



UNIVERSITY OF
SOUTH CAROLINA

Project Manual
USC Horseshoe Brick Repair

Project # H27-Z220-A

April 27, 2015

USC Facilities Design & Construction

743 Greene Street

Columbia, SC 29208

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Project Number: H27-Z220-A/CP00423805

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SE-311

INVITATION FOR MINOR CONSTRUCTION QUOTES

PROJECT NAME: USC Horseshoe Brick RepairPROJECT NUMBER: H27-Z220-A/CP00423805PROJECT LOCATION: USC campus between Sumter and Bull StreetsBID SECURITY REQUIRED? Yes No PERFORMANCE BOND REQUIRED? Yes No PAYMENT BOND REQUIRED? Yes No CONSTRUCTION COST RANGE: \$ 10,000-20,000DESCRIPTION OF PROJECT: Brick sidewalk repair and construction, must be completed by July 17, 2015. Small & minority business participation is encouraged.BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM: purchasing.sc.edu, Facilities/Construction Solicitations & AwardsPLAN DEPOSIT AMOUNT: \$ \$0.00 IS DEPOSIT REFUNDABLE Yes No N/A

Bidders must obtain Bidding Documents/Plans from the above listed source(s) to be listed as an official plan holder. Only those Bidding Documents/Plans obtained from the above listed source(s) are official. Bidders rely on copies of Bidding Documents/Plans obtained from any other source at their own risk.

IN ADDITION TO THE ABOVE OFFICIAL SOURCE(S), BIDDING DOCUMENTS/PLANS ARE ALSO AVAILABLE AT:

It is the contractor's responsibility to check the purchasing website for all plans, addenda, and awards.*All questions & correspondence concerning this Invitation shall be addressed to the A-E.*A-E NAME: Emily JonesA-E CONTACT: USC Facilities Design & ConstructionA-E ADDRESS: Street/PO Box: 743 Greene StreetCity: ColumbiaState: SCZIP: 29208-EMAIL: efjones@fmc.sc.eduTELEPHONE: 803-777-7592FAX: 803-777-8739AGENCY: USC FacilitiesAGENCY PROJECT COORDINATOR: Kathleen AlleyADDRESS: Street/PO Box: 743 Greene StreetCity: ColumbiaState: SCZIP: 29208-EMAIL: kalley@fmc.sc.eduTELEPHONE: 803-777-5356FAX: 803-777-7334PRE-QUOTE CONFERENCE: Yes No MANDATORY ATTENDANCE: Yes No PRE-QUOTE DATE: 5/6/2015TIME: 10 amPLACE: 743 Greene Street, Room 53QUOTE CLOSING DATE: 5/19/2015TIME: 2 pmPLACE: 743 Greene Street, Room 56

QUOTE DELIVERY ADDRESSES:

HAND-DELIVERY:

Attn: Kathleen Alley743 Greene StColumbia, SC 29208

MAIL SERVICE:

Attn: Kathleen Alley743 Greene StColumbia, SC 29208APPROVED BY: *(Agency Project Coordinator)*DATE: 4/27/15

**SE-331
QUOTE FORM**

Quotes shall be submitted only on SE-331.

QUOTE SUBMITTED BY: _____
(Offeror's Name)

QUOTE SUBMITTED TO: University of South Carolina
(Owner's Name)

FOR: PROJECT NAME: Horseshoe Brick Repair

PROJECT NUMBER: H27-Z220-A/CP00423805

OFFER

1. In response to the Invitation for Minor Construction Quotes, and in compliance with the Instructions to Bidders for the above-named Project, the undersigned **OFFEROR** proposes and agrees, if this Quote is accepted, to enter into a Contract with the Owner in the form included in the Solicitation Documents, and to perform all Work as specified or indicated in the Solicitation Documents, for the prices and within the time frames indicated in the Solicitation and in accordance with the other terms and conditions stated.
2. Pursuant to Section 11-32-3030(1) of the SC Code of Laws, as amended, **OFFEROR** has submitted Bid Security as follows in the amount and form required by the Solicitation Documents:

Bid Bond with Power of Attorney Electronic Bid Bond Cashier's Check

(Bidder check one)

3. **OFFEROR** acknowledges the receipt of the following Addenda to the Solicitation documents and has incorporated the effects of said Addenda into its Quote *(Bidder, check only boxes that apply):*

ADDENDA: #1 #2 #3 #4 #5

4. **OFFEROR** agrees that this Quote, including all bid alternates, if any, may not be revoked or withdrawn after the opening of quotes, and shall remain open for acceptance for a period of 60 Days following the Quote Date, or for such longer period of time that **OFFEROR** may agree to in writing upon request of the Owner.
5. **OFFEROR** agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the amount of \$ 200.00 for each calendar day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted Contract Time for Substantial Completion, as provided in the Contract Documents.
6. **OFFEROR** herewith submits its offer to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fee, permits, licenses and applicable taxes necessary to complete the following items of construction work:

6.1 BASE QUOTE \$ _____
(enter BASE QUOTE in figures only)

6.1.1 ALTERNATE NO. 1 \$ _____ **to be ADDED / DEDUCTED from BASE QUOTE.**
(circle one)

6.1.2 ALTERNATE NO. 2 \$ _____ **to be ADDED / DEDUCTED from BASE QUOTE.**
(circle one)

SC Contractor's License Number: _____

Classification(s) & Limits: _____

Address: _____

Telephone/Fax _____

E-mail _____

This Quote is hereby submitted on behalf of the Offeror named above.

