aquatic play products and associated equipment must be properly wrapped and secured in place while in transport to the project site. Care shall be observed during offloading and handling to prevent excessive stress and abrasions.

B. At the site, the play products and associated equipment are to be stored in safe areas, out of the way of traffic and other construction activities, until the actual time of installation. If required, safety barricades or other like precautions must be taken for the protection of public and adjacent property.

C. Protective wrapping on the aquatic play features must be left in place until construction work for the Splashpad is complete.

1.4 COMMISSIONING OF THE SPLASHPAD

A. Upon completion of construction, the general contractor shall provide the owner/operator adequate training on facility operations and maintenance. The contractor may request that the
equipment manufacturer and/or manufacturer’s representative provide on-site start-up and training for the owner/operator.

1.5 SPLASHPAD QUALITY ASSURANCE

A. Provide evidence of commitment of quality craftsmanship as demonstrated by the following manufacturer qualifications:

B. The products shall be designed and produced at a facility owned and directly supervised by the supplier.

C. All products shall be shipped from a single source.

D. A full time licensed engineer must be on-staff

E. A full time quality control manager must be on-staff

1.6 EQUIVALENCIES CLAUSES

A. To enable all bids to be judged equitably, they shall be based on the specified products in this document and shown on the drawings.

B. A. The proposal for any substitute products must be attached to the bid separately, identifying the substitute product by its trade name along with any savings it may represent for the client.

C. B. Following the opening of the bid, only those substitutes proposed by the lowest bidder of the specified products, will be considered.

D. C. All substitute approval requests shall be accompanied by manufacturing drawings, including spray zones, sequencing, plumbing and electrical schematics and complete salt spray resisting testing data produced by an independent laboratory for coatings and a written warranty from the manufacturer.

E. No substitution or equivalency submitted will be considered if products to be considered are not part of manufacturer standard existing product line or a written proof that product has manufactured previously by the substitute manufacturer. Please refer to General Clauses 1.1

F. D. Each substitute sample must be presented to the owner/consultant within seven days following the opening of bids. The sample must be completely operational. After this time period, the bidder will be required to supply the original specified product.

G. E. The owner/consultant reserves the right to grant or deny approval for proposed substitutions without prejudice to his rights and his decision shall be final. The above conditions apply to this section independently of any other clauses on the subject found in this document.

H. F. If applicable the products must be interchangeable and of equivalent quality to the materials already installed.
1.7 SPLASHPAD EQUIPMENT WARRANTIES

A. Minimum Warranty periods

B. Splashpad Play Events/Products & Skid Mounted Water Quality Management System Equipment

C. A 25 Year Warranty on stainless steel Play Events/Products, stainless steel anchoring systems and aluminum spheres.

D. A 10 Year Warranty on the reinforced fiberglass skid, sand filter fiberglass tank and cartridge filter fiberglass tank.

E. A 5 Year Warranty on brass components including; spray nozzles, spray caps and spray heads, High-density polyethylene components, polyurethane components, and ultra high molecular weight polyethylene components. The Subterranean vault (enclosure and access hatches), stainless steel automated water distribution manifold, drain boxes, strainers, electrical enclosures, and chemical controllers.

F. A 2 Year Warranty on color coatings, stainless steel hardware & moving parts, fiberglass products, Seeflow Polymers, Soft Touch Elastomers (Toe Guards), subterranean water containments system, circulation pumps, chemical injection pumps, chlorinator systems, acid feed systems, polyvinyl chloride (PVC); piping, fittings, ball valves, check valves, cartridge elements, pressure gauges, chemical sensing probes, motor starters, electrical relays, terminal blocks, actuated valves, programmable logic controller (PLC controller), time switches, manual switches, transformers, breakers, electrical wiring and connections.

G. All warranties are to be managed by the equipment supplier.

1.8 ADDITIONAL REQUIREMENTS/OPTIONS: FILTRATION/CHEMICAL TREATMENT (NIC)

A. The manufacturer is required to offer a complete water quality management system to accommodate the specified aquatic play products. This complete Splashpad automation package, consisting of a FRP water containment system, 2 loop water filtration system, automated chemical treatment system, automated water distribution system, Splashpad operational control and failsafe monitoring systems, Motor starter protection circuitry, and a user activated controller to regulate the use of the play events and their hours of operation.

B. This water quality management system must be pre-assembled, factory tested, and come complete with all the necessary plumbing, pre-wired control systems, pumps, and solenoid valves. The manufacturer must have the capacity to provide technical documentation, operations and maintenance manuals, and technical support for the entire system.
PART 2 - SYSTEMS

2.1 WATER QUALITY MANAGEMENT SYSTEM (NIC)

A. The contractor shall provide and install the following Water Quality Management System as manufactured by VORTEX, 328 Avro St., Montreal, Quebec, Canada H9R 5W5, (514) 694-3868.

B. The Water Quality Management System shall be factory assembled and water pressure tested before delivery.

C. The Water Quality Management System shall be serviceable through a walk in door enclosure, and must be accessible from a minimum of 3 sides.

D. All electrical equipment, including circulation pumps, filtration pumps, chemical controllers, chemical feed pumps, electrical solenoid valves, and flow switches, shall be pre-wired and tested before delivery.

E. All specified flow rates shall be tested and verified before delivery.

F. All equipment shall be mounted directly onto a corrosion resistant fiberglass skid using stainless steel hardware prior to delivery.

G. The Water Quality Management System shall use NSF certified self-priming pump(s), with an integral strainer, to operate the play features.

H. The pump(s) shall be capable of providing the required flow to operate all play features simultaneously at a minimum of 70 feet head.

I. A complete motor starter protection enclosure and circuitry shall be skid mounted, factory assembled and wired to the pumps before delivery.

J. All pump(s) shall be electronically interlocked to start and stop simultaneously, unless otherwise specified.

K. The sand filter(s) shall be NSF-listed for swimming pool filters. It shall be capable of maintaining a filtration rate of less than 30 minutes, at the required filtration rate.

L. A flow control valve and flow meter shall be present to maintain the required filter flow rates. Influent and effluent pressure gauges shall be present on all pumps.

M. A backwash valve kit shall be provided, including a sight glass, flow control valve, and flow meter to control the backwash rate.

N. An automated chemical controller shall be present on the system, capable of monitoring and adjusting pH and ORP levels.

O. The chemical controller shall have an alarm system that shall close all valves to the aquatic play features in case of a loss of proper water chemistry.
P. The chemical controller shall not be capable of injecting chemicals into the system whenever the filter or feature pump is off.

Q. The chemical controller shall be pre-wired to the Splashpad System Controller and feed systems prior to delivery.

R. Both 50 gallon chemical reservoirs shall be double-walled polyethylene with a polyethylene lid and vent to atmosphere.

S. A flow switch shall be present on each pump to monitor flow and shut down the pump system in the event of no flow. It shall be pre-wired to the Splashpad System Controller prior to delivery.

T. The water distribution system must be fabricated out of Stainless Steel 304/304L and be pre-assembled, factory tested, and come complete with all the necessary plumbing.

2.2 SPLASHPAD SYSTEM CONTROLLER (CONNECT TO EXISTING VORTEX MAESTRO CONTROLLER)

A. The Touch Pad programmable logic controller shall be mounted and pre-wired to all Water Quality Management System skid mounted components. Sized according to the number of outputs it is required to control, the programmable logic controller shall be factory programmed with a variety of spray sequences designed according to the requirements of the project. It shall have the flexibility to user modify the sequences using either a transportable memory cartridge or via the Touch Pad user interface.

B. A 24hr/7day user programmable time switch, which shall allow the user to set the operational hours of the facility, shall be incorporated into the operating system. The time switch shall have the ability to be programmed with a different time schedule for each day of the week, and up to 2 time schedules per day.

C. The operating system shall be capable of interfacing with the supplied automated water chemistry control unit, and other pertinent monitoring equipment and shall display current operating parameters on the touch screen interface. In the event of a chemical or equipment fault the operating system shall disable water flow to the patrons and/or initiate an equipment shut down procedure.

D. The operating system shall be supplied with a touch pad user interface with controls for each output, activation device(s), and time switch. These selector switches allow the user to select the operational mode of the components (i.e. Hand, Off and Automatic)

E. The operating system shall be housed in a corrosion resistant NEMA 4X rated enclosure, complete with stainless steel lockable latches.

F. The operating system shall have the capacity to receive signals from activation devices, operating on 24VDC.

G. The operating system shall have the capacity to send signals from the controller PLC to actuated valves operating at 24 VAC.

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H. The operating system shall have the ability to automatically purge all water lines based on the user selected time and duration (i.e. every day at 5 am). It shall also, be configured to purge all lines after a user defined period of inactivity (i.e. after 4 hours of inactivity).

I. The operating system shall have the ability to display “help menu” topics within the touch pad screen window for each relevant function. i.e. an on screen step by step tutorial for backwashing the sand filter.

J. The operating system shall contain a 120 VAC primary / 24 VAC secondary transformer with built- in electrostatic shield protection.

2.3 WATER CONTAINMENT SYSTEM (NIC)

A. The contractor shall provide and install the following activation devices as manufactured by VORTEX, 328 Avro St., Montreal, Quebec, Canada H9R 5W5, (514) 694-3868.

B. The 3000 gallon water containment system shall be fabricated from (FRP) an impermeable potable water quality material. The water containment system shall include a 4” inch and a 6” inch check valve fitted to the pump suction ports. All fittings above 6” inch shall be flanged. An automated water level control device, corrosion resistant access ladder, and corrosion resistant lockable access hatch shall be pre installed at the factory. The entire Water Containment System shall be pressure and leak tested at the factory prior to delivery.

C. The water containment system shall have inlets and outlets sized and located per the hydraulic requirements of the Water Quality Management System. (refer to construction drawings)

D. The water containment system shall have an overflow line to connect to the sanitary system.

E. The water containment system shall be equipped with anchoring straps to securely anchor the water containment system.

PART 3 - EXECUTION

3.1 EXECUTION

A. Should the bidder wish to substitute products other than the products specified herein, the bidder shall list products and submit a written Substitution Form of Proposal at least 10 calendar days prior to the date of receipt of bids. The bidder shall submit specifications, cut sheets, and performance data, along with an itemization listing each and every deviation from the specifications herein.

B. The manufacturer shall furnish the purchaser with at least two sets of complete installation and operating manuals. The installation manual will illustrate the installation of the entire system. It shall describe the start-up procedure and day- to- day operation of the system.
3.2 PLAY PRODUCT INSTALLATION

A. When applicable, templates shall be supplied to facilitate the installation of embedded anchoring equipment.

B. All play products shall have electrical grounding studs incorporated into their associated anchoring equipment. All play products shall be grounded by the installer per local codes.

C. All installation conduit wiring including electrical supply panel, PVC connections, piping, elbows, tees, play product assembly if required and other items relating to the installation shall be supplied by the general contractor.

D. Drawings and Instructions: Product drawings and installation manuals shall be supplied by the manufacturer for ease of installation.

3.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All aquatic play products and associated equipment must be properly wrapped and secured in place while in transport to the project site. Care shall be observed during offloading and handling to prevent excessive stress and abrasions.

B. At the site, the play products and associated equipment are to be stored in safe areas, out of the way of traffic and other construction activities, until the actual time of installation. If required, safety barricades or other like precautions must be taken for the protection of public and adjacent property.

C. Protective wrapping on the aquatic play features must be left in place until construction work for the Splashpad is complete.

3.4 COMMISSIONING OF THE SPLASHPAD

A. Upon completion of construction, the general contractor shall provide the owner/operator adequate training on facility operations and maintenance. The contractor may request that the equipment manufacturer and/or manufacturer’s representative provide on-site start-up and training for the owner/operator.

END OF SECTION 116800.10
SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities abandoning site utilities in place.
7. Temporary erosion and sedimentation control.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

C. Related Requirements:

1. Section 01500 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.
D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated according to requirements in Section 015639 "Temporary Tree and Plant Protection."

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PRECONSTRUCTION MEETINGS

A. Pre-Construction Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

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

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
   1. Use sufficiently detailed photographs or video recordings.
   2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Topsoil stripping and stockpiling program.

C. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of properly trained personnel to properly follow procedures and handle materials and equipment during the Work.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify Dig Safe System for area where Project is located before site clearing.

C. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

D. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist. Apply dust control measures as needed to prevent nuisance dusts.

PART 2 - PRODUCTS

2.1 MATERIALS

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

C. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.

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

C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Owner's representative written permission.

D. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.

3. Use only hand methods or air spade for grubbing within protection zones.

4. Chip removed tree branches and dispose of off-site.
B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth indicated on Drawings in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or re-used.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

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

END OF SECTION 311000
SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for walks pavements turf and grasses and plants.
4. Subbase course and base course for asphalt paving.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

2. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Owner's Representative. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 300 in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner's Representative. Unauthorized excavation, as well as remedial work directed by Owner's Representative, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

J. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 PRE CONSTRUCTION MEETINGS

A. Pre Construction Meeting: Conduct meeting at Project site.

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
   a. Personnel and equipment needed to make progress and avoid delays.
   b. Coordination of Work with utility locator service.
   c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
   d. Extent of trenching by hand or with air spade.
   e. Field quality control.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Warning tapes.

B. Samples for Verification: For the following products, in sizes indicated below:

1. Warning Tape: 12 inches long; of each color.
1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify "Dig Safe System" for area where Project is located before beginning earth-moving operations.

C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified Section 010000 General Requirements in and Section 311000 "Site Clearing" are in place.

D. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

E. The following practices are prohibited within protection zones:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Foot traffic.
   4. Erection of sheds or structures.
   5. Impoundment of water.
   6. Excavation or other digging unless otherwise indicated.
   7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

F. Do not direct vehicle or equipment exhaust towards protection zones.

G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
C. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

D. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

E. Sand: ASTM C33/C33M; fine aggregate.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.
3.2 **EXPLOSIVES**

A. Explosives: Do not use explosives.

3.3 **EXCAVATION, GENERAL**

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.

3.4 **EXCAVATION FOR WALKS AND PAVEMENTS**

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

3.5 **EXCAVATION FOR UTILITY TRENCHES**

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit As indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.

3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.

4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

E. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to combs soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 SUBGRADE INSPECTION

A. Notify Owner's Representative when excavations have reached required subgrade.

B. If Owner's Representative determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

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

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Testing and inspecting underground utilities.
3. Removing trash and debris.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

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

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of, free of particles larger than [1 inch] in any dimension, to a height of 12 inches over the pipe or conduit.
   a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
2. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.

E. Final Backfill:
1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

F. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use satisfactory soil material.
   2. Under walks and pavements, use satisfactory soil material.

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

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
   1. Turf or Unpaved Areas: Plus or minus 1 inch.
   2. Walks: Plus or minus [1 inch] \(<\) Insert dimension>.

3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

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

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
   1. Place base course material over subbase course under hot-mix asphalt pavement.
   2. Shape subbase course and base course to required crown elevations and cross-slope grades.
3. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.

3.14 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

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

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course 6 inches or less in compacted thickness in a single layer.
2. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact each layer of drainage course to required cross sections and thicknesses to not less than [95] percent of maximum dry unit weight according to ASTM D698.

3.15 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

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

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

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000
SECTION 312316.13 - TRENCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating trenches for stormwater conveyance
   2. Compacted fill from top of utility bedding to subgrade elevations
   3. Backfilling and compaction.

B. Related Sections:
   1. Section 321216 - Asphalt Paving: paving over trenches in walkway
   2. Section 329119 - Landscape Grading: Filling of topsoil over backfilled trenches to finish grade elevation.
   3. Section 334200 - Stormwater Conveyance

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Trenching:
   2. Basis of Payment: Includes excavating to required elevations, and Over Excavating: Payment is not made for over excavated work nor for replacement materials.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³).
   2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³).
   4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS
A. Utility: Any buried pipe, duct, conduit, or cable.

1.5 SUBMITTALS
A. Section 013300 - Submittal Procedures: Requirements for submittals.
B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

1.6 QUALITY ASSURANCE
A. Perform Work in accordance with RIDOT Standard Specifications for Road and Bridge Construction- latest edition.

1.7 FIELD MEASUREMENTS
A. Verify field measurements prior to fabrication.

1.8 COORDINATION
A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 Drainage Stone:
A. #2 Stone - Washed, crushed stone with a maximum diameter of 2" and a minimum diameter of 1/2"
B. Loam: Screened loam with no sticks or stones greater than 3/8" blended with minimum 20% organic compost
PART 3 - EXECUTION

3.1 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.
   1. Architect/Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

A. Call Local Utility Line Information service at 1-888-DIG-SAFE not less than seven working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. Protect plant life, lawns, and other features remaining as portion of final landscaping.

D. Protect bench marks, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities indicated to remain.

F. Establish temporary traffic control when trenching is performed in public right-of-way. Relocate controls as required during progress of Work.

3.3 TRENCHING

A. Excavate subsoil required for:
   1. Drainage
   2. Splashpad Water Lines
   3. Irrigation

B. Remove lumped subsoil, boulders, and rock above 3" diameter, remove larger material as specified in Section .312213

C. Perform excavation in accordance with State & Local requirements.

D. Do not advance open trench more than 200 feet ahead of installed pipe.
E. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

F. Excavate bottom of trenches maximum \(2 < \_\_\_\_\_\_ > \text{feet} \) wider than outside diameter of pipe.

G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.

H. Trim excavation. Remove loose matter.

I. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

J. Remove excess subsoil not intended for reuse, from site.

3.4 BACKFILLING

A. Backfill trenches to contours and elevations in lifts using materials specified in details.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place fill material in continuous layers and compact.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Do not leave more than \(50 < \_\_\_\_\_\_ > \text{feet} \) of trench open at end of working day.

F. Protect open trench to prevent danger to the public.

3.5 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch [\(0.08 \text{ feet}\)] from required elevations.

3.6 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION 312316.13
SECTION 312500 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment and incidentals required and perform all installation, maintenance, removal and area cleanup related to erosion and sedimentation control work required to meet Federal, State, and local permit requirements and as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to; installation of temporary access ways and staging areas, compost filter socks, catch basin sediment filters (silt sack), sediment removal and disposal, device maintenance, removal of temporary devices, and final cleanup.

B. Related Sections:

1. Section 311000 - Site Clearing.
2. Section 329119 - Landscape Grading.

1.2 REFERENCES

A. EPA document titled: "Stormwater Management for Construction Activities — Developing Pollution Prevention Plans and Best Management Practices" document number EPA 832-R-92-005, dated 1992, or most recent edition. State, County Conservation Districts or local Conservation Commission standards can be substituted for the EPA standard if the State, County or Local Conservation Commission standards is equal to, or more detailed than, the EPA standard.

B. State of Rhode Island Department of Transportation Standard Specifications for Road and Bridge Construction, Current Edition with latest addenda.

1.3 SUBMITTALS

A. Submit, in accordance with Division 01 10 00 – General Requirements: Submittal Procedures ten (10) days after award of Contract, technical product literature for all commercial products to be used for erosion and sedimentation control.

B. If a NPDES General Permit is required, Contractor shall, prior to the start of construction:

1. Prepare and submit the EPA NPDES Notice of Intent to Discharge to the applicable EPA office in accordance with EPA regulations. Submit one copy of the permit to Owner’s Representative for informational purposes only.
2. Prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the U.S. Environmental Protection Agency (EPA) National Pollution Discharge...
Elimination System (NPDES) General Permit for this work. Submit one copy of the permit to Owner’s Representative for informational purposes only.

1.4 QUALITY ASSURANCE

A. Be responsible for the timely installation and maintenance of all erosion and sedimentation control devices necessary to prevent the movement of sediment from the construction site to off-site areas or into the stream system via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the Owner will be considered.

B. Where Contractor's efforts to control erosion and sediment have been demonstrated to be ineffective or potentially ineffective in the opinion of the Owner’s Representative, the Owner’s Representative may order that additional measures be implemented and constructed at no additional cost to the Owner.

C. Perform Work according to State Municipality of Department of Public Works standards.

PART 2 - PRODUCTS

2.1 MATERIALS

A. When work is performed outside of normal seeding window straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

B. Compost Filter Sock

2. Straw filled tubes of compacted straw of rice, wheat or barley.
3. Compost filter sock to be certified as weed free.
4. Netting for tubes to be seamless, high density polyethylene with ultra violet inhibitors.
5. Roll length to be 10.0 feet to 25.0 feet.
6. Weight per linear foot, 12-inch: 2.5 lbs. minimum 9-inch: 1.5 lbs. minimum
7. Stakes shall be wooden, 1 1/8-inch x 1 1/8-inch x 2.5 feet long, with lower ends tapered to facilitate driving into compacted soil. Rebar may be substituted for wooden stakes
PART 3 - EXECUTION

3.1 INSTALLATION
A. Staging areas and stabilized construction entrance shall be surfaced with a minimum depth of 6 inches of crushed stone (if so directed by the Owner’s Representative). Stabilized construction entrances shall be installed as shown on the Plans.

3.2 MAINTENANCE AND INSPECTION
A. Inspections
1. Make a visual inspection of all erosion and sedimentation control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas, promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

3.3 REMOVAL AND FINAL CLEANUP
A. Once the site has been permanently stabilized against erosion, remove all sediment control devices and sediment. Dispose sediment and all waste materials in a proper manner.
B. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.
C. Do not damage structure or device during cleaning operations.
D. Clean channels when depth of sediment reaches approximately one half channel depth.
E. Clean channels when depth of sediment reaches approximately one half channel depth.

3.4 DIVERSION CHANNELS
A. Windrow excavated material on low side of channel.
B. Compact to 95 percent maximum density.
C. On entire channel area, apply soil supplements and sow seed as specified in Section 329219.
D. Mulch seeded areas with hay as specified in Section 329219.

3.5 SITE STABILIZATION
A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time.
B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.

C. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2: 1 or flatter.

D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.
   1. During non-germinating periods, apply mulch at recommended rates.
   2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Section 329219 at <______> percent of permanent application rate with no topsoil.
   3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with Section 329219 permanent seeding specifications.

E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

END OF SECTION 312500
SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Hot-mix asphalt patching.
   2. Hot-mix asphalt paving.

B. Related Requirements:
   1. Section 024119 "Selective Demolition" for demolition and removal of existing asphalt pavement.
   2. Section 312000 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
   3. Section 321400 "Unit Paving" for bituminous setting bed for pavers and for stone and precast concrete curbs.

1.3 UNIT PRICES

A. Work of this Section is affected by square foot .

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

   1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
      a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
      b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
1.5 **ACTION SUBMITTALS**

A. **Product Data:** For each type of product.
   1. Include technical data and tested physical and performance properties.
   2. **Job-Mix Designs:** Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
   3. **Job-Mix Designs:** For each job mix proposed for the Work.

1.6 **INFORMATIONAL SUBMITTALS**

A. **Qualification Data:** For manufacturer.

B. **Material Certificates:** For each paving material. Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

C. **Material Test Reports:** For each paving material, by a qualified testing agency.

1.7 **QUALITY ASSURANCE**

A. **Manufacturer Qualifications:** A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.

B. **Testing Agency Qualifications:** Qualified according to ASTM D 3666 for testing indicated.

C. **Regulatory Requirements:** Comply with materials, workmanship, and other applicable requirements of RIDOT Standard Specifications for Road and Bridge Construction for asphalt paving work.
   1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.8 **FIELD CONDITIONS**

A. **Environmental Limitations:** Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
   1. **Asphalt Base Course:** Minimum surface temperature of 40 deg F and rising at time of placement.
   2. **Asphalt Surface Course:** Minimum surface temperature of 60 deg F at time of placement.
PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073 or, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
   1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D 242/D 242M, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: ASTM D 6373 or binder designation PG 64-22.


D. Emulsified Asphalt Prime Coat: ASTM D 977 or emulsified asphalt, or ASTM D 2397/D 2397M or cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

E. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires asphalt shingles or glass from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.

