Project Manual/ Contract Documents

For

WHALEHEAD

LANDSCAPE AND PEDESTRIAN IMPROVEMENTS

Currituck County

Corolla, NC

Surface 678, PA

The Imperial Building

215 Morris Street, Suite 150

Durham, NC 27701

(919) 419-1199 phone

(919) 419-1669 fax

www.surface678.com

Bid Documents

December-19-2014

CURRITUCK COUNTY

HISTORIC COROLLA PARK - WHALEHEAD

Historic Currituck County Courthouse
153 Courthouse Road, Suite 204
Currituck, NC 27929

ADVERTISEMENT FOR BIDS

FOR THE

LANDSCAPE AND PEDESTRIAN IMPROVEMENTS
PHASE I

Date of Issue: **December 19, 2014**

Currituck County invites contractors to submit sealed proposals for the **Landscape and Pedestrian Improvements (Phase I) project at Historic Corolla Park/ Whalehead.** This is an informal bid project. Sealed proposals will be received until 1:00 pm on January 6, 2015 at the Currituck County Engineer's Office, Currituck County Historic Courthouse, 153 Courthouse Road, Suite 302, Currituck, NC 27929.

WHALEHEAD/ HISTORIC COROLLA PARK
LANDSCAPE AND PEDESTRIAN IMPROVEMENTS – PHASE I
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PERMITS

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LIST OF DRAWINGS IN SET (Bound Together)

Whalehead – Historic Corolla Park Landscape and Pedestrian Improvements Phase I

NOTICE TO BIDDERS

REQUEST FOR BIDS TO CONSTRUCT THE LANDSCAPE AND PATHWAYS IMPROVEMENTS

WHALEHEAD – CURRITUCK COUNTY
COROLLA, NORTH CAROLINA

Sealed proposals will be received by the Currituck County Engineer's Office, Currituck County Courthouse, 153 Courthouse Road, Suite 302, Corolla, NC 27929, **until 1:00 PM on Tuesday, January 6th, 2015** to construct the following project:

LANDSCAPE AND PEDESTRIAN IMPROVEMENTS
PHASE I

Project Scope of Work

The project is located at 1100 Club Road in Corolla, NC 27927. This project includes removal of existing guard shack, removal of existing planting, installation of proposed concrete sidewalks, installation of proposed wood 6' wide boardwalks, and installation of proposed planting at the Highway 12 entrance, between the entrance drive and adjacent parcels, and along the South shorelines of the property. The Owner reserves the right to reject any or all bids and to waive informalities.

Bid Schedule

- Advertisement Date –**Friday December 19th, 2014**
- Questions Deadline – **Tuesday, December 30, 2014 at 4:00 PM**
  Submit all questions to the Designer
- Sealed Proposals due – **Tuesday, January 6, 2015 at 1:00 PM**
  Deliver to: Currituck County Engineer's Office, Currituck County Courthouse, 153 Courthouse Road, Suite 302, Corolla, NC 27929

For a complete project documents, please contact:
Robert Pratt; 919-282-9128; rpratt@surface678.com

Designer
Surface 678, PA
Mr. Robert Pratt
215 Morris Street
Durham, NC 27701
919-282-9128
rpratt@surface678.com

Owner
Currituck County
Mr. Daniel F. Scanlon II (County Manager)
Historic Currituck County Courthouse
153 Courthouse Road, Suite 204
Currituck, NC 27929
252-232-2075

This project will be an informal bid. The bids will be evaluated and contract will be awarded in accordance with the statutory requirements. All bidders must meet the licensing requirements under Chapter 87 of the N.C. General Statues. Small Business Entities, Women Owned Businesses and Minority Owned Businesses are encouraged to submit bids. The County reserves the right to reject any and all bids and to accept such bids as appears in its judgement to be in the best interest of the County. The County reserves the right to waive any informality.

INSTRUCTIONS TO BIDDERS

GENERAL

The purpose of this advertisement for bids is to identify a single contractor for the construction of the Landscape and Pedestrian Improvements for Historic Corolla Park - Phase I. The Contractor will be responsible to provide all necessary materials, equipment, and labor necessary to perform the work described in the plans and specifications.

PROJECT LOCATION

1100 Club Road, Corolla, North Carolina 27927

BID SCHEDULE

Advertisement Date……...……**Friday December 19th, 2014**

Question Deadline……. **Tuesday, December 30, 2014 at 4:00 PM**

Bids Due……. **Tuesday, January 6, 2015 at 1:00 PM**

Sealed proposals will be received by the Currituck County Engineer's Office, Currituck County Courthouse, 153 Courthouse Road, Suite 302, Corolla, NC 27929, **until 1:00 PM on Tuesday, January 6th, 2015**.

BID DOCUMENTS

Complete documents may be obtained electronically at no cost upon contacting:

Surface 678, PA
Mr. Robert Pratt
215 Morris Street
Durham, NC 27701
919-282-9128
rpratt@surface678.com

BIDS

Sealed bids can be delivered to Currituck County, Currituck County Engineer's Office, Currituck County Courthouse, 153 Courthouse Road, Suite 302, Corolla, NC 27929, **until 1:00 PM on Tuesday, January 6th, 2015.** ATTN: Daniel F. Scanlon II, and must be received by 1:00 PM on Tuesday, January 6th, 2015.

Bids must be submitted on the BID PROPOSAL FORM included herein. Submit one (1) set of bid forms enclosed with this Project Manual. **The bid shall be submitted in a sealed envelope, with the bidder's name, license number, and project name written on the outside. ALL BIDS ARE TO BE MARKED "WHALEHEAD – HISTORIC COROLLA PARK LANDSCAPE AND PEDESTRIAN IMPROVEMENTS – PHASE I".**

Currituck County shall not be held responsible for late deliveries. Faxed and/or email submissions will not be accepted. Proposals not received by the designated time will **NOT** be accepted.

The bidder shall fill in and sign the bid form correctly. Bids that show any omission, alterations of form, additions not called for, conditional bids, or any irregularities of any kind may be rejected. Bid Bond shall be signed by the Bidder and notarized.

It is the County's intention to award a contract for work under this project to the lowest responsive, responsible bidder. The City reserves the right to reject any or all bids and to waive informalities.

INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

Should a bidder find discrepancies or ambiguities in, or omissions from the Specifications and Drawings bound herein, or should be in doubt as to their meaning; he shall at once notify the Project Landscape Architect who will issue an interpretation in the form of an addendum. This addendum will be forwarded to all bidders of record.

Bidders must act promptly and allow sufficient time for a reply to reach them before the date established for submission of bids.

Each bidder must acknowledge receipt of all addenda in his bid.

No oral interpretations will be made to any bidder as to the meaning or intent of the Contract Documents or be effective to modify any of the provisions of the Documents.

All questions related to this request shall be submitted in writing no later than 4:00pm on Tuesday, December 30, 2014.

SITE INVESTIGATION

All bidders shall be responsible for examining the site before submitting a proposal in order to determine the extent of work involved, size of work, etc., and the conditions under which the work must be staged and performed.

CONTRACTOR LICENSING REQUIREMENTS

All bidders must meet the licensing requirements under Chapter 87 of the N.C. General Statutes.

PERMITS AND FEES

County Permits are the responsibility of the Contractor. The fees associated with Currituck County Permits and all other Currituck County Fees associated with this project are reimbursable with the Owner's Contingency; however, no mark-up will be accepted. A copy of the CAMA Amendment Permit (Issued October 9, 2014) will be provided to the Contractor for use in obtaining additional permits with the County. The Contractor is responsible for all other necessary certificates of eligibility and other applicable certifications, as required. No fees or expenses for such items are reimbursable by the owner.

NON-COLLUSION IN BIDDING

The Bidder specifically agrees to abide by all applicable provisions of Article 3 of Chapter 133 of the North Carolina General Statutes. By submission of this Bid, each Bidder and each person signing on behalf of any Bidder certifies, and in case of a joint Bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this Bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor;

(2) Unless otherwise required by Law, the prices quoted in the Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other Bidder or to any competitor; and

(3) No attempt has been made or will be made by the Bidder to induce any other person, partnership, or corporation to submit or not to submit a Bid for the purpose of restricting competition.

FORM OF AGREEMENT

The form of agreement to be entered into shall be **Currituck County Independent Contractor Agreement** as bound within these specifications.

REQUIRED FORMS

The Contractor awarded the project shall be required to:

- Execute the Independent Contractor Agreement (Form Included in Document Set)
- Execute the E-Verify Statement (Form Included in Document Set)
- Provide a form W-9
- Provide Certificate of Insurance for general liability and workers' compensation coverage with Currituck County named as a certificate holder.

BID DEPOSIT

A bid deposit/ bid bond is not required on this project.

CONTRACT SECURITY

The Contractor awarded the project shall be responsible for furnishing a Contract Performance Bond and Payment Bond, each equal to one hundred percent (100%) of the Contract Price. A bid bond is not required. Bonds given shall meet the requirements of the laws of the State of North Carolina including but not limited to G.S. 143-129. The surety on each Bond shall be a surety company satisfactory to the County and duly authorized to do business in the State of North Carolina.

UTILITIES

The Contractor shall be responsible for locating all utilities on project site.

CONSTRUCTION DURATION

The project shall be completed within 90 days of the Notice to Proceed.

CONSTRUCTION WARRANTY

The Contractor shall be required to provide a minimum of 1 year warranty for all work, unless otherwise specified within Construction Documents.

BID PROPOSAL FORM (Page 1 of 4)

HISTORIC COROLLA PARK – WHALEHEAD

LANDSCAPE AND PEDESTRIAN IMPROVEMENTS
PHASE I

CURRITUCK COUNTY

Bidder agrees to perform all of the work included in the Contract as indicated in the Contract Documents, and to furnish all labor, tools, equipment, transportation and all other incidentals necessary for completion of the **Historic Corolla Park/ Whalehead – Landscape and Pedestrian Improvements – Phase I.**

It is the County's intention to award a contract for all work under this project to the lowest responsive, responsible bidder. The County reserves the right to reject any or all bids and to waive informalities. The County reserves the right to accept or reject any bid alternates.