BY: _____
(Signature of Offeror's Representative)

(Print or Type Name of Offeror's Representative)

TITLE: _____

USC SUPPLEMENTAL GENERAL CONDITIONS
FOR CONSTRUCTION PROJECTS

WORK AREAS

1. The Contractor shall maintain the job site in a safe manner at all times. This includes (but is not limited to) the provision and/or maintenance of lighting, fencing, barricades around obstructions, and safety and directional signage.
2. Contractor's employees shall take all reasonable means not to interrupt the flow of student traffic in building corridors, lobbies, stairs and exterior walks. All necessary and reasonable safety precautions shall be taken to prevent injury to building occupants while transporting materials and equipment through the work area. Providing safe, accessible, plywood-shielded pedestrian ways around construction may be required if a suitable alternative route is not available.
3. At the beginning of the project, the USC Project Manager will establish the Contractor's lay-down area. This area will also be used for the Contractor's work vehicles. The lay-down area will be clearly identified to the contractor by the Project Manager, with a sketch or drawing provided to USC Parking Services. In turn, Parking Services will mark off this area with a sign containing the project name, Project Manager's name, Contractor name and contact number, and end date. Where this area is subject to foot traffic, protective barriers will be provided as specified by the Project Manager. The area will be maintained in a neat and orderly fashion.
4. Work vehicles parked in the lay down area (or designated parking areas) will be clearly marked and display a USC-furnished placard for identification. No personal vehicles will be allowed in this area, or in any areas surrounding the construction site. Personal vehicles must be parked in the perimeter parking lots or garages. Temporary parking permits can be obtained at the Contractor's expense at the USC Parking Office located in the Pendleton Street parking garage. Refer to the CAMPUS VEHICLE EXPECTATIONS (below) for additional information.
5. Contractor is responsible for removal of all debris from the site, and is required to provide the necessary dumpsters which will be emptied on a regular basis. Construction waste must not be placed in University dumpsters. The construction site must be thoroughly cleaned with all trash picked up and properly disposed of on a daily basis and the site must be left in a safe and sanitary condition each day. The University will inspect job sites regularly and will fine any contractor found to be in violation of this requirement an amount of up to \$1,000 per violation.
6. The Contractor shall be responsible for erosion and sediment control measures where ground disturbances are made.

PROJECT FENCING

7. All construction projects with exterior impacts shall have construction fencing at the perimeter. Fencing shall be 6' chain link with black or green privacy fabric (80-90% blockage). For fence panels with footed stands, sandbag weights shall be placed on the inside of the fence. Ripped sandbags shall be replaced immediately.
8. For projects with long fencing runs and/or high profile locations, decorative USC banners shall be used on top of privacy fabric; banners should be used at a ratio of one banner for every five fence panels. USC Project Manager will make arrangements for banner delivery for Contractor to hang.
9. The use of plastic safety fencing is discouraged and shall only be used on a temporary basis (less than four weeks) where absolutely necessary. Safety fencing shall be a neon yellow-green, high-

visibility fencing equal to 'Kryptonight' by Tenax. Safety fencing shall be erected and maintained in a neat and orderly fashion throughout the project.

10. Vehicles and all other equipment shall be contained within a fenced area if they are on site for more than 3 consecutive calendar days.

BEHAVIOR

11. Fraternalization between Contractor's employees and USC students, faculty or staff is strictly prohibited.
12. USC will not tolerate rude, abusive or degrading behavior on the job site. Heckling and cat-calling directed toward students, faculty or staff or any other person on USC property is strictly prohibited. Any contractor whose employees violate this requirement will be assessed a fine of up to \$500 per violation.
13. Contractor's employees must adhere to the University's policy of maintaining a drug-free and tobacco-free campus.

HAZARDOUS MATERIALS & SAFETY COMPLIANCE

14. A USC Permit to Work must be signed prior to any work being performed by the general contractor or sub-contractor(s).
15. The contractor will comply with all regulations set forth by OSHA and SCDHEC. Contractor must also adhere to USC's internal policies and procedures (available by request). Upon request, the contractor will submit all Safety Programs and Certificates of Insurance to the University for review.
16. Contractor must notify the University immediately upon the discovery of suspect material which may contain asbestos or other such hazardous materials. These materials must not be disturbed until approved by the USC Project Manager.
17. In the event of an OSHA inspection, the Contractor shall immediately call the Facilities Call Center, 803-777-4217, and report that an OSHA inspector is on site. An employee from USC's Safety Unit will arrive to assist in the inspection.