2.4 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes; designed according to procedures in AI MS-2, "Asphalt Mix Design Methods"; and complying with the following requirements:
Providence Parks Department
Harriet and Sayles Park and
Mary Fogarty Green
Schoolyards Complex

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: Class 9.5.
3. Surface Course: Class 19.0.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.
B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.
B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
   1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
   2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
   3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

3.3 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.
   1. Undersealing: Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
   2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.
C. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

D. Placing Patch Material: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4 REPAIRS

3.5 SURFACE PREPARATION

A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

3.6 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.
3. Spread mix at a minimum temperature of 250 deg F.
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927, but not less than 94 percent or greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041/D 2041M, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/2 inch.
2. Surface Course: 1/4 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
3.9 SURFACE TREATMENTS

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549/D 3549M.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979/D 979M or .
   1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041/D 2041M, and compacted according to job-mix specifications.
   2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726/D 2726M.
      a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
      b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726/D 2726M.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.11 WASTE HANDLING

A. General: Handle asphalt-paving waste according to approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."

END OF SECTION 321216
SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes Concrete Paving Including the Following:

1. Walks
2. Splashpad surfacing
3. Pads for Benches & Trash Receptacles.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PRE-CONSTRUCTION MEETINGS

A. Pre-Construction Meeting: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:
   a. Concrete mixture design.
   b. Quality control of concrete materials and concrete paving construction practices.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color selection.
C. Samples for Verification: For each type of product or exposed finish, prepared as Samples of size indicated below:
   1. Exposed Aggregate: 5 lb Sample of each mix.

D. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer.

B. Material Certificates: For the following, from manufacturer:
   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Fiber reinforcement.
   4. Admixtures.
   5. Curing compounds.
   7. Bonding agent or epoxy adhesive.

C. Material Test Reports: For each of the following:
   1. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

1.7 QUALITY ASSURANCE

A. Ready-Mix-Concrete 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" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
   2. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than 48" x 48".
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

1.9 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from galvanized-steel wire into flat sheets.

B. Plain-Steel Wire: ASTM A 1064/A 1064M, galvanized.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

1. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150/C 150M, gray portland cement Type I.

B. Normal-Weight Aggregates: ASTM C 33/C 33M, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:

1. Exposed Aggregate (Mixture Type 2 in drawings)
   b. Aggregate Source, Shape, and Color: Native rounded Bluestone, uniform color Native rounded bluestone.

2. Seeded Exposed Aggregate (Mixture Type 3)
   a. Aggregate Size: 1/2-3/4" nominal
D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
   1. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

E. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
   1. <Click here to find, evaluate, and insert list of manufacturers and products.>
   2. Color: As selected by Architect from manufacturer's full range Colors TBD.

F. Water: Potable and complying with ASTM C 94/C 94M.

2.5 FIBER REINFORCEMENT

A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in decorative concrete paving, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

B. GFRC Glass Fiber: 200-400 individual glass filaments which are lightly bonded to make up a stand

2.6 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry or cotton mats.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
   1. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
   1. Air Content: 6 5 percent plus or minus 1-1/2 percent for 3/4-inch nominal maximum aggregate size.
C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use in concrete as required for placement and workability.

E. Concrete Mixtures: Normal-weight concrete.
   2. Maximum W/C Ratio at Point of Placement: 0.45.
   3. Slump Limit: 8 inches, plus or minus 1/2 inch.

2.8 CONCRETE MIXING

A. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
   1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
   2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
   3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
   1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
   2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
   3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION
A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION
A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT 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, or other bond-reducing materials.
C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.
F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS
A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

C. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows per Landscape Architect:

1. 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 will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
   a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.

D. Edging: After initial floating, tool edges of paving, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.

C.Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.
I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT FINISHING

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

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture-retaining-cover curing or a combination of these as follows:

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. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch.
3. Surface: Gap below 10-feet long; unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.

3.10 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Owner's Representative, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313
PART 1 - PART 1 GENERAL

1.1 SUMMARY

A. Section includes the following:
   1. Concrete Pavers
   2. Joint Sand
   3. Setting Bed Sand
   4. Base Aggregate

1.2 RELATED SECTIONS

A. Section 312000 – Earth Moving
B. Section 321313 – Concrete Paving

1.3 SUBMITTALS

A. Concrete Pavers:
   1. Samples for verification: Three representative full-size samples of each paver type, thickness, color and finish that indicate the range of color variation and texture expected upon project completion.
   2. Accepted samples become the standard of acceptance for the product produced.
   3. Test results from an independent testing laboratory for compliance of concrete pavers with ASTM C 936.
   4. Manufacturer’s catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.

B. Joint and Setting Bed Sand:
   1. Provide representative one pound samples in containers of Joint Sand materials.
   2. Test results from an independent testing laboratory for sieve analysis per ASTM C 136 conforming to the grading requirements of ASTM C 144.

C. Paving Installation Contractor:
   1. Job references from a minimum of three projects similar in size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.
1.4 QUALITY ASSURANCE

A. Utilize a Manufacturer having at least ten years of experience manufacturing concrete pavers on projects of similar nature or project size.

B. Source Limitations:
   1. Obtain Concrete Pavers from one source location with the resources to provide products of consistent quality in appearance and physical properties.
   2. Obtain Joint and Setting Bed Sands from one source with the resources to provide materials and products of consistent quality in appearance and physical properties.

C. Paving Contractor Qualifications:
   1. Utilize an installer having successfully completed concrete paver installation similar in design, material, and extent indicated on this project.

D. Mockups:
   1. Install a 3 ft x 3 ft paver area per each paving pattern.
   2. Use this area to determine joint sizes, lines, laying pattern(s) and levelness. This area will serve as the standard by which the workmanship will be judged.
   3. Subject to acceptance by owner, mock-up may be retained as part of finished work.
   4. If mock-up is not retained, remove and dispose legally.

1.5 DELIVERY, STORAGE & HANDLING

A. Deliver Concrete Pavers in manufacturer’s original, unopened and undamaged container packaging with identification labels intact.
   1. Coordinate delivery and paving schedule to minimize interference with normal use of streets and sidewalks adjacent to paver installation.
   2. Deliver Concrete Pavers to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by forklift or clamp lift.
   3. Unload Concrete Pavers at job site in such a manner that no damage occurs to the product or adjacent surfaces.

B. Store and protect materials free from mud, dirt and other foreign materials.

C. Prevent Joint and Setting Bed Sand from exposure to rainfall or removal by wind with secure, waterproof covering.

1.6 PROJECT/SITE CONDITIONS

A. Environmental Requirements:
   1. Install Concrete Pavers only on unfrozen and dry Setting Bed Sand.
2. Install Setting Bed Sand only on unfrozen and dry Base or Subbase Aggregate materials.
3. Install Base or Subbase Aggregates only over unfrozen subgrade.
4. Install Setting Bed Sand or Concrete Pavers when no heavy rain or snowfall are forecast within 24 hours.

1.7 CONCRETE PAVER OVERAGE AND ATTIC STOCK

A. Provide a minimum of 5% additional material for overage to be used during construction.
B. Manufacture to supply maintenance and reinstatement manuals for Concrete Paver units.

1.8 CONCRETE PAVERS

A. Basis-of-Design Product: The Concrete Paver shapes are based on:

1. Unilock:
   a. Hollandstone
   b. As manufactured by: Unilock 35 Commerce Dr. Uxbridge, MA 01569
   c. Contact: Ashley Allard-LaCroix - 508 278 4536 ext.4046

2. Approved Equal
   a. To obtain acceptance of unspecified products, submit written requests at least 7 days before the Bid Date.

B. Product requirements:

1. Concrete Paver Type 1: Hollandstone
   a. Finish: (Select finish type from below and insert here. Finish type will affect product pricing).
   b. Standard – this is not a face mix finish.
   c. Color: Granite
   d. Edge: Chamfer,
   e. Size: Manufacture the sizes indicated with a maximum tolerance of plus or minus 1/16 inch for length and width. Maximum height tolerance of plus or minus 1/8 inch.
   f. 7.875" X 3.875" X 2.375".

C. Provide pavers meeting the minimum material and physical properties set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units. Efflorescence is not a cause for rejection.

1. Average compressive strength 8000 psi (55MPa) with no individual unit under 7,200 psi (50 MPa).
2. Average absorption of 5% with no unit greater than 7% when tested according to ASTM C 140.
3. Conforming to ASTM C 1645 when tested for freeze-thaw requirements.
4. Height tolerances +/- 3.2 mm (1/8 in).
D. Accept only pigments in concrete pavers conforming to ASTM C 979. Note: ACI Report No. 212.3R provides guidance on the use of pigments.

E. Maximum allowable breakage of product is 5%.

1.9 JOINT SAND
A. Provide natural Joint Sand as follows:
   1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
   2. Do not use limestone screenings, stone dust, or sand for the Joint Sand material that does not conform to the grading requirements of ASTM C 33.
   3. Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.

1.10 SETTING BED SAND
A. Provide Setting Bed Sand as follows:
   1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
   2. Do not use limestone screenings, stone dust, or sand material that does not conform to the grading requirements of ASTM C 33.
   3. Do not use mason sand or sand conforming to ASTM C 144.
   4. Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.

1.11 BASE AGGREGATE
A. Provide Base Aggregate materials conforming to ASTM D 2940 and as indicated in the drawings and section 312000

1.12 EDGE RESTRAINTS
A. Concrete Edge Restraint as indicated.
B. Plastic and Metal Edge Restraints:
   1. Pave Tech
      a. Material Type: Plastic
      b. Model No.: Pave Edge Rigid, Pave Edge Flexible, Pave Edge Industrial
   2. Snap Edge
      a. Material Type: Plastic
      b. Model No.: One Piece Edging, 96 inches
1.13 EXAMINATION

A. Examine areas indicated to receive paving for compliance with requirements for installation tolerances and other conditions affecting performance for the following items before placing the Concrete Pavers.

1. Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
2. Verify that the Base Aggregate materials, thickness, compacted density, surface tolerances and elevations conform to specified requirements.
3. Provide written density test results for soil subgrade, Base Aggregate materials to the Owner, General Contractor and paver installation subcontractor.
4. Verify location, type, and elevations of edge restraints, concrete curbing, concrete collars around utility structures, and drainage inlets.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Beginning of Bedding Sand and Concrete Paver installation signifies acceptance of Base and edge restraints.

1.14 PREPARATION

A. Verify that the subgrade soil is free from standing water.

B. Stockpile Setting Bed Sand, Joint Sand, Base Aggregate materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.

C. Remove any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities before placing the Aggregate materials.

D. Keep area where pavement is to be constructed free from sediment during entire job. Remove and replace all Joint Sand, Setting Bed Sand, Base Aggregate materials contaminated with sediment with clean materials.

E. Complete all subdrainage of underground services within the pavement area in conjunction with subgrade preparation and before the commencement of Base Aggregate construction.

F. Prevent to damage underdrain pipes, overflow pipes, observation wells, or inlets and other drainage appurtenances during installation. Report all damage immediately.

G. Compact soil subgrade uniformly to at least 95 percent of Standard Proctor Density per ASTM D 698 for pedestrian areas. Compact soil subgrade uniformly to at least 98 percent Modified Proctor per ASTM D 1557 for vehicular areas. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils.
H. Backfill all service trenches within the pavement area to the sub-grade level with approved material placed in uniform lifts not exceeding 4 in. (100 mm) loose thickness. Compact each lift to at least 100 percent Standard Proctor Density as specified in ASTM D 698.

I. Trim the subgrade to within 0 to ½ in. (0 to 13mm) of the specified grades. Do not deviate the surface of the prepared subgrade by more than 3/8 in. (10mm) from the bottom edge of a 39 in. (1m) straight edge laid in any direction.

J. Do not proceed with further pavement construction, under any circumstances, until the subgrade has been inspected by the Architect/Engineer.

1.15 INSTALLATION

A. EDGE RESTRAINTS

1. Provide plastic or metal edge restraints as indicated. (Delete if not being used).
   a. Provide plastic or metal edge restraints along the perimeter of all paving as indicated and supported on a minimum of 6 inches (150 mm) of Base Aggregate.
   b. Provide 10” spiral galvanized or stainless steel spike to fasten plastic edge restraint at 24 inches on center for straight sections and 12 inches on center for curved sections.