In compliance with the Notice to Bidders, Instructions to Bidders, the Contract Documents which include the Independent Contractor's Agreement and the contract drawings and project specifications titled "**Historic Corolla Park/ Whalehead – Landscape and Pedstrian Improvements – Phase I**" dated December 19, 2014, and all addenda issued to date, all of which are part of the proposal, the undersigned hereby proposes to furnish and install all materials, labor, and equipment called for by, and in strict accordance with, said Contract Documents, for the complete Scope of Work indicated:

Base Bid: Landscape and Pedestrian Improvements

(LUMP SUM)

_____ Dollars ($) (In Words)

_____Dollars ($) (In Figures)

Bid Alternative 1: Planting within extents of "Alternate Planting 1" line along shoreline, east of existing pond bridge. See sheet L161 for propose alternate planting.

(LUMP SUM)

(Add) _____ Dollars ($) (In Words)

(Add) _____Dollars ($) (In Figures)

BID PROPOSAL FORM (Page 2 of 4)

Bid Alternative 2: Planting within extents of "Alternate Planting 2" line along shoreline, west of existing pond bridge. See sheet L161 for propose alternate planting.

(LUMP SUM)

(Add) _____ Dollars ($) (In Words)

(Add) _____Dollars ($) (In Figures)

Bid Alternative 3: Planting within extents of "Alternate Planting 3" line along buffer to existing properties south of entry drive. See sheet L162 for propose alternate planting.

(LUMP SUM)

(Add) _____ Dollars ($) (In Words)

(Add) _____Dollars ($) (In Figures)

Total Cost for the Landscape and Pedestrian Improvements (Including Base Bid and Bid Alternates):

_____ Dollars ($) (In Words)

_____Dollars ($) (In Figures)

BID ACKNOWLEDGEMENT

- The bid amount shall be shown in both words and figures. In cases of discrepancy, the amount in words shall govern.
- The above prices shall include labor, materials, overhead, profit, insurance, bonds, taxes, site repair, clean-up, etc., to cover the finished work of the several kinds called for.
- The Bidder agrees that this bid shall be valid and may not be withdrawn for a period of 60 calendar days after the scheduled closing time for receiving bids.

BID PROPOSAL FORM (Page 3 of 4)

ADDENDA ACKNOWLEDGEMENT

Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Addendum # _____ Addendum Date_____Bidder's Initials _____

Addendum # _____ Addendum Date_____Bidder's Initials _____

Addendum # _____ Addendum Date_____Bidder's Initials _____

Addendum # _____ Addendum Date_____Bidder's Initials _____

UNIT PRICE SCHEDULE

Bidder to fill in unit prices in below schedule. Unit prices will be used as the basis for change orders adds and deducts.

Description	Estimated Quantity	Unit	Price	Total Price
Unit Price No. 1: 6' WIDE LIGHT DUTY CONCRETE PAVING TYPE A – SEEDED AGGREGATE FINISH (Includes base and sub-base preparation, and concrete finishing per specifications)	1	SY	$	$
Unit Price No. 2: 6' WIDE LIGHT DUTY CONCRETE PAVING TYPE B – ROCK SALT FINISH (Includes base and sub-base preparation, and concrete finishing per specifications)	1	SY	$	$
Unit Price No. 3: 6' WIDE LIGHT DUTY CONCRETE PAVING TYPE C – BROOM SWEPT FINISH (Includes base and sub-base preparation, and concrete finishing per specifications)	1	SY	$	$
Unit Price No. 4: 6' WIDE WOOD BOARDWALK	1	LF	$	$
Unit Price No. 5: TRIPLE SHREDDED HARDWOOD MULCH (Includes materials, delivery and install/application to planting bed areas)	1	CY	$	$
Unit Price No. 6: IMPORTED TYPE C PLANTING SOILS (Includes materials, delivery and install/application to planting bed areas)	1	CY	$	$

BID PROPOSAL FORM (Page 4 of 4)

Respectfully submitted this _____ day of _____, 2014.

_____	_____
Name of Firm	Contractor's License No.
_____	_____
Signature	Telephone No.
_____	_____
Printed Name and Title	Fax. No.

_____

Address

_____

Address

_____

Email Address

INDEPENDENT CONTRACTOR AGREEMENT

THIS AGREEMENT is made the _____ day of _____, 2014 between the **County of Currituck** (hereinafter "County") and _____[Contractor], (hereinafter "Contractor").

RECITALS

County is a body corporate and politic of the State of North Carolina with the duties and powers set forth in Chapter 153A of the North Carolina General Statutes.

Contractor represents that it is duly qualified to perform business, and otherwise to transact business in North Carolina.

IT IS THEREFORE AGREED as follows:

1. Scope of Work. Contractor agrees to perform the following services for County: **Work as outlined in the Contract Documents for Historic Corolla Park / Whalehead Landscape and Pedestrian Improvements – Phase I,** (hereinafter "the Services").

2. Compensation. Contractor will be paid for its Services by County as follows: **_____[here, specify compensation arrangement including payment method and frequency.]**

3. Contractor's Freedom to Contract. Contractor may employ assistants at its sole expense and discretion as may be necessary to fulfill Contractor's obligations under this Agreement. Contractor agrees that anyone to whom it delegates any or all of the Services called for by this contract will be competent, qualified and capable of performing the work without any supervision, contact or assistance by County's employees. Any such assistant will be employed only by Contractor, and will not be an employee of the County while performing services under this contract.

4. Expenses. County shall not be liable to Contractor for any expenses which Contractor incurs, nor shall Contractor be liable to County for office help or expenses. Contractor shall have no authority to bind County by any promise or representation, unless specifically authorized by the County Manager in writing to do so.

5. Term. This Agreement may be terminated by either party at any time upon 7 days written notice to the other party. Upon the termination of this Agreement, Contractor shall prepare and provide to County a list of all pending unfinished business involving Contractor. Contracted Services under the terms of this agreement shall terminate upon completion of the Services which shall in no event exceed 90 days for completion of the Services.

6. Nature of Relationship. Contractor understands that it is an independent contractor and is not an employee, subcontractor, agent, servant, partner nor joint venturer of County. Contractor understands that it has the right to use its best judgment and efforts to fulfill the terms and obligations of this Agreement. Contractor further understands and acknowledges the following:

a. That it will receive no compensation other than as outlined in this Agreement and is not subject to nor eligible for any benefits which may be offered by County to its employees, such as vacation pay, sick leave, insurance coverage or retirement plan participation.

b. Its Services provided in accordance with this Agreement are an independent calling or occupation.

c. Contractor is expected to use its own skill, judgment and expertise to fulfill the obligations of this Agreement, and is not supervised, directed or controlled by County as to the means or methods it should employ.

d. Contract is not required to perform tasks in any particular order or sequence.

e. Contractor needs no training from County as to how to fulfill its duties and responsibilities.

f. Contractor may determine its own daily schedule and those of its own employees or servants without prior approval of County.

g. Contractor is not required to devote any particular percentage of its time or resources to perform the Services required hereunder.

h. Contractor furnishes its own equipment and supplies and is expected to maintain its business office somewhere other than at the County's office.

i. To the extent Contractor must procure or maintain any insurance, license, certification or trade membership, it must do so at its own cost.

j. This Agreement shall not prevent Contractor from performing other services for other parties. Contractor may engage in other business endeavors or projects of any kind or nature.

7. Taxes. Contractor assumes exclusive liability for payment of all federal, state or other governmental division taxes and contributions for social security, Medicare/Medicaid, etc., now or hereafter required, incurred or assessed by law. Contractors providing equipment, materials, parts or supplies shall provide a breakdown of labor, materials, parts or supplies and sales tax by County or a sales tax report approved by the County Finance Department with the invoice. Contractor agrees to indemnify and hold harmless the County from any claims for taxes as described in this Section.

8. Insurance. Contractor understands and agrees that neither it nor its employees are subject to workers' compensation or general liability coverage maintained by the County for its employees. Contractor agrees to procure and maintain workers' compensation insurance coverage for the benefit of contractor's employees or subcontractors and to procure general liability insurance listing the County as an additional insured at all times relevant to this Agreement. Contractor shall provide to County upon request a valid and current certificate of workers' compensation and general liability insurance. In the event Contractor shall fail at any time to have in force and effect insurance as required by this Section, Contractor agrees to indemnify and hold harmless County for (1) any premium paid by County to maintain insurance coverage applicable to Contractor and/or its employees or subcontractors; (2) any worker's compensation benefits paid by County as a result of Contractor's failure to comply with this

Section; and (3) any amounts paid by County for general liability claims as a result of Contractor's failure to comply with this Section.

9. Indemnity. Contractor shall and does hereby agree to indemnify, save harmless and defend County from the payment of any sum or sums of money to any person whomsoever on account of claims or suits growing out of injuries to persons, including death, or damage to property caused by Contractor, its employees, agents or subcontractors in any way attributable to the performance of the Services, including (but without limiting the generality of the foregoing), all claims for service, labor performed, materials furnished, provisions and supplies, injuries to person or damage to property, liens, garnishments, attachments, claims, suits, costs, attorneys' fees, costs of investigation and of defense. It is the intention of this paragraph to hold the Contractor responsible for the payment of any and all claims, suits, or liens, of any nature and character, in any way attributable to or asserted against County or against Contractor and County, or which the County may be required to pay. In the event the liability of the Contractor shall arise by reason of the sole negligence of County and/or the sole negligence of County's employees, agents or servants, then and only then, Contractor shall not be liable under the provisions of this paragraph.

10. Arbitration. Any controversy or claim arising out of, or relating to this Agreement, or its breach, shall be settled by arbitration in Currituck County, North Carolina in accordance with the provisions of the North Carolina Revised Uniform Arbitration Act, (the "Act"). The parties to this Agreement understand that this arbitration provision shall expressly apply to this Agreement in accordance with the Act. Judgment upon the award rendered may be entered and enforced in any court of competent jurisdiction.

11. Notices. Any notice, request or report given by one party to the other shall be in writing, deposited in the United States Mail (postage prepaid) or hand delivered and properly addressed as follows:

If the notice is to County:

Currituck County
Mr. Daniel F. Scanlon II, County Manager
Historic Currituck County Courthouse
153 Courthouse Road, Suite 204
Currituck, NC 27929

(Or such other person or address as County shall have designated by due notice to Contractor).

If the notice is to Contractor:

_____
_____
_____

(Or such other person or address as Contractor shall have designated by due notice to County).

12. Non-Waiver. Nothing set forth herein is intended nor shall be construed as a waiver of any immunity available to County, its governing board or employees.

13. Headings. The headings, subheadings and captions in this Agreement and in any exhibit hereto are for reference purposes only and shall not affect the meaning or interpretation of this Agreement.