LANDSCAPE & TREE PROTECTION

18. In conjunction with the construction documents, the USC Arborist shall direct methods to minimize damage to campus trees. Tree protection fencing is required to protect existing trees and other landscape features to be affected by a construction project. The location of this fence will be evaluated for each situation with the USC Arborist, Landscape Architect and Project Manager. Tree protection fencing may be required along access routes as well as within the project area itself. Fence locations may have to be reset throughout the course of the project.
19. The tree protection fence shall be 6' high chain link fence with 80-90% privacy screening unless otherwise approved by USC Arborist and/or Landscape Architect. If the tree protection fence is completely within a screened jobsite fence perimeter, privacy fabric is not required. In-ground fence posts are preferred in most situations for greater protection. If utility or pavement conflicts are present, fence panels in footed stands are acceptable. See attached detail for typical tree protection fencing.
20. No entry, vehicle parking, or materials storage will be allowed inside the tree protection zone. A 4"

layer of mulch shall be placed over the tree protection area to maintain moisture in the root zone.

21. Where it is necessary to cross walks, tree root zones (i.e., under canopy) or lawns the following protective measures shall be taken:
 - a. For single loads up to 9,000 lbs., a 3/4" minimum plywood base shall be placed over 4" of mulch.
 - b. For single loads over 9,000 lbs., two layers of 3/4" plywood shall be placed over 4" of mulch.
 - c. Plywood sheets shall be replaced as they deteriorate or delaminate with exposure.
 - d. For projects requiring heavier loads, a construction entry road consisting of 10' X 16' oak logging mats on 12" coarse, chipped, hardwood base. Mulch and logging mats shall be supplemented throughout the project to keep matting structurally functional.
22. Damage to any trees during construction shall be assessed by the USC Arborist, who will stipulate what action will be taken for remediation of damage. The cost of any and all remediation will be assumed by the contractor at no additional cost to the project. Compensation for damages may be assessed up to \$500 per caliper inch of tree (up to 8") and \$500 per inch of diameter at breast height (for trees over 8").
23. Damage to trunks and limbs, as well as disturbance of the root zone under the dripline of tree, including compaction of soil, cutting or filling, or storage of materials, shall qualify as damage and subject to remediation.
24. Any damage to existing pavements or landscaping (including lawn areas and irrigation) will be remediated before final payment is made.

TEMPORARY FACILITIES

25. Contractor will be responsible for providing its own temporary toilet facilities, unless prior arrangements are made with the USC Project Manager.
26. Use of USC communications facilities (telephones, computers, etc.) by the Contractor is prohibited, unless prior arrangements are made with the USC Project Manager.

CAMPUS KEYS

27. Contractor must sign a Contractor Key Receipt/Return form before any keys are issued. Keys must be returned immediately upon the completion of the work. The Contractor will bear the cost of any re-keying necessary due to the loss of or failure to return keys.

WELDING

28. A welding (hot work) permit must be issued by the University Fire Marshall before any welding can begin inside a building. The USC Project Manager will coordinate.

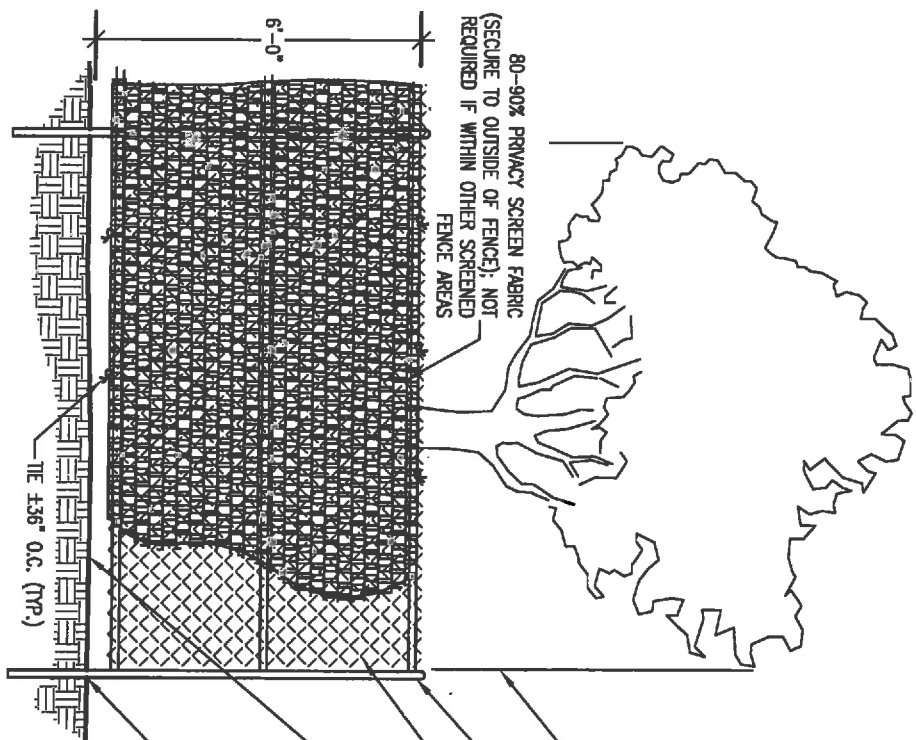
PROJECT EVALUATION & CLOSE-OUT

29. For all projects over \$100,000, including IDCs, a Contractor Performance Evaluation (SE 397) will be reviewed with the GC at the beginning of the project and a copy given to the GC. At the end of the project the form will be completed by the USC Project Manager and a Construction Performance rating will be established.
30. Contractor must provide all O&M manuals, as-built drawings, and training of USC personnel on new equipment, controls, etc. prior to Substantial Completion. Final payment will not be made until

this is completed.