B. BASE AGGREGATE

1. Provide the Base Aggregate material in uniform lifts not exceeding 6 in. (150 mm) over the compacted or Subgrade material and compact to at least 100 percent Standard Proctor Density as per ASTM D 698.
2. Compact the Base Aggregate material with at least two passes in the vibratory mode then at least two in the static mode with a minimum 10 ton vibratory roller until there is no visible movement. Do not crush aggregate with the roller.
3. Tolerance: Do not exceed the specified surface grade of the compacted Base Aggregate material more than ±3/8 in. (10 mm) over a 10 ft. (3 m) long straightedge laid in any direction.
4. Compact and grade the upper surface of the base sufficiently to prevent infiltration of the bedding sand into the base both during construction and throughout its service life. Blend segregated areas of the granular base by the application of crushed fines that have been watered and compacted into the surface.

C. SETTING BED SAND

1. Provide, spread and screed Setting Bed Sand evenly over the compacted Base Aggregate course.
   a. Protect screeded Setting Bed Sand from being disturbed by either pedestrian or vehicular traffic.
   b. Screed only the area which can be covered by pavers in one day.
   c. Do not use Setting Bed Sand material to fill depressions in the base surface.
2. Keep moisture content constant and density loose and constant until Concrete Pavers are set and compacted.
3. Screed Setting Bed Sand using either an approved mechanical spreader (e.g.: an asphalt paver) or by the use of screed rails and boards. Maintain in a loose condition slightly ahead of the paving units and fully protect against incidental compaction following screeding. Loosen compacted sand by rain or screeded sand left overnight before further paving units are placed.

4. Inspect the Setting Bed Sand course prior to commencing the placement of the Concrete Pavers. Acceptance of the Setting Bed Sand occurs with the initiation of Concrete Paver placement.

D. CONCRETE PAVERS

1. Replace Concrete Pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.

2. Mix Concrete Pavers from a minimum of three (3) bundles simultaneously drawing the paver vertically rather than horizontally, as they are placed, to produce uniform blend of colors and textures. (Color variation occurs with all concrete products. This phenomenon is influenced by a variety of factors, e.g. moisture content, curing conditions, different aggregates and, most commonly, from different production runs. By installing from a minimum of three (3) bundles simultaneously, variation in color is dispersed and blended throughout the project).

3. Exercise care in handling face mix concrete pavers to prevent surfaces from contacting backs or edges of other units.

4. Provide Concrete Pavers using laying pattern as indicated. Adjust laying pattern at pavement edges such that cutting of edge pavers is minimized. Cut all pavers exposed to vehicular tires no smaller than one-third of a whole paver.

5. Use string lines or chalk lines on Setting Bed Sand to hold all pattern lines true.

6. Set paver surface elevation a minimum of 3 mm (1/8 inch) to a maximum of 6 mm (1/4 inch) above adjacent drainage inlets, concrete collars or channels (provided the change in slope does not impede or alter the drainage or direction of flow).

7. Place units hand tight against spacer bars. Adjust horizontal placement of laid pavers to align straight.

a. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.

8. Provide space between paver units of 1/32 in. (1 mm) wide to achieve straight bond lines.

9. Prevent joint (bond) lines from shifting more than ±1/2 in. (±13 mm) over 50 ft. (15 m) from string lines.

10. Fill gaps between units or at edges of the paved area that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.

11. Cut Concrete 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.

12. Prevent all traffic on installed Concrete Pavers until Joint Sand has been vibrated into joints. Keep skid steer and forklift equipment off newly laid Concrete Pavers that have not received initial compaction and Joint Sand material.

13. Vibrate Concrete Pavers into leveling course with a low-amplitude plate vibrator capable of a to 5000-lbf (22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:

a. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
14. Compact installed Concrete Pavers to within 6 feet (2 meters) of the laying face before ending each day's work. Cover Concrete Pavers that have not been compacted and leveling course on which pavers have not been placed, with nonstaining plastic sheets to prevent Setting Bed Sand from becoming disturbed.

15. Protect face mix Concrete Paver surface from scuffing during compaction by utilizing a urethane pad.

16. Remove any cracked or structurally damaged Concrete Pavers and replace with new units prior to installing Joint Sand material.

E. JOINT SAND

1. Provide, spread and sweep dry Joint Sand into joints immediately after vibrating pavers into Setting Bed Sand course until full. Vibrate pavers and add Joint Sand material until joints are completely filled, then remove excess material. This will require at least 4 passes with a plate compactor.

2. Leave all work to within 3 ft. (1 m) of the laying face fully compacted with sand-filled joints at the completion of each day.

3. Remove excess Joint Sand broom clean from surface when installation is complete.

1.16 FIELD QUALITY CONTROL

A. Verify final elevations for conformance to the drawings after sweeping the surface clean.

1. Prevent final Concrete Paver finished grade elevations from deviating more than
   a. ±3/8 in. (±10 mm) under a 10 ft (3 m) straightedge or indicated slope, for finished surface of paving.

B. Lippage: Paver-to-Paver Lippage:

1. No greater than 3 mm (1/8 inch) difference in height between adjacent pavers.

1.17 REPAIRING, CLEANING AND SEALING

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Cleaning: Remove excess dirt, debris, stains, grit, etc. from exposed paver surfaces; wash and scrub clean.

1. Clean Concrete Pavers in accordance with the manufacturer’s written recommendations.

1.18 PROTECTION

END OF SECTION 321413
SECTION 321600.10 - PRECAST CONCRETE CURBS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The Work of this Section consists of providing labor, equipment, materials, incidental work, and construction methods necessary to furnish and install the precast concrete curb, as indicated on the Contract Documents and as specified.

1.2 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General Requirements, apply to this Section.

B. The following items of related work are specified and included in other Sections of the Specifications:

1. Section 312000 – Earth Moving

1.3 REFERENCES

A. The following standards shall apply to the work of this Section.

1. State of Rhode Island Department of Transportation (RIDOT):
   a. Specifications Standard Specifications for Road and Bridge Construction

   a. A 615 Deformed and Plain Billet - Steel Bars for Concrete Reinforcement

1.4 SUBMITTALS

A. A. Submit complete shop drawings of precast concrete curbing for Owner's Representative’s approval.

1. Shop drawings shall indicate size, dimension, and finish of each curb type.

2. Submit a complete schedule for quantity, lengths, and size for all curbing on the project.

B. Submit manufacturer’s literature and test reports for all curbing required for project; include each curb type.
1.5 QUALITY ASSURANCE

A. Unless otherwise indicated, pre-cast concrete curb materials and construction shall conform to the applicable portions of the following:

1. RIDOT Specifications Section 906, "Curbing for Roadways".
2. Concrete for all curbing shall be supplied from a single source for entire project
3. Source of concrete shall be approved by Owner’s Representative prior to construction

1.6 DELIVERY, STORAGE, AND HANDLING

A. Precast concrete curb units shall be delivered to the job adequately protected from damage during transit.

B. Curb units shall be stored off the ground with wood cribbing between each unit. Curb shall be protected against staining, chipping, and other damage. Cracked, chipped, or stained units will be rejected and shall not be employed in the work.

C. Store pallets of curbing on pavement or other hard, durable surfaces that will not compact as a result of the weight of the pallets of curbing. Prevent steel strapping of pallets from rusting and staining of pavement. Remove and replace all pavement stained by rusting steel strapping of pallets.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Precast curb units shall be the product of one of the following precast concrete curb suppliers, or an approved equal:

1. Means Precast, Braintree, MA 02184, Tel. (781) 843-1909.
2. Durastone Corporation, P.O. Box 1114, 150 Higginson Avenue, Lincoln, RI 02865, Tel. (401) 596-7225.
3. Precast Specialties Corp., 999 Adams Street, P.O. Box 86, Abington, MA 02351, Tel. (781) 878-7220.

2.2 CONCRETE MATERIALS

A. Formwork:

1. Forms shall be wood or steel and shall have a "smooth form" surface to produce required finish on exposed portions of precast curbing.

B. Reinforcing Steel:

1. Steel reinforcing bars shall be deformed type conforming to ASTM A 615.
2. Unless otherwise indicated on the Contract Documents, provide a minimum of two No. 3 bars for each curb unit.

C. Concrete for Precast Curbing:
   1. Concrete shall be air-entrained type with a minimum 28 day compressive strength of 4000 psi, 3/4 inches aggregate, 610 lb. Portland cement per cubic yard. Air content shall be 5% to 7%.

2.3 SIZE AND DIMENSIONS
   A. Straight curb units shall be 6 inches x 18 inches, 6 feet lengths.
   B. Curved curbing shall be employed on radii up to 100 feet.
   C. Arris exposed to traffic shall be rounded to a 3/4 inches radius. Back arris line shall be straight.
   D. Curb units shall be true to line, plane, and dimensions.

2.4 FINISH
   A. Curb units shall have a uniform, smooth texture finish, free from cracks and other defects. Color of units shall be uniform.
   B. Curb shall have no paint, mortar, or other coating.

2.5 CURING
   A. Precast units shall be moist cured by steam or water for a sufficient length of time for the concrete to obtain the required compressive strength. Curing compounds will not be permitted.

PART 3 - EXECUTION

3.1 SETTING CURB
   A. Curb shall be set in an 18-inch wide trench, with trench bottom at 6 inches below bottom of curb. Excavation shall be filled to required level with dense graded crushed stone provided, installed and paid for under the work of Section 312000 - Earth Excavation, Backfill, Fill, & Grading.
      1. All spaces under the curb shall be filled with compacted dense graded crushed stone so that the curb will be completely supported throughout its length.
      2. Vertical face of vertical curb shall be plumb, with curb top parallel to adjacent surface.
      3. Curb shall be set accurately to line and grade. Curb alignment shall be uniform, with smooth and continuous arris lines. Radius curbs shall meet with a common tangent.
B. Curb units shall be placed accurately to line. Final points (locations where lines of curb intersect) shall be joined by closure pieces made to order and not less than 30 inches in length.

C. Curb shall not be field cut except with the prior permission of the Owner’s Representative.

1. If field cutting of curb is permitted by the Owner’s Representative, the curb shall be cut using concrete cutting tools to provide a smooth and uniform saw cut. Sawn end shall match manufactured end, in every respect. Chamfers shall be ground to match abutting curb unit. Field chamfers and sawn end profiles shall be finished with manufacturer recommended bonding agent, to match surface finish of curb unit. In no case, shall field sawn end cut be exposed to view.

D. Curb units shall be butted together with joints between curb units (both front and back) no greater than 1/8 inches. Joint space shall not be filled with mortar.

E. Set curb to required line and grade. Where indicated, provide transition sections to create smooth transition between standard curb and flush curb at entrances, ramps, and all other locations requiring transition curbing as determined by the Owner’s Representative.

F. Backfill material on each side of curb shall be as specified for adjacent surface and shall be thoroughly compacted by means of power tampers. Extreme care shall be taken not to destroy alignment. Curb sections disturbed during backfilling or otherwise shall be reset to line and grade, and properly backfilled.

G. Remove and reset all curb sections that do not conform to the vertical and horizontal alignment shown on the Contract Documents.

END OF SECTION 321600.10
SECTION 321816.13 - PLAYGROUND PROTECTIVE SURFACING

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. Unitary, seamless surfacing.
   2. Organic loose-fill surfacing.
   3. EPDM playground safety domes.

1.3 DEFINITIONS
A. Definitions in ASTM F 2223 apply to Work of this Section.
B. Critical Height: Standard measure of shock attenuation according to ASTM F 2223; same as "critical fall height" in ASTM F 1292. According to ASTM F 1292, this approximates "the maximum fall height from which a life-threatening head injury would not be expected to occur."
C. SBR: Styrene-butadiene rubber.
D. EPDM: Ethylene propylene diene monomer rubber.
E. Unitary Surfacing: A protective surfacing of one or more material components bound together to form a continuous surface; same as "unitary system" in ASTM F 2223.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: For each type of protective surfacing.
   1. Include plans, sections, placement and penetration details, and attachment to substrates.
   2. Include accessories and edge terminations.
   3. Include patterns made by varying colors of surfacing and details of graphics.
   4. Include fall heights and use zones for equipment and structures specified in Section 116800 "Play Field Equipment and Structures," coordinated with the critical heights for protective surfacing.
C. Samples for Initial Selection: For each type of exposed finish.

D. Samples for Verification: For each type of protective surfacing and exposed finish.
   1. Unitary, Seamless Surfacing: Minimum 6 by 6 inches.
   2. Loose-Fill Surfacing: Minimum 1 quart.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Material Certificates: For each type of loose-fill surfacing.