14. Amendments. This Agreement may not be amended except by written instrument duly executed by or on behalf of all of the parties hereto.

15. Complete Agreement. This Agreement constitutes the entire Agreement between County and Contractor pertaining to its subject matter and supersedes all prior and

contemporaneous negotiations, agreements and understandings of either or both parties in connection therewith.

16. Governing Law. The validity, interpretation and performance of this Agreement and of its provisions shall be governed by the laws of the State of North Carolina.

The undersigned have read the entire Agreement and accept the terms and conditions as shown by their signatures below.

COUNTY OF CURRITUCK

By:_____ By: _____(SEAL)
Attest Daniel F. Scanlon, II, County Manager

CONTRACTOR

By:_____ By: _____(SEAL)
Attest Name and Title

Independent Contractor carries and will provide County with a Certificate of Insurance for:

Workers' Compensation	Yes	No
General Liability	Yes	No

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act.

_____
Sandra Hill, Finance Officer

County of Currituck E-Verify Affidavit

STATE OF NORTH CAROLINA

AFFIDAVIT:

COUNTY OF CURRITUCK E-VERIFY COMPLIANCE

****

I, _____(the individual attesting below), being duly authorized by and on behalf of _____ (the entity bidding on project hereinafter "Employer") after first being duly sworn hereby swears or affirms as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25(5).

2. Employer understands that Employers Must Use E-Verify. Each employer, after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS§64-26(a).

3. Employer is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in this State. (mark Yes or No)

a. YES _____, or

b. NO _____

4. Employer's subcontractors comply with E-Verify, and if Employer is the winning bidder on this project, Employer will ensure compliance by providing the County with an E-Verify Compliance Affidavit for any subcontractors current or subsequently hired by Employer.

This ____ day of _____, 20_____.

Signature of Affiant: _____

Print or Type Name: _____
Contractor: _____
State of _____ County of _____
Signed and sworn to (or affirmed) before me, this the _____ day of _____, 20__.

_____
Notary Public
My Commission Expires:

_____(Affix Official/Notarial Seal)

Appendix – A

TECHNICAL SPECIFICATIONS

SECTION 012100

ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

C. Related Requirements:

1. Section 012200 "Unit Prices" for procedures for using unit prices.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Landscape Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Landscape Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Landscape Architect from the designated supplier.

1.4 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 LUMP-SUM, UNIT-COST, AND QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Landscape Architect under allowance and shall include taxes, freight**,** and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Landscape Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Landscape Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation**,** taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 TESTING AND INSPECTING ALLOWANCES

A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.

B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.

C. Costs of services not required by the Contract Documents are not included in the allowance.

D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.10 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Quantity Allowance: Include 10 LF of 6’ wide wood boardwalk per requirements as specified in Section 061063 “Exterior Rough Carpentry” and in drawings.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

B. Allowance No. 2: Quantity Allowance: Include 10 cu. yd. of installation of Triple Shredded Hardwood Mulch, as specified in Section 329200 “Turf and Grasses” and Section 329300 “Plants” and in drawings.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

C. Allowance No. 3: Quantity Allowance: Include 10 cu. yd. of installation of Imported Type ‘C’ Planting Soil, as specified in Section 329300 “Plants” and in drawings.

1. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

END OF SECTION 012100

SECTION 012200

UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price 1: Installation of 6’ wide light duty concrete paving Type ‘A’ – seeded aggregate finish.

1. Description: This work includes base and sub-base preparation, installation of concrete paving and concrete finishing per requirements in Section 321316 and in drawings.
2. Unit of Measurement: Square yard of concrete installed, based on survey of area installed.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

B. Unit Price No. 2: Installation of 6’ wide light duty concrete paving Type ‘B’ – rock salt finish.

1. Description: This work includes base and sub-base preparation, installation of concrete paving and concrete finishing per requirements in Section 321316 and in drawings.
2. Unit of Measurement: Square yard of concrete installed, based on survey of area installed.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

C. Unit Price No. 3: Installation of 6’ wide light duty concrete paving Type ‘C’ – broom swept finish.

1. Description: This work includes base and sub-base preparation, installation of concrete paving and concrete finishing per requirements in Section 321316 and in drawings.
2. Unit of Measurement: Square yard of concrete installed, based on survey of area installed.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

D. Unit Price No. 4: Installation of 6’ wide wood boardwalk.

1. Description: This work includes installation of wood boardwalk per requirements in Section 061063 and in drawings.
2. Unit of Measurement: Linear foot of boardwalk installed, based on survey of area installed.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

A. Unit Price No. 5: Triple Shredded Mulch

1. Description: This work includes materials, delivery and install/ application of triple shredded hardwood mulch to planting bed areas per requirements in Section 329300 and in drawings.
2. Unit of Measurement: Cubic yard of mulch installed, based on ticket or certificate of purchase and delivery.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

F. Unit Price No. 6: Imported Type ‘C’ Planting Soils

1. Description: This work includes materials, delivery and install of imported type ‘c’ planting soils to planting bed areas per requirements in Section 329200, Section 329300, and in drawings.
2. Unit of Measurement: Cubic yard of planting soils installed, based on ticket or certificate of purchase and delivery.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

END OF SECTION 012200

SECTION 012300

ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. Alternate #1: Planting along shoreline east of existing pond bridge:

1. Base Bid: Base bid includes no planting in this area as indicated on Sheet L161 and as specified in Sections 329200 and 329300.
2. Alternate: Includes planting soil preparation, soil amendments, fine grading, plant materials, installation of plant materials, and installation of mulching as identified in specifications and drawings for alternate area within extents of line labeled “Alternate Planting 1”. Refer to drawing L161 for scope of alternate planting.

B. Alternate No. Alternate #2: Planting along shoreline west of existing pond bridge:

1. Base Bid: Base bid includes no planting in this area as indicated on Sheet L161 and as specified in Sections 329200 and 329300.
2. Alternate: Includes planting soil preparation, soil amendments, fine grading, plant materials, installation of plant materials, and installation of mulching as identified in specifications and drawings for alternate area within extents of line labeled “Alternate Planting 2”. Refer to drawing L161 for scope of alternate planting.

C. Alternate No. Alternate #3: Planting along buffer to existing properties south of entry drive:

1. Base Bid: Base bid includes no planting in this area as indicated on Sheet L162 and as specified in Sections 329200 and 329300.
2. Alternate: Includes planting soil preparation, soil amendments, fine grading, plant materials, installation of plant materials, and installation of mulching as identified in specifications and drawings for alternate area within extents of line labeled “Alternate Planting 3”. Refer to drawing L162 for scope of alternate planting.

D. Alternate No. Alternate #4: Concrete Paving – Course Rock Salt Finish:

1. Base Bid: Base bid includes sub-base and base preparation, installation of concrete sidewalk paving, and finishing of concrete sidewalk with a seeded shell aggregate exposed finish per requirements of Section 321326 and drawings.
2. Alternate: Includes sub-base and base preparation, installation of concrete sidewalk paving, and finishing of concrete sidewalk with a Rock Salt Finish per requirements of Section 321326 and drawings

E. Alternate No. Alternate #5: Concrete Paving – Broom Swept Finish:

1. Base Bid: Base bid includes sub-base and base preparation, installation of concrete sidewalk paving, and finishing of concrete sidewalk with a seeded shell aggregate exposed finish per requirements of Section 321326 and drawings.
2. Alternate: Includes sub-base and base preparation, installation of concrete sidewalk paving, and finishing of concrete sidewalk with a Medium Texture Broom Swept Finish per requirements of Section 321326 and drawings

END OF SECTION 012300

SECTION 01 56 39

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of 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 and as defined by a circle concentric with each tree with a radius 1 times the diameter of the drip line unless otherwise indicated.

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

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of the following:

1. Organic Mulch: 1-quart volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified arborist and tree service firm.

B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.6 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA.

B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

C. Pre-installation 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. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    b. Enforcing requirements for protection zones.
    c. Arborist's responsibilities.
    d. Field quality control.

1.7 PROJECT 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. Do not direct vehicle or equipment exhaust toward protection zones.

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.

B. Topsoil: Stockpiled topsoil from location shown on Drawings and Imported or manufactured topsoil complying with ASTM D 5268.

C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Triple Shredded hardwood.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural.

D. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by Architect.

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 8 feet apart.

a. Height: 4 feet and as indicated on drawings.
b. Color: High-visibility orange, nonfading.

E. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:

1. Size and Text: As shown on Drawings.

2. Lettering: 3-inch- high minimum, black characters on white background.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag or Tie a 1-inch blue-vinyl tape around each tree trunk at 54 inches above the ground.

B. 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.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.

1. Apply 4-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.3 TREE- AND PLANT-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 and animals from easily entering protected area 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.

1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
2. Access Gates: Install where indicated on drawings; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 50 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect 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 arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving."

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

C. 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.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

E. If excavation causes pruned roots over 1.5” in diameter to remain exposed for more than 24 hours, roots on tree side shall be kept moist. Backfill with top soil, moist mulch, or drape with wet burlap.

3.5 ROOT PRUNING

A. Area or root pruning must be approved by Certified Arborist and the architect to prevent a hazardous tree condition prior to construction activity in the area.

B. Acceptable methods of cutting are by sharp hand pruners, loppers, hand saw or hydraulic tools. Implemented method must leave a clean cut.Prune roots that are affected by temporary and permanent construction. Prune roots as shown on Drawings and 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. Cut Ends: Do not paint cut root ends.
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."

D. Root Pruning at Edge of Protection Zone: Prune roots 6 inches inside flush with the edge of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

E. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

F. Where concrete is poured adjacent to pruned roots heavy duty plastic shall be installed against the tree side of the pruned roots to prevent uptake (toxic to tree).

3.6 CROWN PRUNING

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

1. All tree pruning shall be done by or under the supervision of an ISA Certified Arborist or City approved professional.

2. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
3. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:

    a. Type of Pruning: Cleaning, Thinning, Raising, and Reduction.
    b. Specialty Pruning: Restoration.

4. Cut branches with sharp pruning instruments; do not break or chop.
5. Do not apply pruning paint to wounds.

B. Chip removed branches and dispose of off-site.

3.7 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 arborist 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. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

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

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
4. Perform repairs within 24 hours.
5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain 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 and species as those being replaced for each tree that measures 4 inches or smaller in caliper size.
2. For trees greater than 4 inches in caliper, provide replacement trees in quantity sufficient to match the existing caliper with trees of a minimum 2.5” caliper size, or provide minimum caliper inch size trees as required by local zoning ordinance if this requirement surpasses 2.5” caliper size.

    a. Species: Species selected by Landscape Architect.