CAMPUS VEHICLE EXPECTATIONS

31. Personal vehicles must be parked in the perimeter parking lots or garages. Temporary parking permits can be obtained at the Contractor's expense at the USC Parking Office located in the Pendleton Street parking garage.
32. All motorized vehicle traffic on USC walkways and landscape areas must be approved by the USC Project Manager and Parking Division, have a USC parking placard, and be parked within the approved laydown area. Violators may be subject to ticketing, towing and fines.
33. All motorized vehicles that leak or drip liquids are prohibited from traveling or parking on walks or landscaped areas.
34. Drivers of equipment or motor vehicles that damage university hardscape or landscape will be held responsible for damages and restoration expense.
35. All vehicles parked on landscape, hardscape, or in the process of service delivery, must display adequate safety devices, i.e. flashing lights, cones, signage, etc.
36. All drivers of equipment and vehicles shall be respectful of University landscape, equipment, structures, fixtures and signage.
37. All incidents of property damage shall be reported to Parking Services or the Work Management Center.



TREE CANOPY DRIPLINE;
SEE NOTE #2.

2 1/2" O.D. GALV. FENCEPOST

CHAIN LINK FENCE PANEL

PROVIDE 4" HARDWOOD MULCH
AT TREE PROTECTION AREA
UPON RECOMMENDATION OF
USC ARBORIST

FENCE POSTS TO BE SET INTO
GROUND; MARK POST
LOCATIONS FOR REVIEW AND
APPROVAL BY USC ARBORIST
PRIOR TO INSTALLATION. SEE
NOTE #4.

NOTES:

1. PROVIDE PROTECTION FENCING FOR ALL TREES WITHIN AREA OF DISTURBANCE AND CONSTRUCTION ACCESS.
2. PROTECTION FENCING SHALL BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION.
3. PROTECTION FENCING TO BE PLACED AT THE OUTSIDE OF THE CANOPY DRIPLINE, OR AT A DISTANCE OF ONE FOOT PER ONE INCH OF TREE DIAMETER, MEASURED AT BREAST HEIGHT, WHICHEVER IS LARGER, UNLESS OTHERWISE INDICATED ON LANDSCAPE PLAN OR APPROVED BY UNIVERSITY ARBORIST.
4. IN-GROUND POSTS ARE STANDARD. IF EXISTING ROOTS, UTILITIES OR PAVEMENT PRECLUDE USE OF IN-GROUND POSTS, FOOTED STANDS ARE ACCEPTABLE. SAND BAGS SHALL BE PLACED ON THE INSIDE OF FENCE.
5. DAMAGE TO ANY TREES DURING CONSTRUCTION SHALL BE ASSESSED BY UNIVERSITY ARBORIST AND THE UNIVERSITY ARBORIST SHALL STIPULATE WHAT ACTION WILL BE TAKEN FOR REMEDIATION OF DAMAGE. THE COST OF ANY AND ALL REMEDIATION WILL BE ASSUMED BY CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
6. DISTURBANCE OF ROOT ZONE UNDER DRIPLINE OF TREE, INCLUDING COMPACTION OF SOIL, CUTTING OR FILLING OR STORAGE OF MATERIALS SHALL QUALIFY AS DAMAGE AND SUBJECT TO REMEDIATION.

TREE PROTECTION FENCING (IN-GROUND) WITH SCREENING

NO SCALE REVISED 8.28.14

Project Name: USC Horseshoe Brick Repair

Project Number: H27-Z220-A

University of South Carolina

CONTRACTOR'S ONE YEAR GUARANTEE

STATE OF _____

COUNTY OF _____

WE _____
as General Contractor on the above-named project, do hereby guarantee that all work executed under the requirements of the Contract Documents shall be free from defects due to faulty materials and /or workmanship for a period of one (1) year from date of acceptance of the work by the Owner and/or Architect/Engineer; and hereby agree to remedy defects due to faulty materials and/or workmanship, and pay for any damage resulting wherefrom, at no cost to the Owner, provided; however, that the following are excluded from this guarantee;

Defects or failures resulting from abuse by Owner.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, or civil commotion.