C. Product Certificates: For each type of unitary surfacing product.

D. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For playground protective surfacing to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Loose Fill: Amount equal to 1 percent of amount installed, but no fewer than 3 units

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for materials and execution.
   1. Build mockups for protective surfacing including accessories.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Landscape Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
1.9 WARRANTY

A. Special Warranty: Manufacturer and Installer agree to repair or replace components of protective surfacing that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Reduction in impact attenuation as measured by reduction of critical fall height.
   b. Deterioration of protective surfacing and other materials beyond normal weathering.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain protective surfacing materials, including loose-fill accessories, from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Impact Attenuation: Critical fall height tested according to ASTM F 1292.

B. Accessibility Standard: Minimum surfacing performance according to ASTM F 1951.

2.3 UNITARY, SINGLE-DENSITY, SEAMLESS SURFACING

A. Description: Manufacturer's standard, site-mixed and applied, single-layer material in thickness as required, tested for impact attenuation according to ASTM F 1292 [and for accessibility according to ASTM F 1951].

1. Manufacturers: Surface America Incorporated or approved equal
2. Composition: Blend of recycled SBR and EPDM rubber, particles and binder, forming a wearing and cushioning product.
4. Critical Height: As indicated on Drawings.
5. Overall Thickness: As determined by recommendations of play equipment manufacturers, as indicated on Drawings.
6. Primer/Adhesive: Manufacturer's standard primer and weather-resistant, moisture-cured polyurethane adhesive suitable for unit, substrate, and location.
7. Color(s): As selected by Architect from manufacturer's full range.
8. Design- where color pattern is required, provide as indicated on Drawings.

B. Leveling and Patching Material: Portland cement-based grout or epoxy- or polyurethane-based formulation suitable for exterior use and approved by protective surfacing manufacturer.
2.4 ORGANIC LOOSE-FILL SURFACING

A. Engineered Wood Fiber: ASTM F 2075; containing no bark, leaves, twigs, or foreign or toxic materials; tested for accessibility according to ASTM F 1951.

1. Critical Height: As indicated on Drawings and as recommended by play and fitness equipment manufacturer.
2. Uncompressed Material Depth: Not less than as required for critical height indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for subgrade elevations, slope, and drainage and for other conditions affecting performance of the Work.

1. Verify that substrates are sound and without high spots, ridges, holes, and depressions.

B. Hard-Surface Substrates: Verify that substrates are satisfactory for unitary, protective surfacing installation and that substrate surfaces are dry, cured, and uniformly level within recommended tolerances according to protective surfacing manufacturer's written requirements for cross-section profile.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates to receive surfacing products according to protective surfacing manufacturer's written instructions.

B. Hard-Surface Substrates: Clean surface free of laitance, efflorescence, curing compounds, and other contaminants incompatible with protective surfacing.

1. Repair: Fill holes and depressions in unsatisfactory surfaces with leveling and patching material.
2. Treatment: Mechanically abrade or otherwise prepare concrete substrates according to protective surfacing manufacturer's written instructions to achieve adequate roughness.

3.3 INSTALLATION OF SEAMLESS SURFACING

A. Mix and apply components of seamless surfacing according to manufacturer's written instructions to produce uniform, monolithic, and impact-attenuating protective surfacing of required overall thickness.
1. Substrate Primer: Apply over prepared substrate at manufacturer's standard spreading rate for type of substrate.

2. Poured Cushioning Layer: Spread evenly over primed substrate to form a uniform layer applied at manufacturer's standard spreading rate in one continuous operation, with a minimum of cold joints.

3. Intercoat Primer: Over cured cushioning layer, apply primer at manufacturer's standard spreading rate.

4. Wearing Layer: Spread over primed base course to form a uniform layer applied at manufacturer's standard spreading rate in one continuous operation and, except where color changes, with no cold joints. Finish surface to produce manufacturer's standard wearing-surface texture.
   a. Allipathic urethane binder to be applied on all color blends.
   b. Design: Where colored pattern is required, place colored, design material as soon as previously placed material is sufficiently cured, using primer or adhesive if required by manufacturer's written instructions.

5. Lacquer Topcoat: Spray or roller applied at manufacturer's standard coating rate in one continuous operation.

6. Edge Treatment: As indicated on Drawings. Fully adhere edges to substrate with full coverage of substrate. Maintain fully cushioned thickness required to comply with performance requirements.

3.4 INSTALLATION OF LOOSE-FILL SURFACING

A. Apply components of loose-fill surfacing according to manufacturer's written instructions to produce a uniform surface.

B. Loose Fill: Place loose-fill materials to required depth after installation of playground equipment support posts and foundations. Include manufacturer's recommended amount of additional material to offset natural compaction over time.

C. Grading: Uniformly grade loose fill to an even surface free from irregularities.

D. Compaction: After initial grading, mechanically compact loose fill before finish grading to 95% mod proctor density.

E. Finish Grading: Hand rake to a uniformly smooth finished surface and to required elevations.

3.5 PROTECTION

A. Contractor is responsible for securing all areas to prevent traffic over [seamless] surfacing for not less than 36 hours after installation.

END OF SECTION 321816.13
PART 1 - GENERAL:

1.1 SECTION INCLUDES
A. Decorative welded wire fencing, gates, and accessories.

1.2 SYSTEM DESCRIPTION
A. The manufacturer shall supply a total ornamental welded wire fence system of the style, strength, size, and color defined herein. The system shall include all components as required, and shall be fabricated, coated, and assembled in the United States.

1.3 QUALITY ASSURANCE
A. The contractor shall provide laborers and supervisors who are familiar with the type of construction involved, and the materials and techniques specified.
B. Manufacturer of fence system must have ten (10) years of documented experience in manufacturing the products specified in this section.

1.4 REFERENCES
A. ASTM A525 - Specification for General Requirements for Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process
B. ASTM A641 – Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
C. ASTM A185 – Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
D. ASTM B117 – Practice for Operating Salt Spray (Fog) Apparatus

1.5 SUBMITTALS
A. Manufacturer’s submittal package shall be provided prior to installation.
B. Changes in specification may not be made after the bid date.
C. Samples of assembled materials, components, hardware, accessories, and/or colors, if requested.
1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Upon receipt, materials should be checked for damage that may have occurred in shipping to the job site.

B. Each package shall bear the name of the manufacturer.

C. Store products in manufacturer’s unopened packaging.

D. Store materials in a secure and dry area to protect against damage, weather, vandalism, and theft.

E. Transport, handle and store products with care to protect against damage before installation.

PART 2 - PRODUCTS:

2.1 MANUFACTURER

A. The fencing system shall be Patriot Ornamental Wire Fence as manufactured by Jerith Manufacturing LLC., 14400 McNulty Road, Philadelphia, PA 19154. Telephone: 800-344-2242; Fax: 215-676-9756; email: sales@jerith.com.

B. Substitutions: Approved equal permitted.

C. Nominal fence height shall be 48 inches. Fences taller than 72” shall be made by stacking two same height panels on top of each other.

D. Color shall be Black.

2.2 MATERIALS

A. Structural Components: All posts and rails used in the fence system shall be manufactured from coil steel having a minimum yield strength of 55,000 psi. The steel shall be galvanized to meet the requirements of ASTM A525 with a zinc coating weight of 0.60-1.0 ounces per square foot.

B. Infill: Section infill wires shall be steel with a minimum yield strength of 50,000 psi. The steel shall be galvanized to meet the designation of “regular coating” in accordance with requirements of ASTM A641.

2.3 FINISH

A. Pretreatment: A five stage non-chrome pretreatment shall be applied. The final stage shall be a dry-in-place activator which produces a uniform chemical conversion coating for superior adhesion.
B. Coating: Fence materials shall be coated with a TGIC polyester powder-coat finish system. Epoxy powder coatings, baked enamel or acrylic paint finishes are not acceptable. The finish shall have a cured film thickness of at least 2.0 mils.

C. Tests: The cured finish shall meet the following requirements:
   1. Humidity resistance of 1,000 hours using ASTM D2247.
   2. Salt-spray resistance of 1,000 hours using ASTM B117.
   3. Outdoor weathering shall show no adhesion loss, checking or crazing, with only slight fade and chalk when exposed for 3 years in Florida facing south at a 45 degree angle.

2.4 FABRICATION

A. Fence Sections shall be manufactured with 1” square x 18 gauge (.049”) tubing welded every 12” to the top and bottom of welded wire panels. Welded wire panels shall be comprised of 4 (.225”) gauge (Washburn & Moen Standard) vertical wires and 6 (.192”) gauge horizontal wires. 4 gauge vertical wires shall be placed 3½” on center. 6 gauge vertical wires shall be placed 1¾” on center. Horizontal wires shall be 6 gauge and spaced to provide style differences but no further apart than would allow substantial rigidity of vertical wires. Horizontal and vertical wires shall be assembled by automatic machines or other suitable mechanical means that will ensure accurate spacing and alignment of all members of the finished fabric. The wires shall be connected at every intersection by electric resistance welding in accordance with all requirements in ASTM A185. Sections shall be capable of supporting a 550 lb. load applied vertically at midspan and a concentrated load of 225 lbs. applied horizontally at midspan without permanent deformation.

B. Posts shall be 2½”square x 11 (.125”) gauge steel tubing. Posts shall be spaced 70” apart from inside face to inside face. Steel rail ends shall be screwed to terminal posts to receive the 1” square top and bottom rails. The rails shall be secured to the rail ends by stainless steel screws. Steel caps shall be provided with all posts.

C. Residential and light commercial grade gates shall be assembled using gate uprights with 1” outside cross-section dimensions having 7/8” tubes welded to them. A Fence Section shall then be cut to size and secured to two uprights using stainless steel screws. A 1” x .125” diagonal brace shall be provided, cut to length, cold galvanized, touched up, and screwed into position from the top hinge side to the bottom latch side of the gate. All gates shall support a 300 lb. vertical load on the latch side of the gate without collapsing.

D. Heavy duty grade gate frames shall consist of 2” square x .125” wall gate uprights and 1.5” x 1.5” x .125” U-channels for top and bottom members welded at each connection with a 1” x .125” wall diagonal brace welded into place. Infill of matching Fence Section shall be welded into frame.

2.5 WARRANTY

A. The entire fence system shall have a written 8 Year Warranty against rust and defects in workmanship and materials. In addition, the finish shall be warranted not to crack, chip, peel, or blister for the same period.
PART 3 - EXECUTION:

3.1 PREPARATION
   A. Verify areas to receive fencing are completed to final grades and elevations.
   B. Ensure property lines and legal boundaries are clearly established.
   C. Remove any surface irregularities which may cause interference with the installation of the fence.

3.2 FENCE INSTALLATION
   A. Install fence in accordance with the manufacturer’s instructions.
   B. Excavate post holes to proper depth to suit local conditions for stability and support of the fence system without disturbing the underlying materials. Excavate deeper as required for adequate support in soft and loose soils.
   C. Set fence posts in concrete footers at 70” spacing from inside of post to inside of post. Note that this fence must be stepped for installations on a slope. It can not follow the grade.
   D. Center and align posts in holes to required depth. Place concrete around posts and tamp for consolidation. After tamping, check alignment of posts, and make necessary corrections before the concrete hardens.
   E. Insert rail ends into horizontal rails and fasten in place to the posts.

3.3 GATE INSTALLATION
   A. Set gate posts plumb and level for gate openings specified in construction drawings.
   B. Install gates to allow full opening without interference after concrete has hardened around gate posts. Adjust hardware for smooth operation. Install one drop rod for double gates.

3.4 ACCESSORIES
   A. Install post caps and other accessories to complete fence.

3.5 CLEANING
   A. Contractor shall clean site of debris and excess materials. Post hole excavations shall be scattered uniformly away from posts.
   B. If necessary, clean fence system with mild household detergent and clean water. Excess concrete must be removed from posts and other fencing material before it hardens.
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. Work includes furnishing and installing dry boulder retaining wall to be installed to the lines and grades designated on the project’s final construction drawings or as directed by the Landscape Architect.
   B. Related Requirements:
      1. Section 312000 "Earth Moving" for excavation for boulder retaining walls.