3. Plant and maintain new trees as specified in Section 329300 "Plants."

C. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 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 and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:
1. Section 015639 "Temporary Tree and Plant Protection" for temporary protection of existing trees and plants that are affected by selective demolition.
2. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless 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 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Engineering Survey: Submit engineering survey of condition of building.

C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

D. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.9 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. 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. Any equipment within Guard House that Owner wishes to retain in their possession.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. 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 Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.

F. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

G. Storage or sale of removed items or materials on-site is not permitted.

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

1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.11 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Comply with requirements specified in Section 013233 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 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.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

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

3.5 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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 12 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements with Local Guidelines and Regulations.

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. Work in Historic Areas: Selective demolition may be performed only in areas of Project that are not designated as historic. In historic spaces, areas, and rooms, or on historic surfaces, the terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 024296 "Historic Removal and Dismantling."

D. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area as designated by Owner.
5. Protect items from damage during transport and storage.

E. 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.

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

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. 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. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

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

E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.

1. Remove existing roof membrane, flashings, copings, and roof accessories.

2. Remove existing roofing system down to substrate.

3.7 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.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with local municipality and applicable guidelines and regulations.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.9 SELECTIVE DEMOLITION SCHEDULE

A. Remove: Items and materials as indicated on drawings.

B. Remove and Salvage: Items and materials as indicated on drawings.

C. Remove and Reinstall: Items and materials as indicated on drawings.

D. Existing to Remain: Items and materials as indicated on drawings.

E. Dismantle: Items and materials as indicated on drawings.

END OF SECTION 024119

SECTION 061063

EXTERIOR ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Elevated decks including wood decking, railings and support framing.

1.3 DEFINITIONS

A. Boards: Lumber of less than 2 inches nominal (38 mm actual) in thickness and 2 inches nominal (38 mm actual) or greater width.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.

D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. SPIB: The Southern Pine Inspection Bureau.

1.4 ACTION SUBMITTALS

A. Product Data: For preservative-treated wood products and metal framing anchors.

1. For preservative-treated wood products, include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. For metal framing anchors, include installation instructions.
3. For galvanized fasteners, include verification for galvanized 90 requirements.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. For lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by ALSC's Board of Review.

2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Certificates of Inspection: Issued by lumber grading agency for exposed wood products not marked with grade stamp.

C. Evaluation Reports: For the following, from:

1. Preservative-treated wood products.
2. Expansion anchors.
3. Metal framing anchors.
4. Decking fasteners.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

B. Handle and store plastic lumber to comply with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Lumber: Comply with DOC PS 20 and with applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by ALSC's Board of Review. Provide lumber graded by an agency certified by ALSC's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each item with grade stamp of grading agency.
2. For items that are exposed to view in the completed Work, mark grade stamp on end or back of each piece.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
4. Provide dressed lumber, S4S, unless otherwise indicated.

B. Certified Wood: Wood products shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

2.2 DIMENSION LUMBER

A. Maximum Moisture Content: 15 percent.

B. Exposed Lumber: Provide material hand selected for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

C. Deck Framing: No. 2 and the following species:

1. Southern pine; SPIB.

2. No. 2 grade shall meet structural requirements.

D. Deck Framing: Any species and grade with a modulus of elasticity of at least 1,500,000 psi (10 350 MPa) and an extreme fiber stress in bending of at least 1000 psi (6.9 MPa) for 2-inch nominal (38-mm actual) thickness and 12-inch nominal (286-mm actual) width for single-member use.

E. Dimension Lumber Posts: No. 2 grade and the following species:

1. Mixed southern pine; SPIB.

F. Dimension Lumber Decking: No. 2 grade and the following species:

1. Mixed southern pine; SPIB.

G. Dimension Lumber Railing Members: Select Structural grade and the following species:

1. Mixed southern pine; SPIB.

H. Dimension Lumber Railing Members: Mixed southern pine, SPIB.

2.3 BOARDS

A. Maximum Moisture Content: 15 percent.

B. Provide boards hand selected for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

C. Board Decking: 1-1/4-inch- (32-mm-) thick radius-edged decking of the following species and grades:

1. Southern pine, Premium, SPIB.

D. Railing Boards:

1. Southern pine, Premium, B & B finish; SPIB.

2.4 TIMBER

A. Maximum Moisture Content: 19 percent.

B. Dressing: Provide dressed timber (S4S) unless otherwise indicated.

C. Timber Posts: Southern pine; No. 1, SPIB.

2.5 PRESERVATIVE TREATMENT

A. Pressure treat boards and dimension lumber with waterborne preservative according to AWPA C2.

B. Pressure treat timber with waterborne preservative according to AWPA UC5B requirements.

1. Treatment with CCA shall include post-treatment fixation process.

2. Treatment is to be AWPA UC5B immersion with 2.50 PCF preservative retention for use in salt and brackish waters.

C. Preservative Chemicals: Acceptable to authorities having jurisdiction.

1. Do not use chemicals containing arsenic or chromium except for timber posts.

D. Use process that includes water-repellent treatment.

E. After treatment, re-dry boards and dimension lumber to 19 percent maximum moisture content.

F. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.

1. For items indicated to receive a stained or natural finish, mark each piece on surface that will not be exposed.

G. Application: Treat all exterior rough carpentry unless otherwise indicated.

1. Framing members less than 18 inches (460 mm) above grade.
2. Sills and ledgers.
3. Members in contact with masonry or concrete.
4. Posts.
5. Decking.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

1. Use **fasteners with hot-dip zinc coating, G185 (Z550), complying with ASTM A 153/A 153M ASTM F 2329, or SDS screws with double-barrier coating** unless otherwise indicated.
2. For pressure-preservative-treated wood, use Galvanized Steel Sheet: Hot-dip, zinc-coated steal sheet complying with ASTM A 653/A 653, G185 (Z550) coating design.
3. For wood decking, use stainless-steel fasteners where fasteners are exposed to view.
   a. Fasteners shall be 305 Stainless Steel.
   b. Fasteners shall be Bugle Head deck screws.
   c. Fasteners shall be 2 ½”.

d. Stainless-Steel Bolts: ASTM F 593, Alloy Group 1 or 2 (ASTM F 738M, Grade A1 or A4); with ASTM F 594, Alloy Group 1 or 2 (ASTM F 836M, Grade A1 or A4) hex nuts and, where indicated, flat washers.

B. Nails: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).

F. Postinstalled Anchors: Galvanized Steel Sheet: Hot-dip, zinc-coated steal sheet complying with ASTM A 653/A 653, G185 (Z550) coating design.

2.7 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, **provide products by one of the following**:

1. Parker Steel Co.Cleveland Steel Specialty Co.
2. Simpson Strong-Tie Co., Inc.
3. USP Structural Connectors.
4. Cleveland Steel Specialty Co.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Galvanized Steel Sheet: Hot-dip, zinc-coated steal sheet complying with ASTM A 653/A 653, G185 (Z550) coating design.

D. Joist Hangers: U-shaped, with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.

1. Thickness: 0.062 inch (1.6 mm).

E. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.

1. Strap Width: 2 inches (50 mm).
2. Thickness: 0.062 inch (1.6 mm).

F. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch- (50-mm-) minimum side cover, socket 0.062 inch (1.6 mm) thick, and standoff and adjustment plates 0.108 inch (2.8 mm) thick.

G. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.

1. Width: 3/4 inch (19 mm).
2. Thickness: 0.050 inch (1.3 mm).
3. Length: 16 inches (400 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Prime lumber to be painted, including both faces and edges. Cut to required lengths and prime ends. Comply with requirements in Division 09 Section "Exterior Painting."

3.3 INSTALLATION, GENERAL

A. Set exterior rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit exterior rough carpentry to other construction; scribe and cope as needed for accurate fit.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction" unless otherwise indicated.

C. Install wood decking with crown up (bark side down).

D. Secure decking to framing with concealed decking fasteners.

E. Install metal framing anchors to comply with manufacturer's written instructions.

F. Do not splice structural members between supports unless otherwise indicated.

G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron (SBX) for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Securely attach exterior rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.

2. Chapter 23, “Fastening Schedule”, North Carolina Building Code – 2009.

K. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.

L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

3.4 ELEVATED DECK JOIST FRAMING INSTALLATION

A. General: Install joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on masonry. Attach floor joists where framed into wood supporting members by using wood ledgers as indicated or, if not indicated, by using metal joist hangers. Do not notch joists.

B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).

C. Lap members framing from opposite sides of beams or girders not less than 4 inches (102 mm) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

D. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at intervals of 96 inches (2438 mm) o.c., between joists.

3.5 RAILING INSTALLATION

A. Balusters: Fit to railings, glue, and screw in place. Countersink fastener heads, fill flush, and sand filler.

B. Newel Posts: Secure to stringers and risers with countersunk-head wood screws and glue.

C. Railings: Secure wall rails with metal brackets. Fasten freestanding railings to newel posts and to trim at walls with countersunk-head wood screws or rail bolts and glue.

END OF SECTION 061063

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. 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 and abandoning site utilities in place.
7. Temporary erosion and sedimentation control.

B. Related Sections:

1. Section 015639 "Temporary Tree and Plant Protection" for tree and plant protection requirements.

C. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

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

E. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.

F. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

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

H. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings. Refer to Section 015639 “Temporary Tree and Plant Protection”.

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

1.3 MATERIAL OWNERSHIP

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

1.4 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 videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

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

1.5 QUALITY ASSURANCE

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

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated or coordinate storage location with Owner as indicated on drawings.

D. Utility Locator Service: Notify utility locator service area where Project is located before site clearing.

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

F. 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.

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

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

I. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

B. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #79, Alkyd Anticorrosive Metal Primer or SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.

1. Use coating with a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 PREPARATION

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

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Wrap a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.

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. General: 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, in a manner approved by Architect.

3.4 EXISTING UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Contractor shall verify that utilities have been disconnected and capped before proceeding with site clearing.

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

1. Arrange with utility companies to shut off indicated utilities.

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

D. 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 Architect not less than two in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

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

F. Removal of underground utilities is included in earthwork sections and with applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security and utilities sections and Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."