[Name of Contracting Firm]

*By _____

Title _____

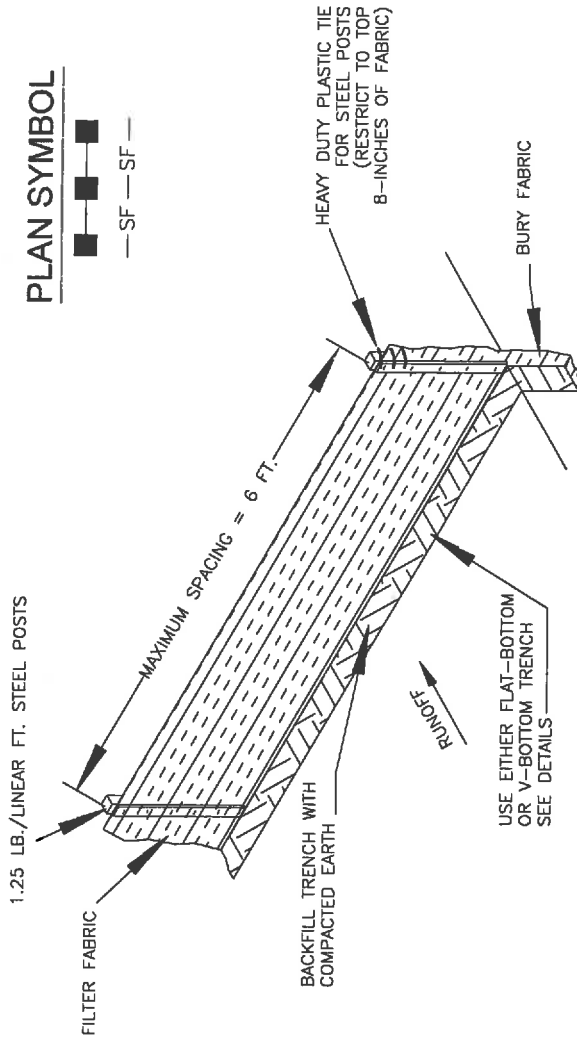
*Must be executed by an Officer of the Contracting Firm.

SWORN TO before me this _____ day of _____, 2____ (seal)

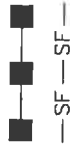
_____ State

My commission expires _____

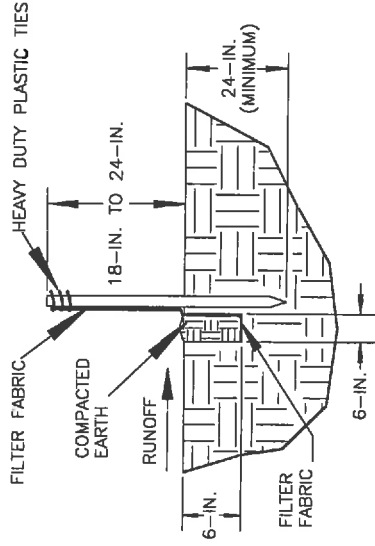
SILT FENCE INSTALLATION



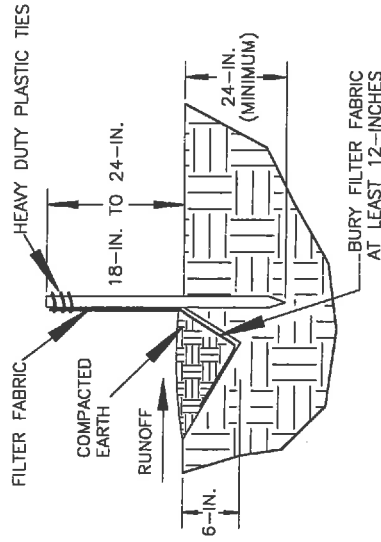
PLAN SYMBOL



FLAT-BOTTOM TRENCH DETAIL



V-SHAPED TRENCH DETAIL



SILT FENCE - GENERAL NOTES

- Do not place silt fence across channels or in other areas subject to concentrated flows. Silt fence should not be used as a velocity control BMP. Concentrated flows are any flows greater than 0.5 cfs.
- Maximum sheet or overland flow path length to the silt fence shall be 100-feet.
- Maximum slope steepness (normal [perpendicular] to the fence line) shall be 2:1.
- Silt fence joints, when necessary, shall be completed by one of the following options:
 - Wrap each fabric together at a support post with both ends fastened to the post, with a 1-foot minimum overlap;
 - Overlap silt fence by installing 3-foot passed the support post to which the new silt fence roll is attached. Attach old roll to new roll with heavy-duty plastic ties; or,
 - Overlap entire width of each silt fence roll from one support post to the next support post.
- Attach filter fabric to the steel posts using heavy-duty plastic ties that are evenly spaced within the top 8-inches of the fabric.
- Install the silt fence perpendicular to the direction of the stormwater flow and place the silt fence the proper distance from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.
- Install Silt Fence Checks (Tie-Bocks) every 50-100 feet, dependent on slope, along silt fence that is installed with slope and where concentrated flows are expected or are documented along the proposed/installed silt fence.