1.3 PREINSTALLATION MEETINGS
   A. Preinstallation Conference: Conduct conference at Project site

1.4 ACTION SUBMITTALS
   A. Work Samples: Submit photos of at least three (3) similar projects completed by the installer that will be working on this project.
   B. Boulder Samples: Submit photos & measurements of a minimum of five (5) boulders that will be used.
   C. Work Documentation: Contractor shall submit detailed photographic or video documentation of the project from start to completion. This report is to verify correct building techniques.
      1. Document to include the following points:
      2. Prepared sub grade
      3. First Course Placement
      4. Completed Wall with Backfill

1.5 DELIVERY, STORAGE, AND HANDLING
   A. Store and handle stone to prevent deterioration or damage due to contaminants, breaking, chipping, or other causes.
PART 2 - MATERIALS

2.1 BOULDERS
   A. Boulders for the wall shall be sized appropriately per the details for a single-course wall. The size ranges are as follows:
      1. Boulders for first course: 24-36” Height x 24-36” Depth x 30-42” Width/Length

2.2 FOOTING MATERIAL
   A. Drainage aggregate shall be clean angular stone, allowing water to freely pass through.
   B. Material must be stable and firm when compacted.
   C. Commonly available crushed stone aggregate in the size range of ¾” to 1½” is required.
   D. In areas were the ground freezes water must easily pass through the footing material and have a place to drain to well away from the wall.

2.3 BACKFILL AGGREGATE
   A. Drainage aggregate shall be clean angular stone, that allows water to freely pass through.
   B. Material must be stable and firm when compacted.
   C. Aggregate size must be large enough that water will not “wash” it through the wall.
   D. Commonly available crushed stone aggregate in the size range of ¾” to 1½” is typically suitable.

PART 3 - PART 3 – CONSTRUCTION

3.1 EXCAVATION
   A. Contractor shall excavate to the lines and grades shown on the project grading plans. Contractor shall take precautions to minimize over---excavation. Over---excavation shall be filled with compacted infill material, or as directed by the Landscape Architect, at the Contractor's expense.
   B. Contractor shall verify location of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation. Excavation support, if required, is the responsibility of the Contractor.
3.2 FOOTING

A. The subgrade soil shall be proof rolled and compacted to 95% standard Proctor density and inspected by the Owner's Engineer prior to placement of footing material.

B. The footing material shall be placed to the depth and width called for in the construction documents. It shall be proof rolled and compacted to 95% standard Proctor density and inspected by the Owner's Engineer prior to placement of Foundation Stones.

3.3 PREPARING TO BUILD

A. The Contractor shall build the wall in the location shown on the project plans.

B. The Contractor shall build the wall to the dimensions and grades shown on the project plans.

C. The exterior face of the wall shall have no bulges or hollows greater than 3” from adjacent stone

3.4 BUILDING THE WALL

A. FIRST COURSE

1. All stones shall be placed with their depth into the wall structure (perpendicular to the face of the wall).
2. Stones should be set level at the base.
3. To the greatest extent possible, stones of the same height should be placed next to each other to form an even horizontal course.
4. The underside of the stone shall be free of voids and well packed with footing material

3.5 BACKFILL PLACEMENT

A. Only hand-operated compaction equipment shall be allowed within 3 feet of the back of the wall. Compaction within the 3 feet behind the wall shall be achieved by at least three (3) passes of a lightweight mechanical tamper, plate, or roller.

B. At completion of wall construction, backfill shall be placed up to the height shown in the construction drawings. If final grading adjacent to the wall is not placed immediately after wall completion, temporary grading and drainage shall be provided to ensure water runoff is not directed at the wall nor allowed to collect or pond behind the wall until final grading adjacent to the wall is completed.

C. Filter fabric should be used to separate the drainage aggregate from the backfill and other soil.

END OF SECTION 323253
SECTION 323300 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General Requirements, apply to this Section.

1.2 SUMMARY
   A. Section Includes:
      1. Seating.
      2. Tables.
      3. Trash receptacles.

1.3 ACTION SUBMITTALS
   A. Manufacturer's Literature: Submit copies of each of manufacturer's material descriptions, dimensions, details, and installation instructions for the following. Submit manufacturer's material descriptions for primer coat and finish coat.

1.4 INFORMATIONAL SUBMITTALS
   A. Complete Shop Drawings for the installation of 6’ bench without back
   B. Complete Shop Drawings for the installation of ADA picnic table
   C. Complete Shop Drawings for the installation of 6’ backless player's benches
   D. Complete Shop Drawings for the installation of trash receptacle with metal hood

1.5 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For site furnishings to include in maintenance manuals.
   B. The Contractor shall furnish and deliver standard written manufacturer's guarantee in Owner's name covering all materials and workmanship under this Section 323300, Site Furnishings, in addition to, and not in lieu of, guarantee requirements set forth under Section 010000, GENERAL REQUIREMENTS, and other liabilities which the Contractor may have by law or other provisions of the Contract Documents.
C. Supplier shall pay for repairs of any damage to any part of the project caused by defects in his work and for any repair to the materials or equipment caused by replacement. All repairs are to be done to the satisfaction of the Owner’s Representative.

D. Any part of the work installed under this contract requiring excessive maintenance shall be considered as being defective, and shall be replaced by the Supplier during the one year guarantee period at no cost to the Owner.

PART 2 - PRODUCTS

2.1 SEATING

A. 72" long bench with backrest, surface mount on concrete pad, Ipe wood slats with black supports, (model #61-892) as manufactured by Dumor, Inc. P.O. Box 142 Mifflintown, PA 17059 or approved equal

B. 72" long backless players bench, in ground mount, Tender Tuff colored steel (model # 141683) as manufactured by Landscape Structures, 601 7th Street South, Delano, MN 55328 or approved equal

2.2 TABLES

A. 8' long ADA picnic table, in-ground mount, Ipe wood slats with Black supports, (model #67-079-68-11) as manufactured by DuMor, Inc., P.O. Box 142, Mifflintown, PA 17059 800.598.4018, or approved equal.

2.3 TRASH RECEPTACLES

A. 24" x 32" round black steel trash receptacle with dome lid surface mount on concrete pad, Model # 26BTR5/ETR55/DL3 as manufactured by The Cary Company.

2.4 FABRICATION

A. Factory Assembly: Factory assemble components to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.5 GENERAL FINISH REQUIREMENTS

A. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. All metal inserts, anchor slots, anchors, anchor bolts, fastenings, and other fastening devices, for attachment of site improvement items to pavements, except as otherwise specified under other Sections of this Specification, shall be in specified, provided, delivered installed and paid for under the work of this Section 323300 Site Furnishings.

C. Unless otherwise indicated, install site furnishings after paving has been completed.

D. Free-standing site improvement items shall be set plumb and horizontal regardless of the pitch of the finished surrounding grade unless otherwise shown on the Contract Documents.

E. The Contractor shall be responsible for timing the delivery of site improvement items so as to minimize the on-site storage time prior to installation. All stored materials are the responsibility of the Contractor and shall be protected from weather, careless handling and vandalism.

F. Contractor shall be responsible for the correct location of site improvement items. Take particular care to maintain shapes, plumb and level during the pouring of concrete.

G. All Work shall be accurately set to established lines and elevations and rigidly set in place to supporting construction.

H. Install site furnishings level, plumb, true, and positioned at locations after final approval in the field by Owner's Representative.

I. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

J. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with
nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 323300
SECTION 328400 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Piping.
2. Encasement for piping.
4. Pressure-reducing valves.
5. Automatic control valves.
6. Automatic drain valves.
7. Transition fittings.
8. Dielectric fittings.
9. Miscellaneous piping specialties.
10. Sprinklers.
11. Quick couplers.
12. Drip irrigation specialties.
13. Controllers.

1.3 DEFINITIONS

A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.

B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.

C. ET Controllers: EvapoTranspiration Controllers. Irrigation controllers which use some method of weather based adjustment of irrigation. These adjusting methods include use of historical monthly averages of ET; broadcasting of ET measurements; or use of on-site sensors to track ET.

D. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

E. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
1.4 PERFORMANCE REQUIREMENTS

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.

B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.

C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:

   1. Irrigation Main Piping: 200 psig.
   2. Circuit Piping: [150 psig].

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, [electrical characteristics], and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.

B. Qualification Data: For qualified Installer.

C. Zoning Chart: Show each irrigation zone and its control valve.

D. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For [sprinklers] [controllers] [and] [automatic control valves] to include in operation and maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   1. All Sprinklers: Equal to no fewer than 5 units.
1.9 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers that include a licensed Master Irrigator.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.11 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without [Owner's] written permission.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

B. Galvanized-Steel Pipe: ASTM A 53/A 53M, Standard Weight, Type E, Grade B.

C. Ductile-Iron Pipe with Mechanical Joints: AWWA C151, with mechanical-joint bell and spigot ends.
   1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
      a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
D. Ductile-Iron Pipe with Push-on Joint: AWWA C151, with push-on-joint bell and spigot ends.
   1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

E. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.
   3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

F. Hard Copper Tube: ASTM B 88, Type L, and ASTM B 88, Type M, water tube, drawn temper.
   3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

G. PE Pipe with Controlled ID: ASTM F 771, PE 3408 compound; [SIDR 15].
   1. Insert Fittings for PE Pipe: ASTM D 2609, nylon or propylene plastic with barbed ends. Include bands or other fasteners.

H. PE Pipe with Controlled OD: ASTM F 771, PE 3408 compound, SDR 11.
   2. PE Socket-Type Fittings: ASTM D 2683.

I. PE Pressure Pipe: AWWA C906, with DR of 7.3, 9, or 9.3 and PE compound number required to give pressure rating not less than 160 psig.

   1. PVC Socket Fittings: ASTM D 2466, Schedules 40 and 80.
   2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
   3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

   1. PVC Socket Fittings: ASTM D 2467, Schedule 80.
   2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.
2.2 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick unless otherwise indicated; full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

F. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.3 MANUAL VALVES

A. Bronze Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. NIBCO INC.
   b. Spears Manufacturing Co
   c. WATTS
   d. or approved equal.

2. Description:
   b. SWP Rating: 150 psig.
   c. CWP Rating: 600 psig.
   d. Body Design: Two piece.
   e. Body Material: Bronze
   f. Ends: Threaded or solder joint if indicated.
   g. Seats: PTFE or TFE.
   h. Stem: Bronze.
   i. Ball: Chrome-plated brass.
   j. Port: Full [or regular, but not reduced].

B. Plastic Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. NIBCO INC.
   b. Spears Manufacturing Company.
   c. WATTS; A Watts Water Technologies Company.
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2. Description:
   b. Pressure Rating: [125 psig minimum] [150 psig].
   c. Body Material: PVC.
   d. Type: Union.
   e. End Connections: Socket or threaded.
   f. Port: Full.

C. Operating Wrenches for Iron Gate Valve Casings: Furnish [one] [two] <Insert number> steel, tee-handle operating wrench(es) with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut for Project.

D. Iron Gate Valves, NRS:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. NIBCO INC.
      b. WATTS; A Watts Water Technologies Company.
      c. or approved equal.
   2. Description:
      a. Standard: MSS SP-70, Type I.
      b. CWP Rating: 200 psig.
      c. Body Material: ASTM A 126, gray iron with bolted bonnet.
      d. Ends: Flanged.
      e. Trim: All bronze.
      f. Disc: Solid wedge.
      g. Packing and Gasket: Asbestos free.

2.4 PRESSURE-REDUCING VALVES

A. Water Regulators:
   1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      a. WATTS; A Watts Water Technologies Company.
      b. Apollo Flow Controls: Conbraco Industries, Inc.
      c. or approved equal.
   2. Description:
      b. Body Material: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and NPS 3.
      c. Pressure Rating: Initial pressure of 150 psig.
      d. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and NPS 3.

B. Water Control Valves:
1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
   a. WATTS; A Watts Water Technologies Company.
   b. Zurn Industries, LLC.
   c. or approved equal.

2. **Description:** Pilot-operation, diaphragm-type, single-seated main water control valve. Include small pilot control valve, restrictor device, specialty fittings, and sensor piping.
   a. **Main Valve Body:** Cast- or ductile-iron body with AWWA C550 or FDA-approved, interior epoxy coating; or stainless-steel body.
   b. **Pattern:** Angle-valve design.
   c. **Trim:** Stainless steel.
   d. **Pressure Rating:** Initial pressure of 150 psig minimum.
   e. **End Connections:** Threaded for NPS 2 and smaller; gasket joint for NPS 2-1/2 and larger.