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, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Use only hand methods 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 depths encountered in field 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 more 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. 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 reused. Surplus topsoil may be stockpiled or returned to Owner only if approved by Owner. Owner reserves the right to have the Contractor remove surplus topsoil at any time during construction.

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.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 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.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 32 13 16

DECORATIVE 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 standard and textured concrete paving for pedestrian walkways.

B. Related Sections:
1. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within decorative concrete paving and in joints between decorative concrete paving and asphalt paving or adjacent construction.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and ground granulated blast-furnace slag.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color, pattern, or texture selection.

C. Samples for Verification: For each type of exposed color, pattern, or texture indicated.

D. Other Action Submittals:

1. Design Mixtures: For each decorative concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and ready-mix concrete manufacturer.

B. Material Certificates: For the following, from manufacturer. Provide compatibility information if from different manufactures:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Applied finish materials.

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.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer of decorative concrete paving systems.

B. 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").

C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

D. Source Limitations: Obtain decorative concrete paving products and each type or class of cementitious material, color materials, curing agents and sealants of the same brand from same manufacturer's plant, and obtain each aggregate from single source.
1. Only provide materials that are compatible with each other and the intended design and installation.
2. Provide written compatibility certification for products outside the brand of color agents.

E. Project Conditions: Conduct integral colored concrete operations within a contiguous time period to insure same source cement materials, processes and weather conditions.

F. Slip Resistance: The project pavement shall conform to the Occupational Safety and Health Administration recommendations for walking surfaces have a static coefficient of friction of 0.5. A static coefficient of friction of 0.6 is required for accessible routes and 0.8 for ramps.

G. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

H. ACI Publications: Comply with ACI 301 unless otherwise indicated.

I. 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 decorative concrete paving to demonstrate typical joints; surface color, pattern, and texture; curing; and standard of workmanship.

2. Build mockups of decorative concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than 96 inches by 96 inches.
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. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

J. Pre-installation Conference: Conduct conference at the project site.

1. Review methods and procedures related to decorative concrete paving, including but not limited to, the following:

   a. Concrete mixture design and delivery.
   b. Quality control of concrete materials and decorative concrete paving construction practices.
   c. Uniformity of appearance goals
   d. Sub base and base preparation
   e. Form work layout
   f. Finish, finish tools and finishing process
   g. Slip resistance of intended finishes

2. Require representatives of each entity directly concerned with decorative concrete paving to attend, including the following:

   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Decorative concrete paving Installer.
   e. Manufacturer's representative of decorative concrete paving system.

1.7 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Schedule concrete work only during job and weather that can produce consistent results.

PART 2 - PRODUCTS

2.1 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. Use material appropriate to obtain the correct quality and alignments.

1. Use 2” thick wood forms or formed steel forms for straight lines and rectangular applications

2. Use flexible forms capable of delivering smoothly curved formwork free of kinks, bulges, or flats. Forms can be steel, plastic or wood, but must have adequate joining methods to allow the smooth flow of curved lines through the union of form sections.

B. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration indicated. Provide solid backing and form supports to ensure stability of textured form liners.

C. 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.

2.2 STEEL REINFORCEMENT

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 ; deformed.

D. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, gray Portland cement Type I, supplement with the following:

2. Polzzolans – Use the same material and amounts of fly ash in all batches of colored concrete

   a. Fly Ash: ASTM C 618, Class C or F.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source with the same color run.

1. Maximum Aggregate Size: 3/4 inch nominal.
   a. Color – Gray
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and not detrimental to integral color or color consistency. Admixtures shall not to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
3. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.

2.4 STAMPING DEVICES

A. Rollers: Manually controlled, water-filled aluminum rollers with projecting ridges on drum capable of imprinting texture and joint patterns on plastic concrete.
   1. Refer to plans and schedule article 3.16 of this section for paving texture specifications.

   2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

      a. Bon Tool Co.
      b. Brickform.

B. Texture Rollers: Manually controlled, abrasion-resistant polyurethane rollers capable of imprinting texture on plastic concrete.

   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

      a. Artcrete, Inc.
      b. Bon Tool Co.
      c. Brickform.
      d. Butterfield Color.
      e. Proline Concrete Tools, Inc.

2.5 CURING AND SEALING MATERIALS

A. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type I, Class A, manufactured for use with colored concrete.
   1. Tinted to match integral colored concrete.

   2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

      a. Advanced Surfaces Inc.
      b. Artcrete, Inc.
      c. Bon Tool Co.
      d. Brickform.
      e. Butterfield Color.
      f. H&C Concrete Care Products.
      g. Scofield, L. M. Company.
      h. Specialty Concrete Products, Inc.
      i. SureCrete Design Products.
      j. Symons by Dayton Superior.

B. Slip-Resistance-Enhancing Additive: Manufacturer's standard finely graded aggregate or polymer additive, designed to be added to clear acrylic sealer to enhance slip resistance of sealed paving surface.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Advanced Surfaces Inc.; Skid Guard.
b. Bomanite Corporation; Bomanite Sure Trak.
c. Bon Tool Co.; Gator Grip.
d. H&C Concrete Care Products; SharkGrip.
e. QC Construction Products; QC Sure Trak
f. Southern Color N.A., Inc.; Mosaics Seal-Grip.
g. Symons by Dayton Superior; Grip Aid.
h. Vexcon Chemicals Inc.; Certi-Vex Grip.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

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. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days):
   a. Light Duty (Pedestrian): 3500 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
3. Slump Limit: 5 inches, plus or minus 1 inch .

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Colored Concrete:
   a. Air Content per pigment manufacturer’s recommendation.

2. All Other Decorative Concrete Types:
   a. Air Content: 5-1/2 percent plus or minus 1.5 percent.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions and are certified not to hinder color performance.

1. Use water-reducing admixture or water-reducing and retarding admixture or water-reducing and accelerating 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. Super plasticizers may only be added at the plant, not at the jobsite.

F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 20 percent.
2. Ground Granulated Blast-Furnace Slag: 20 percent.
3. When combined use a maximum of 40 percent Fly Ash and Ground Granulated Blast Furnace Slag

G. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F , reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F , reduce mixing and delivery time to 60 minutes.
2. Project-Site Mixing: Not allowed.

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 decorative 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 base with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving." Do not fill with concrete.

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

3.2 PREPARATION

A. Remove loose material from compacted base surface immediately before placing concrete.

B. Protect adjacent construction from discoloration and spillage during application of color hardeners, release agents, stains, curing compounds, and sealers.

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

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. 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.

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.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.

C. Expansion Joints: Form isolation joints of preformed joint-filler strips abutting buildings, columns, footings, concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals shown in the drawings but not more than 40’.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent decorative concrete paving]:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
   a. Chamfer [or radiused] enhanced sawed joints: use a diamond bit saw fitted with the ability to create an enlarged cut in the shape of a [bevel][radius]

3. Doweled Expansion Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, 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 base or base 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. UNDER NO CIRCUMSTANCES SHALL WATER BE ADDED AFTER THE CONCRETE HAS BEEN MIXED AT THE PLANT.

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.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using wooden bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. DO NOT WET TOOLS OR OTHERWISE ADD WATER TO THE CONCRETE SURFACE. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Cold-Weather 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.

K. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F 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.
2. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
3. Only place concrete during hot weather if environmental conditions from pour to pour can be maintained to produce consistent color performance.

3.7 FLOAT FINISHING

A. General: DO NOT ADD WATER TO CONCRETE SURFACES OR TOOLS DURING FINISHING OPERATIONS.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

3.8 STAMPING

A. Roller Stamping: After floating and while concrete is plastic, apply roller-stamped finish.

1. Cover surface with polyethylene film, stretch taut to remove wrinkles, lap sides and ends 3 inches , and secure to edge forms. Lightly broom surface to remove air bubbles.
2. Accurately align roller and perform rolling operation to produce required imprint pattern and depth of imprint on concrete surface. Hand stamp surfaces inaccessible to roller.
3. Carefully remove polyethylene film immediately after roller stamping.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Curing and Sealing 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. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
   1. Provide color matched tinting.

D. Curing Paper: Do not use curing paper.

3.10 SEALER

A. Clear Acrylic Sealer: Apply uniformly in two coats in continuous operations according to manufacturer's written instructions. Allow first coat to dry before applying second coat, at 90 degrees to the direction of the first coat using same application methods and rates.

   1. Add sealant color at the factory.
   2. Begin sealing dry surface no sooner than 25 days after concrete placement
   3. Allow stained concrete surfaces to dry before applying sealer.
   4. Thoroughly mix tinting or slip-resistance-enhancing additive into sealer before applying sealer according to manufacturer's written instructions. Stir sealer occasionally during application to maintain even distribution of additive.

3.11 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

   1. Elevation: 3/4 inch .
   2. Thickness: Plus 3/8 inch , minus 1/4 inch .
   3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 3/8 inch .
   4. Lateral Alignment and Spacing of Dowels: 1 inch .
   5. Vertical Alignment of Dowels: 1/4 inch .
   6. Contraction Joint Depth: Plus 1/4 inch , no minus.
   7. Joint Width: Plus 1/8 inch , no minus.
   8. Joint Spacing: as shown on the drawing
   9. Joint alignment: when aligned with plan identified site element, ¼".
   10. Edge alignment – no more than ½" out of alignment over 20'
   11. Joint straightness – no more than ½" our of alignment over 20'

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for the first 20 yards and one each 100 cu. yd. thereafter or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi .

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Decorative concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.13 CONCRETE REJECTION AND REPLACEMENT

A. Concrete paving will be considered defective if it:
    1. Does not pass tests and inspections.

2. Does not meet layout and alignments,
3. Does not have a consistent color and texture
4. Shows spalling, alligator cracking or cracking due to base failures.
5. Jointing is installed after contraction cracking has occurred,
6. Jointing and edges are not smooth curves or in straight lines as indicated by the drawings,
7. Exceeds the gradients indicated on the plans,
8. Does not adequately drain water away as shown on the drawings.
9. If the incorrect color has been used.
10. If there exists color variations that can be attributed to improper finishing, addition of water to concrete or finishing, delivery of unmatched concrete mixes, or the combination of incompatible concrete materials or admixtures.

B. Defective concrete shall be removed immediately and replaced with acceptable concrete work at the Contractor's expense.