South Carolina Department of
Health and Environmental Control

SILT FENCE

STANDARD DRAWING NO. SC-03 Page 1 of 2

NOT TO SCALE

FEBRUARY 2014
DATE

SILT FENCE — POST REQUIREMENTS

1. Silt fence posts must be 48-inch long steel posts that meet, at a minimum, the following physical characteristics.
 - Composed of a high strength steel with a minimum yield strength of 50,000 psi.
 - Include a standard "T" section with a nominal face width of 1.38-inches and a nominal "T" length of 1.48-inches.
 - Weigh 1.25 pounds per foot (\pm 8%)
2. Posts shall be equipped with projections to aid in fastening of filter fabric.
3. Steel posts may need to have a metal soil stabilization plate welded near the bottom when installed along steep slopes or installed in loose soils. The plate should have a minimum cross section of 17-square inches and be composed of 15 gauge steel, at a minimum. The metal soil stabilization plate should be completely buried.
4. Install posts to a minimum of 24-inches. A minimum height of 1- to 2-inches above the fabric shall be maintained, and a maximum height of 3 feet shall be maintained above the ground.
5. Post spacing shall be at a maximum of 6-feet on center.

SILT FENCE — FABRIC REQUIREMENTS

1. Silt fence must be composed of woven geotextile filter fabric that consists of the following requirements:
 - Composed of fibers consisting of long chain synthetic polymers of at least 85% by weight of polyolefins, polyesters, or polyamides that are formed into a network such that the filaments or yarns retain dimensional stability relative to each other;
 - Free of any treatment or coating which might adversely alter its physical properties after installation;
 - Free of any defects or flaws that significantly affect its physical and/or filtering properties; and,
 - Have a minimum width of 36-inches.
2. Use only fabric appearing on SC DOT's Qualified Products Listing (QPL), Approval Sheet #54, meeting the requirements of the most current edition of the SC DOT Standard Specifications for Highway Construction.
3. 12-inches of the fabric should be placed within excavated trench and toed in when the trench is backfilled.
4. Filter Fabric shall be purchased in continuous rolls and cut to the length of the barrier to avoid joints.
5. Filter Fabric shall be installed at a minimum of 24-inches above the ground.

SILT FENCE — INSPECTION & MAINTENANCE

1. The key to functional silt fence is weekly inspections, routine maintenance, and regular sediment removal.
2. Regular inspections of silt fence shall be conducted once every calendar week and, as recommended, within 24-hours after each rainfall event that produces 1/2-inch or more of precipitation.
3. Attention to sediment accumulations along the silt fence is extremely important. Accumulated sediment should be continually monitored and removed when necessary.
4. Remove accumulated sediment when it reaches 1/3 the height of the silt fence.
5. Removed sediment shall be placed in stockpile storage areas or spread thinly across disturbed area. Stabilize the removed sediment after it is relocated.
6. Check for areas where stormwater runoff has eroded a channel beneath the silt fence, or where the fence has sagged or collapsed due to runoff overtopping the silt fence. Install checks/tie-backs and/or reinstall silt fence, as necessary.
7. Check for tears within the silt fence, areas where silt fence has begun to decompose, and for any other circumstance that may render the silt fence ineffective. Removed damaged silt fence and reinstall new silt fence immediately.
8. Silt fence should be removed within 30 days after final stabilization is achieved and once it is removed, the resulting disturbed area shall be permanently stabilized.

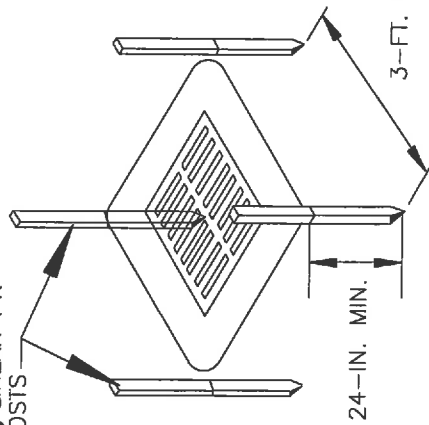
South Carolina Department of
Health and Environmental Control

SILT FENCE

STANDARD DRAWING NO. SC-03 PAGE 2 of 2

GENERAL NOTES FEBRUARY 2014
DATE

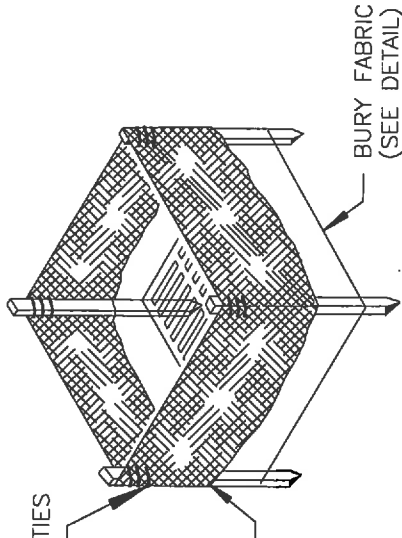
1.25 LB./LINEAR FT.
STEEL POSTS



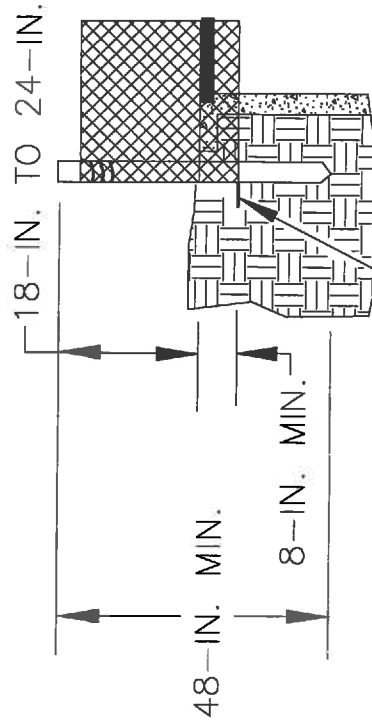
POST INSTALLATION DETAIL

ATTACH FILTER FABRIC TO
POSTS WITH HEAVY DUTY PLASTIC TIES
ALONG TOP 8-INCHES OF FABRIC.