### 2.5 AUTOMATIC CONTROL VALVES

#### A. Plastic, Automatic Control Valves:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
   b. Rain Bird Corporation.

2. **Description:** Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

### 2.6 AUTOMATIC DRAIN VALVES

#### A. Description:

Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig.

### 2.7 TRANSITION FITTINGS

#### A. General Requirements:

Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

#### B. Transition Couplings:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
   a. Ford Meter Box Company, Inc. (The).
   b. JCM Industries, Inc.
   c. Smith-Blair, a Xylem brand.
   d. or approved equal

2. **Description:** AWWA C219, metal sleeve-type coupling for underground pressure piping.
C. Plastic-to-Metal Transition Unions:

1. <Click here to find, evaluate, and insert list of manufacturers and products.>
2. Description: MSS SP-107, PVC four-part union. Include one brass [or stainless-steel] threaded end, one solvent-cement-joint [or threaded] plastic end, rubber O-ring, and union nut.

2.8 MISCELLANEOUS PIPING SPECIALTIES

A. Water Hammer Arresters: ASSE 1010 or PDI WH 201, with bellows or piston-type pressurized cushioning chamber and in sizes complying with PDI WH 201, Sizes A to F.

B. Pressure Gages: ASME B40.1. Include 4-1/2-inch-diameter dial, dial range of two times system operating pressure, and bottom outlet.

2.9 SPRINKLERS

A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.

B. Plastic, Pop-up, Gear-Drive Rotary Sprinklers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
   b. Rain Bird Corporation.
   c. or approved equal.

2. Description:
   a. Body Material: ABS.
   b. Nozzle: ABS.
   c. Retraction Spring: Stainless steel.
   d. Internal Parts: Corrosion resistant.

C. Metal, Pop-up, Impact-Drive Rotary Sprinklers:

1. **Manufacturers:** Subject to compliance with requirements, provide products by the following:
   a. Rainbird.
   b. or approved equal.

2. Description:
   a. Case: Brass.
   c. Pop-up Height: 4 inches Approximately 3 inches aboveground to nozzle.
   d. Sprinkler Construction: Brass and other corrosion-resistant metals.

D. Plastic, Surface Spray Sprinklers:
1. **Manufacturers:** Subject to compliance with requirements, provide products by the following:
   a. Rain Bird Corporation.
   b. or approved equal.

2. **Description:**
   a. Body Material and Flange: ABS.
   b. Pattern: Fixed, with flow adjustment.

E. **Metal, Surface, Pop-up Spray Sprinklers:**

1. **Manufacturers:** Subject to compliance with requirements, provide products by the following:
   a. Rain Bird Corporation.
   b. Hunter
   c. or approved equal.

2. **Description:**
   c. Pattern: Fixed, with flow adjustment.

F. **Plastic, Surface, Pop-up Spray Sprinklers:**

1. **Manufacturers:** Subject to compliance with requirements, provide products by the following:
   a. Rain Bird Corporation.
   b. Hunter
   c. or approved equal.

2. **Description:**
   a. Body Material and Flange: ABS.
   b. Pattern: Fixed, with flow adjustment.

G. **Plastic, Pop-up Spray Sprinklers:**

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
   b. Rain Bird Corporation.
   c. or approved equal.

2. **Description:**
   a. Body Material: ABS.
   b. Nozzle: ABS.
   c. Retraction Spring: Stainless steel.
   d. Internal Parts: Corrosion resistant.
   e. Pattern: Fixed, with flow adjustment.

### 2.10 QUICK COUPLERS

A. **Manufacturers:** Subject to compliance with requirements, provide products by the following:
1. Rain Bird Corporation.
2. Netafim USA
3. or approved equal.

B. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

1. Locking-Top Option: Vandal-resistant locking feature. Include one matching key(s).

2.11 CONTROLLERS

A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:

2. Rain Bird Corporation.
3. or approved equal.

B. Description:

1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.

2. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.
   b. Mounting: Surface type for wall.

3. Interior Control Enclosures: NEMA 250, Type 12, dripproof, with locking cover and two matching keys.
   b. Mounting: Surface type for wall.


5. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.
   a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
   c. Surge Protection: Metal-oxide-varistor type on each station and primary power.

6. Moisture Sensor: Adjustable from one to seven days, to shut off water flow during rain.

7. Smart Controllers: Use ET, tested in accordance with IA SWAT Climatological Based Controllers 8th Draft Testing Protocol and compliant with ASHRAE Standard 189.1.

8. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.
   a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.

c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.

9. Concrete Base: Reinforced precast concrete not less than 36 by 24 by 4 inches thick, and 6 inches greater in each direction than overall dimensions of controller. Include opening for wiring.

2.12 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Armorcast Products Company; brand of Hubbell Utility Solutions; Hubbell Incorporated.
   b. Ametec
   c. Carson
   d. or approved equal

2. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
   a. Size: As required for valves and service.
   b. Shape: Rectangular.
   c. Sidewall Material: PE, ABS, or FRP.
   d. Cover Material: PE, ABS, or FRP.
      1) Lettering: "IRRIGATION."

B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

B. Install warning tape directly above pressure piping, [12 inches] below finished grades, except 6 inches below subgrade under pavement and slabs.

C. Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel or crushed stone, graded from [3/4 to 3 inches], to 12 inches below grade. Cover gravel or crushed stone with sheet of asphalt-saturated felt and backfill remainder with excavated material.

D. Provide minimum cover over top of underground piping according to the following:
1. Irrigation Main Piping: Minimum depth of 36 inches 18 inches below finished grade, or not less than 18 inches \textless \text{Insert value}\textgreater \text{ below average local frost depth, whichever is deeper.}

2. Circuit Piping: \textless\text{Insert value}\textgreater.

3. Drain Piping: 12 inches.

4. Sleeves: 18 inches.

3.2 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Architect's approval before excavation.

3.3 PIPING INSTALLATION

A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.

B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.

C. Install piping free of sags and bends.

D. Install groups of pipes parallel to each other, spaced to permit valve servicing.

E. Install fittings for changes in direction and branch connections.

F. Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.

G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.

H. Install underground thermoplastic piping according to ASTM D 2774.

I. Install expansion loops in control-valve boxes for plastic piping.

J. Lay piping on solid subbase, uniformly sloped without humps or depressions.

K. Install ductile-iron piping according to AWWA C600.

L. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.

M. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Install shutoff valve on outlet. Install aboveground or in control-valve boxes.

N. Water Hammer Arresters: Install between connection to building main and circuit valves aboveground or in control-valve boxes.
O. Install piping in sleeves under parking lots, roadways, and sidewalks.

P. Install sleeves made of Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints.

Q. Install transition fittings for plastic-to-metal pipe connections according to the following:

1. Underground Piping:
   a. NPS 1-1/2 and Smaller: Plastic-to-metal transition fittings.
   b. NPS 2 and Larger: AWWA transition couplings.

2. Aboveground Piping:
   a. NPS 2 and Smaller: Plastic-to-metal transition fittings.
   b. NPS 2 and Larger: Use dielectric flange kits with one plastic flange.

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. Ductile-Iron Piping Gasketed Joints: Comply with AWWA C600 and AWWA M41.


G. Copper-Tubing Soldered Joints: Apply ASTM B 813 water-flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.

H. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.

I. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

   1. Plain-End PE Pipe and Fittings: Use butt fusion.
2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.

J. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
   1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
   2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
   3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.5 VALVE INSTALLATION
   A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.
   B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.
      1. Install valves and PVC pipe with restrained, gasketed joints.
   C. Aboveground Valves: Install as components of connected piping system.
   D. Pressure-Reducing Valves: Install in boxes for automatic control valves or aboveground between shutoff valves.
   E. Throttling Valves: Install in underground piping in boxes for automatic control valves.
   F. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.6 SPRINKLER INSTALLATION
   A. Install sprinklers after hydrostatic test is completed.
   B. Install sprinklers at manufacturer's recommended heights.
   C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.

3.7 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION
   A. Equipment Mounting: Install interior controllers on wall.
      1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
      2. Install anchor bolts to elevations required for proper attachment to supported equipment.
B. Equipment Mounting: Install exterior freestanding controllers on precast concrete bases.
   1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor bolts to elevations required for proper attachment to supported equipment.

C. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.8 CONNECTIONS

A. Comply with requirements for piping specified in Section 221113 "Facility Water Distribution Piping" for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.

C. Connect wiring between controllers and automatic control valves.

3.9 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
   1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

3.10 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Any irrigation product will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.11 STARTUP SERVICE

A. Perform startup service.
   1. Complete installation and startup checks according to manufacturer's written instructions.
   2. Verify that controllers are installed and connected according to the Contract Documents.
   3. Verify that electrical wiring installation complies with manufacturer's submittal.

B. Perform winterization Service.
   1. Complete (1) system shut down with training.

3.12 ADJUSTING

A. Adjust settings of controllers.

B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.

C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/4 inch above, finish grade.

3.13 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.14 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

3.15 PIPING SCHEDULE

A. Install components having pressure rating equal to or greater than system operating pressure.

B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.
C. Underground irrigation main piping, 3 inch to 211/2 inch, shall be the following:
   1. Schedule 40, PVC pipe and socket fittings, and solvent-cemented joints.

D. Circuit piping, NPS 2-1/2 to NPS 4 1-2 inch, shall be the following:
   1. PE, controlled ID pipe; insert fittings for PE pipe; and banded or fastener joints.
   2. PE, controlled OD pipe; PE socket or butt-fusion fittings; and heat-fusion joints. NPS 3 pipe and fittings if NPS 2-1/2 pipe and fittings are not available.
   3. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
   4. SDR 26, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

E. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.
   1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.

F. Risers to Aboveground Sprinklers and Specialties: hard copper tube, wrought-copper fittings, and soldered joints.

G. Risers to Aboveground Sprinklers and Specialties: Schedule 80, PVC pipe and socket fittings; and solvent-cemented joints.

H. Drain piping shall be one of the following:
   1. SDR 21, 26, or 32.5, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

3.16 VALVE SCHEDULE

A. Drain Valves:
   1. NPS 1/2 and NPS 3/4: Plastic ball valve.
   2. NPS 1 to NPS 2: Plastic ball valve.
SECTION 329113 - SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes planting soils specified by composition of the mixes.

B. Related Requirements:

1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
2. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
3. Section 329300 "Plants" for placing planting soil for plantings.

1.3 ALLOWANCES

A. Preconstruction and field quality-control testing are part of testing and inspecting allowance.

1.4 UNIT PRICES

A. Work of this Section is affected by cubic yard

1.5 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.

B. CEC: Cation exchange capacity.

C. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

D. Imported Soil: Soil that is transported to Project site for use.

E. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
F. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

G. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.


I. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

J. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

K. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.


1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include recommendations for application and use.
   2. Include test data substantiating that products comply with requirements.
   3. Include sieve analyses for aggregate materials.
   4. Material Certificates: For each type of soil amendment and fertilizer before delivery to the site, according to the following:
      a. Manufacturer's qualified testing agency's certified analysis of standard products.
      b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
      c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.
1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

C. Field quality-control reports.

1.9 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1. Laboratories: Subject to compliance with requirements, provide testing by the following:
   a. UMass Soil & Plant Nutrient Testing Laboratory Paige Laboratory, Room 203 161 Holdsworth Way Amherst, MA 01003 (413)545-2311.

2. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

1.10 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil imported soil.

1. Notify Architect seven days in advance of the dates and times when laboratory samples will be taken.

B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.11 SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.

B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Architect under the direction of the testing agency.
1. Number and Location of Samples: Minimum of three representative soil samples from varied locations where directed by Architect for each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: as directed by testing laboratory
3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.12 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
   a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NEC-67, including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm and sodium absorption ratio.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.


F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil.
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.
PART 2 - PRODUCTS

2.1 MATERIALS

2.2 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

1. Reaction: pH of 5.5 to 8.
2. Soluble-Salt Concentration: Less than 4 dS/m.
3. Moisture Content: 35 to 55 percent by weight.
4. Organic-Matter Content: 50 to 60 percent of dry weight.
5. Particle Size: Minimum of 98 percent passing through a 1/2-inch sieve.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

PART 3 - EXECUTION

3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated area(s) to a depth of As indicated on drawings and stockpile until amended.