3.14 REPAIRS AND PROTECTION

A. Remove and replace decorative concrete paving that is broken or damaged or does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Detailing: Grind concrete "squeeze" left from tool placement. Color ground areas with slurry of color hardener mixed with water and bonding agent. Remove excess release agent with high-velocity blower.

C. Protect decorative 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 decorative 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.

3.15 DECORATIVE CONCRETE PAVING SCHEDULE

Refer to drawings for concrete pavement finishing schedule.

END OF SECTION 321316

SECTION 32 13 73

CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Cold-applied, fuel-resistant joint sealants.
3. Joint-sealant backer materials.

B. Related Requirements:

1. Division 32 Section “Concrete Paving” for constructing joints in concrete pavement.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Paving-Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Product Certificates: For each type of joint sealant and accessory, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for joint sealants.

D. Preconstruction Compatibility and Adhesion Test Reports: From joint-sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility with and adhesion to joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for installation of units required for this Project.

B. Source Limitations: Obtain each type of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type NS.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Crafco Inc; RoadSaver Silicone.
b. Dow Corning Corporation; 888.
c. Pecora Corporation; 301 NS.

B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Crafco Inc; RoadSaver Silicone SL.
b. Dow Corning Corporation; 890-SL.
c. Pecora Corporation; 300 SL.

C. Multi-Component, Nonsag, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Meadows, W.R., Inc.; Pourtane NS.

D. Single-Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Meadows, W.R., Inc.; Pourtane SL.

E. Multi-Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Pecora Corporation; Dynatrol II-SG.

2.3 COLD-APPLIED, FUEL-RESISTANT JOINT SEALANTS

A. Fuel-Resistant, Single-Component, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Building Systems; Sonomeric 1.

B. Fuel-Resistant, Multi-Component, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 12-1/2 or 25, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Meadows, W.R., Inc; Sealtight Gardox.

b. Pecora Corporation; Urexpan NR-300.

2.4 JOINT-SEALANT BACKER MATERIALS

A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

B. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of joint-sealant backings.
2. Do not stretch, twist, puncture, or tear joint-sealant backings.
3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Joints within concrete paving in areas other than service court area.

1. Joint Location:

a. Expansion and isolation joints in cast-in-place concrete paving.
b. Other joints as indicated.

2. Joint Sealant: Single-component, nonsag, silicone joint sealant, Single-component, self-leveling, silicone joint sealant, Multi-component, nonsag, urethane, elastomeric joint

sealant, Single-component, pourable, urethane, elastomeric joint sealant, or Multi-component, pourable, urethane, elastomeric joint sealant.

3. Joint-Sealant Color: As selected by Landscape Architect from manufacturer's full range.
   a. Joint-sealant colors will vary across project site based upon adjacent integral color concrete paving; in case of two color concretes abutting one another, Landscape Architect will determine which color joint-sealant is to be used – color will be selected from manufacturer's full range.

B. Joint-Sealant Application: Fuel-resistant joints within concrete paving in service court areas.

1. Joint Location:

   a. Expansion and isolation joints in cast-in-place concrete paving.
   b. Other joints as indicated.

2. Joint Sealant: Fuel-resistant, single-component, pourable, modified-urethane, elastomeric joint sealant or Fuel-resistant, multi-component, pourable, modified-urethane, elastomeric joint sealant.

3. Joint-Sealant Color: As selected by Landscape Architect from manufacturer's full range.
   a. Joint-sealant colors will vary across project site based upon adjacent integral color concrete paving; in case of two color concretes abutting one another, Landscape Architect will determine which color joint-sealant is to be used – color will be selected from manufacturer's full range.

END OF SECTION 321373

SECTION 32 92 00

TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Sodding.
3. Temporary Seeding/ Over-seeding.

B. Related Sections:

1. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling.
2. Division 32 Section "Plants" for border edgings.

1.3 DEFINITIONS

A. Substantial Completion: The proper installation of seed, sod, and meadow with final grades, mulch and irrigation functioning (if provided) with no indication of widespread plant death. For seeded and meadow areas, the seed must show germination with green shoots visible. It is possible to grant substantial completion to portions of the site without total project completion however all construction activities must be completed in the requested area.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

D. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

E. Planting Soil: The prepared earth existing or imported as specified herein used to backfill lawn or sod areas.

F. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

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

H. Turf: A groundcover established from either lawn type seeds, lawn type sod or meadow seeds.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

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.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.

B. Qualification Data: For qualified landscape Installer.

C. Product Certificates: For soil amendments and fertilizers, from manufacturer.

D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required initial maintenance periods.

1.6 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 the Professional Landcare Network, the NC Landscape Contractors Association, or the American Nursery and Landscape Association.
2. Experience: Three years' experience in turf installation in addition to requirements in Division 01 Section "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: All personnel who handle herbicides and herbicides shall be State licensed, for commercial.

B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each un-amended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Test native in place surface soil and soil components of Planting Soils Type 'A,B,C and E'.
2. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
3. Test shall include mechanical analysis of sand, silt and clay components.
4. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
5. Soil tests shall include the following information:

    a. Percentage of sand, silt and clay for bioretention soils.
    b. Cation exchange capacity.
    c. Percent of organic matter.
    d. Stated recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    e. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

1.7 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 conformance with state and federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

C. 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 fertilizers, lime, and soil amendments with appropriate certificates.

1.8 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial

Completion.
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.

Grass Type	Fall Season	Spring Season
Warm season grasses	Sept 1 to Oct 15	May 15-July 15

1.9 Construction Water: During the construction period, construction water will be provided by the Contractor.

1.10 Construction Maintenance Water: During the construction period, construction maintenance water will be provided by the Contractor.

A. Initial Maintenance Service for Lawns sod and seed areas: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after lawns are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Construction Maintenance Period: 6 months. The Maintenance Period will begin from the date of Substantial Completion for the last phase of work. Partial substantially completed areas will require continued maintenance until the completion date set by the final phase of work.

2. Landscape Maintenance - The Maintenance Period will begin from the date of the Maintenance period described above lapses.

B. Continuing Maintenance Proposal: Any agreement of an Owner with the Contractor for annual landscape services would begin after the maintenance period elapses.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

Lawn Type	Seed Mix	Notes
Warm Season	Tifway 419 Bermuda	

Temporary Cover/ Over-Seeding	Annual Rye Grass	

2.2 TURFGRASS SOD

A. Turfgrass Sod: Number 1 Quality/Premium, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: Tifway 419 Bermuda.

C. Meadow Seed Carrier: Inert material, sharp clean sand or perlite, mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
   1. Provide lime in form of ground dolomitic limestone or calcitic limestone depending on soil test.

2.4 ORGANIC SOIL AMENDMENTS

A. Soil Conditioner: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

   1. Organic Matter Content: 70 percent of dry weight.
   2. Sources: Agricultural, bark, biosolids; municipal compost; or source-separated or compostable mixed solid waste.
      a. Free of toxic materials to plant growth
      b. Free of weed seeds.

2.5 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
   1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6 PLANTING SOILS

A. Planting Soil Type A: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove 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. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
   1. Depth of soil conditioner to mix in Planting Soil: 3/8”to 4”.
   2. Weight of Slow-Release Fertilizer per 1000 Sq. Ft. consult soil test.
   3. Weight of dolomitic limestone per soil test.

B. Planting Soil Type B: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth by mechanical screening.

   1. Supplement with approved Type ‘C’ topsoil when quantities are insufficient.
   2. Mix existing, native surface topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
   3. Depth of soil conditioner to mix in Planting Soil: 3/8”to 4”.
      a. Weight of Slow-Release Fertilizer as per soil test.
      b. Weight of dolomitic limestone as per soil test.

C. Planting Soil Type C: Imported sandy loam topsoil formed under natural conditions blended with organic matter. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
   1. Depth of soil conditioner to mix in Planting Soil: 3/8”to 4”.
   2. Weight of Slow-Release Fertilizer as per soil test
   3. Weight of dolomitic limestone as per soil test.

2.7 SEED STABILIZATION

A. Grass and meadow seed blankets and coverings:.

   1. Products for lawn areas: Free of plastic or other non biodegradable materials, seed free, , available products that may be incorporated into the Work include, but are not limited to, the following:

      a. American Excelsior Company, Curlex NetFree
      http://www.americanexcelsior.com/erosioncontrol/products/netfree.php

      b. Granite Environmental, Coconut Blanket C4000BD
      (http://www.tdpltd.com/netlon-products/netpave-50.html)

      c. Tensar BioNet
      (http://www.nagreen.com/erosion-control-products/bionet-ecbs.php)

   2. Products for storm water management areas: Made from biodegradable jute matting, free of plastic or other non-biodegradable materials, seed free.

2.8 MULCHES

A. General: The Contractor shall select the mulching products that best suit the grass seed selected. Choose from the following mulches:
   1. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
   2. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

B. Non-asphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

2.9 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance. Notify the Architect immediately and do not start landscape construction operations if:
   1. Grades or site features do not match the design.
   2. There is ponding or areas that do not appear to drain
   3. The subsoil contains 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.
   4. If the soils are frozen or moist beyond that required to produce optimal working conditions.
   5. Excessively dry soil that is not workable and which is too dusty.
   6. If the subsoil is over compacted.
   7. If irrigation main and lateral lines have not been installed.
   8. If irrigation main or lateral line trenches have not been compacted.

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

C. Erosion Control Seeding Contamination – Evaluate the erosion control seeding used and confirm that potential seed sources will not interfere with the establishment of seeded lawns or meadows. Confer with the General Contractor on usage of erosion control seeding and potential threats to establishing lawns or meadows.

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.
3. Protect areas that should not receive seed such as planting beds.

3.3 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches.

1. General

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
b. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
c. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
d. Reduce elevation of planting soil to allow for soil thickness of sod.

2. In areas where Planting Soil Type ‘A’ is applicable, contractor to apply amendments directly to final grade before loosening. Mix to a total depth of 4”.

3. In areas where Planting Soil Type ‘B’ and ‘C’ is applicable, contractor is to spread planting soil to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
4. Thoroughly blend planting soil with organic amendments off-site before spreading
5. Apply lime and fertilizers on surface, and thoroughly blend planting soil.