FOLD FABRIC TO OVERLAP
1 FOOT AND SECURE
TO POSTS WITH HEAVY DUTY
PLASTIC TIES



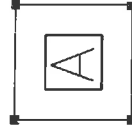
FILTER FABRIC INSTALLATION
DETAIL



BURY & TRENCH MINIMUM
OF 12-INCHES OF FILTER FABRIC

FILTER FABRIC BURIAL DETAIL

PLAN SYMBOL



South Carolina Department of
Health and Environmental Control

Type A

FILTER FABRIC INLET PROTECTION

STANDARD DRAWING NO. SC-07 PAGE 1 of 2

FEBRUARY 2014
DATE

NOT TO SCALE

TYPE A -- FILTER FABRIC REQUIREMENTS

1. Silt fence must be composed of woven geotextile filter fabric that consists of the following requirements:
 - Composed of fibers consisting of long chain synthetic polymers of at least 85% by weight of polyolefins, polyesters, or polyamides that are formed into a network such that the filaments or yarns retain dimensional stability relative to each other;
 - Free of any treatment or coating which might adversely alter its physical properties after installation;
 - Free of any defects or flaws that significantly affect its physical and/or filtering properties; and,
 - Have a minimum width of 36-inches.
2. Use only fabric appearing on SC DOT's Qualified Products Listing (QPL), Approval Sheet #34, meeting the requirements of the most current edition of the SC DOT Standard Specifications for Highway Construction.
3. 12-inches of the fabric should be placed within excavated trench and toed in when the trench is backfilled.
4. Filter Fabric shall be purchased in continuous rolls and cut to the length of the barrier to avoid joints.
5. Filter Fabric shall be installed at a minimum of 24-inches above the ground.

TYPE A -- POST REQUIREMENTS

1. Silt Fence posts must be 48-inch long steel posts that meet, at a minimum, the following physical characteristics.
 - Composed of a high strength steel with a minimum yield strength of 50,000 psi.
 - Include a standard "T" section with a nominal face width of 1.38-inches and a nominal "T" length of 1.48-inches.
 - Weigh 1.25 pounds per foot (\pm 8%)
2. Posts shall be equipped with projections to aid in fastening of filter fabric.
3. Install posts to a minimum of 24-inches. A minimum height of 1- to 2- inches above the fabric shall be maintained, and a maximum height of 3 feet shall be maintained above the ground.
4. Post spacing shall be at a maximum of 3-feet on center.

TYPE A -- INSPECTION & MAINTENANCE

1. The key to functional inlet protection is weekly inspections, routine maintenance, and regular sediment removal.
2. Regular inspections of inlet protection shall be conducted once every calendar week and, as recommended, within 24-hours after each rainfall even that produces 1/2-inch or more of precipitation.
3. Attention to sediment accumulations along the filter fabric is extremely important. Accumulated sediment should be continually monitored and removed when necessary.
4. Remove accumulated sediment when it reaches 1/3 the height of the filter fabric. When a sump is installed in front of the fabric, sediment should be removed when it fills approximately 1/3 the depth of the sump.
5. Removed sediment shall be placed in stockpile storage areas or spread thinly across disturbed area. Stabilize the removed sediment after it is relocated.
6. Check for areas where stormwater runoff has eroded a channel beneath the filter fabric, or where the fabric has sagged or collapsed due to runoff overtopping the inlet protection.
7. Check for tears within the filter fabric, areas where fabric has begun to decompose, and for any other circumstance that may render the inlet protection ineffective. Removed damaged fabric and reinstall new filter fabric immediately.
8. Inlet protection structures should be removed after all the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.