B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

C. Mixing: Spread unamended soil to total depth indicated on Drawings, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.

2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Soil will be considered defective if it does not pass tests and inspections.

C. Prepare test reports.

D. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.
3.5 PROTECTION

A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.6 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113
SECTION 329119 - LANDSCAPE GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Final grade topsoil for finish landscaping.

B. Related Sections:
   1. 329113 - Soil Preparation
   2. 329200 - Turf and Grasses

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Topsoil:
   2. Basis of Payment: Includes excavating existing topsoil, supplying topsoil materials, stockpiling, preparing and scarifying substrate surface, placing where required, and rolling.

1.3 SUBMITTALS

A. Materials Source: Submit name of imported materials source.

1.4 QUALITY ASSURANCE

A. Furnish each topsoil material from single source throughout the Work.


PART 2 - PRODUCTS

2.1 MATERIAL

A. Topsoil: Fill Type S2 as specified in Section 329300.
PART 3 - EXECUTION

3.1 EXAMINATION
   A. Verify substrate base has been contoured and compacted.

3.2 PREPARATION
   A. Protect landscaping and other features remaining as final Work.
   B. Protect existing structures, sidewalks, utilities, paving, and curbs.

3.3 SUBSTRATE PREPARATION
   A. Eliminate uneven areas and low spots.
   B. Remove debris, loose roots, branches, stones, in excess of 1/2 \[1\] \[2\] \(<\] \[6\] \(<\] inch in size. Remove contaminated subsoil.
   C. Scarify surface to depth of 3 \[6\] \(<\] inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL
   A. Place topsoil in areas where seeding, is required. to thickness as scheduled. Place topsoil during dry weather.
   B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
   C. Remove roots, weeds, rocks, and foreign material while spreading.
   D. Manually spread topsoil close to plant material, and path to prevent damage.
   E. Roll placed topsoil.
   F. Remove surplus subsoil and topsoil from site.
   G. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.5 TOLERANCES
   A. Section 014000 - Quality Requirements: Tolerances.
   B. Top of Topsoil: Plus or minus 1/2 \(<\] inch.
3.6 PROTECTION OF INSTALLED WORK

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Prohibit construction traffic over topsoil.

3.7 SCHEDULES

A. Compacted topsoil thicknesses:


END OF SECTION 329119
SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding.
3. Turf renovation.
4. Erosion-control material(s).

B. Related Requirements:

1. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" and drawing designations for planting soils.

E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
1.4 PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS
A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
B. Product Certificates: For fertilizers, from manufacturer.

1.6 CLOSEOUT SUBMITTALS
A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE
A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf and meadow establishment.
   1. Professional Membership: Installer shall be a member in good standing of either the National Association of Landscape Professionals or AmericanHort.
   2. Experience: Five years' experience in turf installation in addition to requirements in Section 014000 "Quality Requirements."
   3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
   4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the National Association of Landscape Professionals:
      a. Landscape Industry Certified Technician - Exterior.
      b. Landscape Industry Certified Lawn Care Manager.
      c. Landscape Industry Certified Lawn Care Technician.
   5. Pesticide Applicator: State licensed, commercial.

1.8 DELIVERY, STORAGE, AND HANDLING
A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.9 FIELD CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.


B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species:

1. Quality: Seed of grass species as listed below for solar exposure, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:

C. Grass-Seed Mixes:

1. Lawn Seed Mix (% by weight):
   a. 30% Improved Perennial Ryegrass
   b. 30% Turf Type Tall Fescue
   c. 30% Chewing Fescue
   d. 5% Creeping Red Fescue
   e. 5% Miniature or Dutch White Clover
   f. Application Rate: 265 lbs per acre or 5-8 lbs per 1,000 sq ft.
2. Products may be acquired from the following source (or approved equal):
   a. Allen's Seed Store: 693 S County Trail Exeter, RI 02822 Phone: 401 294 2722
2.2 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: fertilizer to have a ratio of 18 Nitrogen (N) - 24 Phosphorous (P) - 12 Potassium (K)

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: fertilizer to have a ratio of 18 Nitrogen (N) - 24 Phosphorous (P) - 12 Potassium (K)

2.3 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

3. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.
SECTION 329200 - TURF AND GRASSES

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Placing Planting Soil: Place and mix planting soil in place over exposed subgrade.

C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

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

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.
1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 5 to 8 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

3.6 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Spray-apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.

3.7 TURF RENOVATION

A. Renovate existing turf where indicated.

B. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

C. Remove topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

D. Mow, dethatch, core aerate, and rake existing turf.

E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

G. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

H. Apply soil amendments and initial fertilizer required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.

1. Initial Fertilizer: Commercial fertilizer applied according to manufacturer's recommendations.
I. Water newly planted areas and keep moist until new turf is established.

3.8 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Coordinate irrigation system installation and testing any additional watering measures needed to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow Lawn to a height of 1-1/2 to 2 inches.

3.9 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.
3.10 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

3.11 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:

1. Seeded Turf: 90 days from date of Substantial Completion.
   a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

END OF SECTION 329200
SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Plants.
   2. Tree stabilization.

B. Related Requirements:
   1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
   2. Section 329200 "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.

1.3 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

B. Unit prices apply to authorized work covered by quantity allowances.

C. Unit prices apply to additions to and deletions from the Work as authorized by Change Orders.

1.4 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed
from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

D. Finish Grade: Elevation of finished surface of planting soil.

E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

F. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

G. Planting Area: Areas to be planted.

H. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.

I. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

J. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

K. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

L. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.5 COORDINATION

A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 5 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Organic Compost Mulch: [1-quart] volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
2. Proprietary Root-Ball-Stabilization Device: One unit.
3. Slow-Release, Tree-Watering Device: One unit of each size required.

1.8 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of 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. Sample Warranty: For special warranty.

1.9 CLOSEOUT SUBMITTALS

1.10 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
   a. Landscape Industry Certified Technician - Exterior.
   b. Landscape Industry Certified Interior.
   c. Landscape Industry Certified Horticultural Technician.

5. Pesticide Applicator: State licensed, commercial.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances is made by Architect, who tags plants at their place of growth before they are prepared for transplanting.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.

2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

D. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may 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 seven days in advance of delivery to site.

1.1 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

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

D. Handle planting stock by root ball.

E. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.12 FIELD CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

2. Fall Planting: September 15 - December 1.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.13 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:
PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk (“included bark”); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.

2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

2.2 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.

b. Structural failures including plantings falling or blowing over.

c. Faulty performance of tree stabilization.

2. Warranty Periods: From date of Substantial Completion.

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.

b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.

b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.

d. Provide extended warranty for period equal to original warranty period, for replaced plant material.
1. Type: Ground or shredded bark.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural - no orange mulch.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through a 1-inch sieve; soluble-salt content of 2 to 5 dS/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.3 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood softwood with specified wood pressure-preservative treatment, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.

2.4 MISCELLANEOUS PRODUCTS

A. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.

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

D. Application of Mycorrhizal Fungi: At time directed by Landscape Architect, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

   1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

   2. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.

   3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

   4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

   5. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
8. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
1. Hardpan Layer: Drill 6-inch diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
1. Backfill: Planting soil mixed with excavated soil.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
1. Backfill: Planting soil mixed with excavated soil.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.


E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of three stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend to the dimension indicated on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.

2. Upright Staking and Tying: Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.

3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

3.8 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.

B. Use planting soil mixed with excavated soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.
   1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 2-inch 3-inch average thickness, with 36-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
   2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.10 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.11 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Landscape Architect.
   1. Submit details of proposed pruning and repairs.
   2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
   3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.
B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree of 4 inches or smaller in caliper size.
2. Species of Replacement Trees: Same species being replaced.

3.12 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.13 MAINTENANCE SERVICE

A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion.
SECTION 334200 - STORMWATER CONVEYANCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Stormwater drainage piping.
   2. Channel Drains and Area Drains.
   3. Bedding and cover materials.

B. Related Requirements:
   1. Section 31213 - Rough Grading.
   2. Section 312316.13 - Trenching: Execution requirements for trenching as required by this Section.
   3. 321313 - Concrete Paving

1.2 DEFINITIONS

A. ABS: Acrylonitrile butadiene styrene.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

B. Pipe and Fittings:
   2. Basis of Payment: Includes excavating , removing soft subsoil, bedding and fill , geotextile fabric, pipe and fittings, accessories, and connecting to building service piping and to municipal sewer .

1.4 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:
   2. AASHTO M294 - Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter.
   3. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg Rammer and a 457-mm Drop.
B. ASTM International:

4. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.5 COORDINATION

A. Coordinate Work of this Section with termination of storm sewer connection outside building, trenching, connection to existing catch basins.

1.6 PREINSTALLATION MEETINGS

A. Convene minimum one week prior to commencing Work of this Section.

1.7 SUBMITTALS

A. Product Data: Submit manufacturer information describing pipe, pipe accessories.
B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
C. Manufacturer Instructions: Submit special procedures required to install specified products.
D. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
E. Qualifications Statement:
   1. Submit qualifications for manufacturer.

1.8 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
B. Project Record Documents: Record actual locations of pipe runs, connections, catch basins, cleanouts, and invert elevations.
C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
1.9 QUALITY ASSURANCE

A. Perform Work according to RIDOT Standard Specifications for Road and Bridge Construction standards Current Edition.

1.10 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:
   1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
   2. Provide additional protection according to manufacturer instructions.

1.12 EXISTING CONDITIONS

A. Field Measurements:
   1. Verify field measurements prior to fabrication.
   2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 STORM DRAINAGE PIPING

A. PVC Piping:
   1. Pipe:
      b. Sch 40
   2. Fittings: PVC.
   3. Joints:
      a. Type: Snap fittings.
   4. Accessories:
a. Brass Drain Cover

B. Channel Drains

1. 5" Dura-Slope Channel Drain
   a. 7 Pre-Sloped Sections (DS-091, DS-092, DS-094, DS-095, DS-096, DS-098, & DS-099)
   b. Manufactured by NDS or Approved Equal

2. 'Mannione' Style Cast Iron Grate by Iron Age Designs
   a. (877) 418-3568 - 2104 SW 152nd St. Suite #4 - Burien, WA 98166
   b. or Approved Equal

2.2 MATERIALS

A. Bedding and Cover:

1. Bedding: #2 Crushed Stone as Specified in Section 312316.13
2. Cover: 3/4" Crushed Stone , as specified in Section 312316.13.
3. Soil Backfill from above Pipe to Finish Grade: Loam as specified in Section 312316.13.
4. Subsoil: No rocks more than 6 inches in diameter, frozen earth, or foreign matter.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that excavation base is ready to receive Work of this Section.

C. Verify that excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Correct over-excavation with coarse aggregate.

C. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

3.3 INSTALLATION

A. Excavation and Bedding:
1. Excavate trench to [12] 6 inches below pipe invert, and as specified in Section 312316.13 - Trenching.
2. Hand trim excavation for accurate placement of piping to indicated elevations.
3. Place bedding material at trench bottom.
5. Maintain optimum moisture content of bedding material to attain required compaction density.
6. Level fill materials in continuous layers not exceeding 6 [8] <_______> inches in depth, and compact to 95 percent maximum density.
7. Place geotextile fabric over compacted bedding.

B. Piping:

1. Place pipe on minimum 6-inch- deep bed of #2 filter aggregate.
2. Install 3/4” crushed stone at sides and over top of pipe.
3. Install top cover and compact to 95 percent maximum density.
4. Backfilling and Compaction:
   a. Do not displace or damage pipe while compacting.
5. Connect to existing catch basins , through installed sleeves.
6. Installation Standards: Install Work according to RIDOT Standard Specifications for Road and Bridge Construction standards.

3.4 TOLERANCES

A. Section 014000 - Quality Requirements: Requirements for tolerances.

B. Maximum Variation from Indicated Pipe Slope: 1/8 <_______> inch in 10 <_______> feet.

3.5 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Inspection:

1. Request inspection by Architect/Engineer prior to placing aggregate cover over pipe.

C. Testing:

1. Piping:
   
2. If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.

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3.6 PROTECTION

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 334200