C. For ‘turf renovation’ areas that indicate for existing lawn to be demolished and replaced with new lawn with unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
a. Note any areas on the plan that indicate tree root zones. These areas may require the use of hand tools.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove

ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 TEMPORARY SEEDING / OVER-SEEDING OF ANNUAL GRASS SPECIES

A. Seed temporary seeding prior to installing sod in areas that are to receive permanent groundcover of sod.

B. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

C. Sow seed at the following rates

Annual Rye Grass	8 lbs per 1000 sf

D. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

E. In cases where sod is to be installed; proceed to sod execution; sod to be installed directly over top of temporary seeding.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at the following rates

Tifway 419 Bermuda	3 lbs per 1000 sf

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a rate to form a continuous blanket 1 inch in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Bond straw mulch by spraying with non-asphalt emulsion at a rate to resist wind and erosion. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

F. Protect seeded areas from hot, dry weather or drying winds by applying hydromulch within 4 hours after completing seeding operations.

3.6 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 or in the bottom of swales with steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.7 STORM WATER MANAGEMENT PLANTING STABILIZATION

A. Planting seed or meadow in storm water management areas:

1. Prepare the soils according to plans and details including amendments.

2. Micro grade to meet the requirements of the grading plan.

3. Apply seed and hydromulch slurry to soil surface.

4. Apply jute mat in continuous runs and attach with staples at 30” oc.

3.8 TURF RENOVATION

A. Renovate existing turf.

B. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor re-grading is required.

2. Install new planting soil as required.

C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

D. 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.

E. Mow, dethatch, core aerate, and rake existing turf.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 4 inches.
1. Confirm that there are no protected root zone areas that would require special procedures.

I. Apply soil amendments and initial fertilizers 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.

J. Apply seed or sod as shown on the plans and as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

3.9 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Repair turf as necessary because of settling, erosion or settlement or other processes.
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: Install and maintain irrigation systems, temporary piping, hoses, and turf-watering equipment 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 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
1. Mow turf-type tall fescue to a height of 3 inches.

D. Turf Post-fertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.10 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 3 by 3 inches.
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.11 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.12 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. 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.

C. Remove non-degradable erosion-control measures after grass establishment period.

END OF SECTION 329200

SECTION 32 93 00

PLANTS

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. Plants.
2. Planting soils.
3. Landscape edgings.
4. Mulches

B. Related Sections:

1. Division 01 Section "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. Division 31 Section "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
3. Division 32 Section "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.

1.3 DEFINITIONS

A. Substantial Completion: The proper installation of plant material with final grades, mulch and irrigation (if provided) functioning with no indication of widespread plant death. It is possible to grant substantial completion to portions of the site without total project completion however all construction activities must be completed in the requested area.

B. Backfill: The planting soil used to replace or the act of replacing earth in an excavation.

C. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with 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.

D. 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.

E. Finish Grade: Elevation of finished surface of planting soil.

F. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These 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: The prepared earth [existing or imported as specified herein] used to backfill planting areas or to create planting beds.

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) or main roots of trees below the soil surface.

L. 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.

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

N. Environmental Conditions: Physical, chemical, and biotic factors affecting ecological community and ability for plants to survive.

O. Detrimental Conditions: Environmental conditions harmful to the health of proposed plants that can be corrected through supplemental site improvements. Harmful conditions include, but shall not be limited to the following: poor soil, poor drainage, or contaminated soil.

1.4 ACTION SUBMITTALS

A. Samples for Verification: For each of the following:
   1. Mulch: A 1-quart volume of each 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. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

B. Soil Analysis: For each un-amended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Test native in place surface soil and soil components of Planting Soils Type 'A,B,C,D, and F'.
2. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
3. Test shall include mechanical analysis of sand, silt and clay components.
4. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
5. Soil tests shall include the following information:
    a. Percentage of sand, silt and clay.
    b. Cation exchange capacity.
    c. Percent of organic matter.
    d. Stated recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    e. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified 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. Substitutions: The Contractor shall provide the products specified. Changes must be made by written submittal with reason and alternate suggestion.

C. Environmental Conditions: Prior to contract acceptance by Contractor, submit written description of environmental conditions preventing compliance with warranty.

    1. As applicable, submit detrimental conditions and/or substitutions submittals.

D. Detrimental Conditions: Per encounter, submit written description of detrimental conditions with recommendation for correcting condition. Include cost estimate.

1.6 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 Division 01 Section "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 following:

a. Professional Landcare Network Certified Landscape Technician - Exterior, with installation specialty area(s), designated CLT-Exterior.
b. Or Certified Ornamental Landscape Professional, designated COLP.
c. Or actively certified by the North Carolina Landscape Contractors Association
d. Four year degree in horticulture, landscape architecture or agronomy

5. Selection of plants purchased under allowances will be made by Architect, who will tag plants at their place of growth before they are prepared for transplanting.

B. 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.

C. Plant Pre-Approvals: Utilize the following methods for plant selection.

1. Container Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 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.

2. Large Plant Tagging: The Architect will accompany the Contractor for a scheduled trip to nurseries to tag large shrubs and trees as directed by the Architect.
a. The Architect will tag all shade trees, flowering trees and large shrub material.
b. The Contractor will pre-tag plant materials and submit photos prior to nursery tagging to confirm the nursery has acceptable material for consideration.
c. The Contractor shall provide the cost of travel, meals and accommodations for the trip. He shall provide 3 weeks notice of the trip to the Architect.
d. The Architect will provide his time free of charge to the Contractor.

D. Additional Plant Material Observation: Architect may observe plant material either at site before planting or once installed for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

E. Substitutions: Substitutions will be permitted only upon submission of proof that a specified plant is not obtainable and with written approval of proposed substitution by Landscape Architect.

1. Contractor shall propose the use of the nearest obtainable variety of the plant having the same essential characteristics that is equal to or greater in size to original specified plant.

F. Detrimental Conditions: The contractor shall notify the Owner and Landscape Architect in writing of all conditions considered detrimental to growth of plant material. State condition and submit proposal including costs for correcting condition.

G. Pre-installation Conference: Conduct conference at Project site.

1. The following individuals must be present:

a. GC Contractor's site representative responsible for the Landscape Contractor's work.
b. The Landscape Contractor's branch manager or Owner and job estimator.
c. The Project supervisor who will be directly responsible for field work and/or paperwork.

1.7 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 conformance 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 fertilizers and soil amendments with appropriate certificates.

C. Do not prune trees and shrubs before delivery.

D. Protect bark, branches, and root systems from sunscald, 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.

E. Handle planting stock by root ball or container.

F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

G. 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.

H. If plants are stored for over 24 hours provide the following:
1. Set balled stock upright on ground and cover ball with soil, peat moss, sawdust, or other acceptable material to prevent wind, cold, or heat damage to the roots.
2. Provide shade to shade requiring trees and shrubs.
3. 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.

1.8 PROJECT 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. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Owner and Architect no fewer than two days, or as required by County if Currituck County requires additional notice, in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Landscape Architect's written permission.

C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
1. Fall / Winter / Spring Planting: October 15 – April 15.

D. 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. Do not install planting when frozen or excessively wet soil conditions are present or expected to occur.

E. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated or acceptable to Landscape Architect.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

F. Under no circumstances should work proceed prior to establishment of appropriate grades.

G. The Contractor shall provide water for:
1. The construction period till final acceptance for all plants.
2. Final acceptance through the maintenance period for all plants.

H. The Contractor shall supply watering labor as follows:
1. The construction period till final acceptance
2. Final acceptance through the maintenance period – it is the contractor’s responsibility to ensure proper irrigation system operation for duration of the maintenance period.

I. Unusual Field Conditions: It is the Contractor’s responsibility to communicate to the Architect unusual field conditions found at the project site before and during construction. The presence of unusual field conditions such as wind, wetness, soil issues, invasive weeds, will require the Contractor take note and advise the Architect on how best to remedy the discovery.

1.9 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:

    a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
    b. Structural failures including plantings falling, blowing over or settling out of plumb.
    c. Faulty performance of tree stabilization, edgings, tree grates, or sub-drainage.
    d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Substantial Completion:
    a. Trees, Shrubs, Vines, Ornamental Grasses, Ground Covers, Biennials, Perennials, and Other Plants, metal edges, decorative mulches, landscape drainage features, landscape grading: 12 months.
    b. Annuals: 3 months.

3. Inspections:

    a. Perform maintenance checkups at 3 month and 6 month intervals to verify that plant material is being properly maintained. Notify Owner in writing of any deficiencies.
    b. Eleven months into warranty period, request in writing a year-end inspection by Owner and Landscape Architect.

4. 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. There will be no limitation on replacements of each plant except for losses or replacements due to species intolerance of environmental conditions.

        1) Contractor shall notify Landscape Architect in writing of any concerns related to species intolerance of environmental conditions prior to purchase of plant material; otherwise, purchased plant material will be accepted by Contractor as tolerant of environmental conditions. Detrimental conditions shall be corrected prior to installation of plant material and shall not be considered grounds for warranty exclusion.

    d. Provide extended warranty for period equal to original warranty period, for replaced plant material. As required, continue extended warranty until leaf out to ensure health of replaced material. Plants shall be deemed dead if leaf out does not occur prior to end of spring.

5. All replacements shall be plants of the same kind as originally planted and shall be of size equal to that attained by adjacent plants of the same kind at the time replacement is made. They shall be furnished and planted as specified herein.

6. Removal and replacement shall be at no cost to the Owner.

1.10 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. 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. The Maintenance Period will begin from the date of Substantial Completion for the last phase of work. Partial substantial completions will require continued maintenance until the entire landscape project is deemed substantially complete.

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 Schedule or Plant Legend shown 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 will be rejected.
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.
3. Provide trees from active, consistently aged specimens.
4. Unless directly specified, provide only trees that are genetic clones of the requested variety.

B. Select Balled and Burlapped material from nurseries who utilize root pruning practices and have a systematic approach to hardening off newly dug material.

C. 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.

D. Provide small trees and shade trees that are grown on their own roots, not utilizing grafting or budding techniques (unless directed in the plant list).

E. Provide container plant material that is free from circling roots or pot bound conditions.

F. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

G. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

H. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

I. Annuals: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and are either in bloom or will be blooming within two weeks.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
1. Provide lime in form of ground dolomitic limestone.

2.3 ORGANIC SOIL AMENDMENTS

A. Soil Conditioner: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Pine bark soil conditioner: finely ground, well composted, pine bark mulch with a maximum particle size of ¼".

2. Organic Matter Content: 70 percent of dry weight.
3. Sources: Agricultural, bark, biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
   a. Free of toxic materials to plant growth
   b. Free of weed seeds.

2.4 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

B. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory. Several different blends may be necessary to meet the requirements.

2.5 PLANTING SOILS (Sandy Loam Texture Planting Soils)

A. Planting Soil Type A: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove 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. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

1. Screen to remove extraneous materials.
2. Ratio of soil conditioner to Surface Soil by Volume: 1:5.
3. Weight of Slow-Release Fertilizer per 1000 Sq. Ft. consult soil test.
4. Weight of dolomitic limestone per soil test.
5. Amended planting soil is to have a sandy loam texture.

B. Planting Soil Type B: Existing [found on site], native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth by mechanical screening.

1. Screen native material to remove extraneous materials
2. Supplement with approved imported clean sandy loam topsoil when quantities are insufficient.
3. Mix existing, native surface topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
   a. Ratio of soil conditioner to Topsoil by Volume: 1:10.
   b. Weight of Slow-Release Fertilizer as per soil test.
   c. Weight of dolomitic limestone as per soil test.
4. Amended planting soil is to have a sandy loam texture.

C. Planting Soil Type C: Imported sandy loam topsoil formed under natural conditions blended with organic matter. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

1. Ratio of soil conditioner to Topsoil by Volume: 1:10.
2. Weight of Slow-Release Fertilizer as per soil test
3. Weight of dolomitic limestone as per soil test.

2.6 MULCH

A. Mulch: Well-composted, stable, and weed-free organic matte, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 2 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Triple shredded hardwood.
2. Color: Natural.

2.7 SUB DRAINAGE

A. Drainage pipe: 4” black corrugated slotted PE pipe pre-wrapped in a geo-textile fabric capable of filtering clay soil from migrating into the pipe.

B. Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTMD448.

2.8 MISCELLANEOUS PRODUCTS

A. Planter Filter Fabric: Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

2.9 HERBICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

D. Herbicides are to only be used with specific authorization from the Owner (Currituck County) and must be compliant with any and all local, state and federal guidelines protecting existing conditions on site, including Currituck Sound, Coastal Wetlands, Rain Gardens and Pond.

E. Herbicides are to only be applied by licensed professionals.

2.10 PESTICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pesticides are to only be used with specific authorization from the Owner (Currituck County) and must be compliant with any and all local, state and federal guidelines protecting existing conditions on site, including Currituck Sound, Coastal Wetlands, Rain Gardens and Pond.

C. Pesticides are to only be applied by licensed professionals.

2.11 TREE STABILIZATION MATERIALS

A. Upright and Guy Stakes: Rough-sawn, sound, new hardwood Stakes and Guys:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, 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.
3. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
4. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that subgrades are correct prior to spreading topsoil or spreading amendments.
2. Conduct water percolation tests to verify that planting depths and drainage will meet the needs of the plants that have been selected. Inform the Architect of any drainage issues.
3. 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.
4. Along roadways and in landscape islands, remove gravel and asphalt from landscape beds.
5. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
6. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
7. Uniformly moisten excessively dry soil that is not workable and which is too 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.

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.

C. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.
1. For gridded layouts, provide surveyed offset stakes. Use field strings to aid in layout.
2. For grade sensitive layouts, set up level lines and grade stakes to insure proper planting depths.

3.3 GENERAL REQUIREMENTS FOR ALL PLANTING TYPES

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

D. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

E. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. 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.

1. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
2. 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.
3. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
4. Maintain supervision of excavations during working hours.
5. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
6. If subdrainage is shown on Drawings or required under planting areas, insure contact between the root ball and subdrain pipe.

F. After excavation examine the area for potential drainage difficulties matched to plant varieties and inform the Architect of potential poorly drained areas. Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits. Discuss variations in the depth of planting with the Architect prior to planting.

G. Fill excavations with water and allow it to percolate away before positioning trees and shrubs.

H. Set out and space plants according to the planting plans and notes in even rows with triangular spacing unless otherwise indicated.

I. 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.

J. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

K. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

L. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

M. Backfill plants with the materials and methods indicated in the Tables below and with the following instructions:

1. 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.
2. 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.
3. Continue backfilling process. Water again after placing and tamping final layer of soil.

3.4 MASS PLANTING AREA REQUIREMENTS – TYPE 'A' AND 'C' PLANTING SOIL

A. Preparation - Loosen area of planting areas to a minimum depth indicated in the table below. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

Table 1

PLANTING TYPE	TREATMENT AREA	SOIL TREATMENT	BACKFILL FOR EXCAVATION	IMPORTED TOPSOIL DEPTH
Shrub and Groundcover masses	entire planting area	Loosen 8" deep	Use Planting Soil Type 'A' or 'C'	4"
Mass perennials	entire planting area	Loosen 8" deep	Use Planting Soil Type 'A' or 'C'	4"
Mass annuals	entire planting area	Loosen 8" deep	Use Planting Soil Type 'A' or 'C'	2"

1. Apply slow release fertilizer and amendments directly to grade before loosening.
2. Thoroughly mix amendments and soil to the depths indicated in Table 1 to produce a uniform, loose, friable planting bed.
3. Soil generated from excavations may be used after properly amended as specified.
4. *** IMPORTED TYPE 'C' PLANTING SOIL IS TO BE APPLIED TO ALL PLANTING BEDS TO A MINIMUM DEPTH AS LISTED ABOVE.**

3.5 SOLITARY TREES AND SHRUBS PLANTING REQUIREMENTS – TYPE 'A' AND 'C' PLANTING SOIL

A. Preparation - Loosen area of planting areas to a minimum depth indicated in the table below. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

Table 3

PLANTING TYPE	TREATMENT AREA	SOIL TREATMENT	BACKFILL FOR EXCAVATION
Solitary Trees	10' wider than the root ball	Loosen 12" deep	Use Planting Soil Type 'A' or 'C'
Solitary Shrubs	10' wider than the root ball	Loosen 12" deep	Use Planting Soil Type 'A' or 'C'

1. Soil generated from excavations may be used after properly amended as specified.

3.6 PLANT STABILIZATION

A. Install plant stabilization as follows unless otherwise indicated:

PLANT SIZE	STABILIZATION METHOD
6" in Caliper and Greater	Anchor 4 guys to wood deadmen buried at least 36 inches below grade. Provide turnbuckle and compression spring for each guy wire and tighten securely. Allow enough slack to avoid rigid restraint of tree. Provide soft flexible protection of the trunk from the guy wires. Attach flags to each guy wire, 30 inches above finish grade.
3" to 6" in Caliper	Anchor 3 guys to 30" wood stakes. Install guy wires allowing enough slack to avoid rigid restraint of tree. Provide soft flexible protection of the trunk from the guy wires. Attach flags to each guy wire, 30 inches above finish grade.
Less than 12' tall	Provide two 6' tall hardwood stakes driven into the ground at the edge of the root ball 2' deep. Fasten the tree to the stakes with flexible bands capable of holding the plant steady but not binding.

B. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.

1. Refer to planting plan for location of plants to be receiving underground stabilization.

2. Root-Ball Stabilization Device: Install root-ball stabilization system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.7 PLANT PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Do not apply pruning paint to wounds.

3.8 EDGING INSTALLATION

A. Chiseled Edging: Construct chiseled edge separating mulch areas from lawn as shown in the drawings.

3.9 PLANTING AREA MULCHING

A. Layout mulch beds carefully with smooth lines and as indicated on the drawings. Mulch backfilled surfaces of planting areas and other areas indicated.

B. Organic Mulch in Planting Areas: Apply over whole surface of mass planting areas or on isolated plantings as follows:
1. 3" minimum depth for trees, shrubs and groundcovers
2. 1 ½" minimum depth for groundcovers, perennials, and annual beds.

C. Do not place mulch within 3 inches of tree or large shrub trunks.

3.10 PLANT MAINTENANCE

A. Until final acceptance 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. Spray or treat as required to keep trees and shrubs free of weeds, insects and disease.

B. Until final acceptance 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. Include the following required action at 12 months from Substantial Completion:

1. Remove tree staking systems.
2. Remove tree saucers.
3. Expose root crowns of all trees planted on the job.

3.11 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. 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.

3.12 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 329300

Appendix – B

PERMITS/ ADDITIONAL INFORMATION

Permit Class
MODIFICATION/MINOR

DCM - ECity

Permit Number
143-09

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

Permit

for

_X_ Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

_X_ Excavation and/or filling pursuant to NCGS 113-229

Issued to **Currituck County, PO Box 39, Currituck, NC 27929**

Authorizing development in Currituck County Currituck Sound, 1100 Club Road, Corolla, as requested in the permittee's letter dated received 8/21/14, including the attached workplan drawing (14), all dated 8/5/14

This permit, issued on **October 9, 2014**, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

1) Unless specifically altered herein, this minor modification authorizes the additional concrete sidewalk, boardwalk, landscape plantings, and signage, all as expressly and specifically set forth in the attached letter and workplan drawings. Any additional land disturbing activities and/or construction may require a modification of this permit. Contact a Division of Coastal Management representative at (252) 264-3901 for this determination.

2) This minor modification shall be attached to the original of Permit No. 143-09, which was issued on 10/27/09, as well as all subsequent renewals, modifications, refinements, and copies of all documents shall be readily available on site when Division personnel inspect the project for compliance.

(See attached sheet for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

March 6, 2015

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

Braxton C. Davis, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.

Signature of Permittee

ADDITIONAL CONDITIONS

3) All conditions and stipulations of the active permit remain in force under this minor modification, unless specifically altered herein.

Sedimentation and Erosion Control

4) In order to protect water quality, runoff from construction shall not visibly increase the amount of suspended sediments in adjacent waters.

5) Appropriate sedimentation and erosion control devices, measures or structures shall be implemented to ensure that eroded materials do not enter adjacent wetlands, watercourses and property (e.g. silt fence, diversion swales or berms, etc.).

NOTE: This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

Appendix – C

LIST OF DRAWINGS

	Cover Sheet
L000	Existing Conditions Plan
L001	Site Context / Sheet Extents Plan
L121	Demolition Plan
L122	Demolition Plan
L131	Layout & Materials Plan
L132	Layout & Materials Plan
L151	Grading Plan
L152	Grading Plan
L161	Planting Plan
L162	Planting Plan
L500	Details
L501	Details
L502	Details
E001	Electrical General Notes, Legend, Abbreviations & Specifications
E101	Electrical Site Plan