South Carolina Department of Health and Environmental Control

Type A

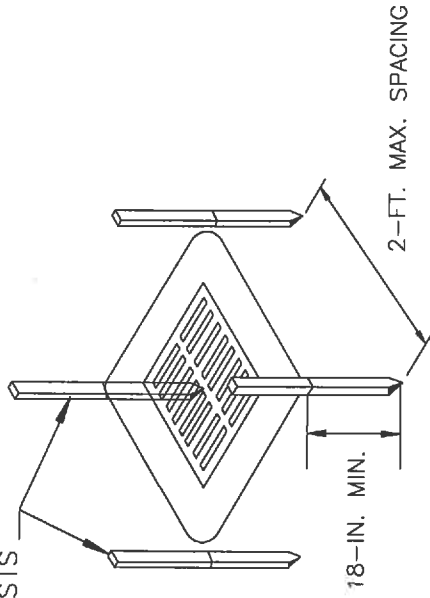
FILTER FABRIC INLET PROTECTION

STANDARD DRAWING NO. SC-07 PAGE 2 of 2

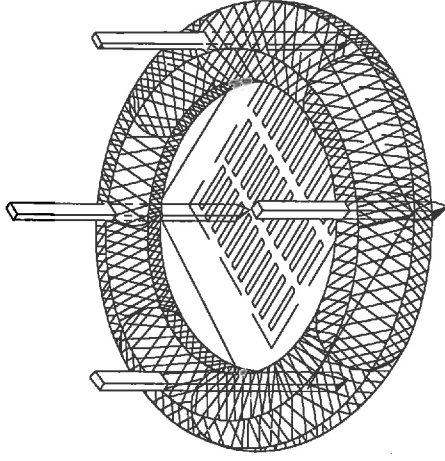
GENERAL NOTES

FEBRUARY 2014
DATE

2" x 2" WOOD STAKES
or 1.25 #/FT
STEEL POSTS

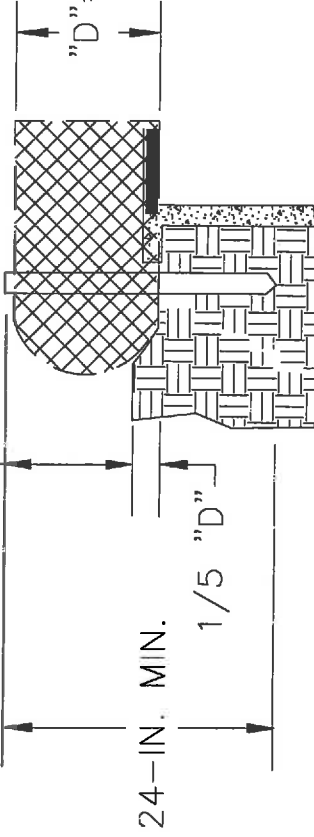


POST INSTALLATION DETAIL



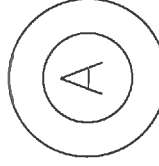
SEDIMENT TUBE INSTALLATION
DETAIL

18-IN. TO 24-IN. DIA.



SEDIMENT TUBE BURIAL DETAIL

PLAN SYMBOL



South Carolina Department of
Health and Environmental Control

Type A

SEDIMENT TUBE INLET PROTECTION

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FEBRUARY 2014

NOT TO SCALE

DATE

TYPE A – SEDIMENT TUBE INLET PROTECTION

GENERAL NOTES

1. Sediment tubes are elongated tubes of compacted geotextiles, curled excelsior wood, natural coconut fiber, or hardwood mulch. Straw, pine needle, and leaf mulch-filled sediment tubes are not permitted.
2. The outer netting of the sediment tube should consist of seamless, high-density polyethylene photodegradable materials treated with ultraviolet stabilizers or a seamless, high-density polyethylene non-degradable material.
3. Sediment tube diameters shall range from 18-inches to 24-inches. Sediment tubes with smaller diameters are prohibited when used as inlet protection.
4. Curled excelsior wood, or natural coconut products that are rolled up to create a sediment tube are not allowed.
5. Sediment tubes should be staked using wooden oak stakes (2-inch X 2-inch) or steel posts (standard "U" or "T" sections with a minimum weight of 1.25 pounds per foot) at a minimum of 48-inches in length placed on 2-foot centers.
6. Install all sediment tubes to ensure that no gaps exist between the soil and the bottom of the tube. Manufacturer's recommendations should always be consulted before installation.
7. The ends of adjacent sediment tubes should be overlapped 6-inches to prevent flow and sediment from passing through the field joint.
8. Sediment tubes should not be stacked on top of one another.
9. Each sediment tube should be installed in a trench with a depth equal to 1/5 the diameter of the sediment tube.
10. Install stakes at a diagonal facing incoming runoff.

INSPECTION & MAINTENANCE

1. The key to functional inlet protection is weekly inspections, routine maintenance, and regular sediment removal.
2. Regular inspections of sediment tube inlet protection shall be conducted once every calendar week and, as recommended, within 24-hours after each rainfall even that produces 1/2-inch or more of precipitation.
3. Attention to sediment accumulations in front of the sediment tube is extremely important. Accumulated sediment should be continually monitored and removed when necessary.
4. Remove accumulated sediment when it reaches 1/3 the height of the sediment tube. When a sump is installed in front of the inlet protection, sediment shall be removed when it fills approximately 1/3 the depth of the sump.
5. Removed sediment shall be placed in stockpile storage areas or spread thinly across disturbed area. Stabilize the removed sediment after it is relocated.
6. Large debris, trash, and leaves should be removed from in front of tubes when found.
7. Inlet protection structures should be removed after the disturbed areas are permanently stabilized. Remove all construction material and sediment, and dispose of them properly. Grade the disturbed area to the elevation of the drop inlet structure crest. Stabilize all bare areas immediately.

South Carolina Department of
Health and Environmental Control

Type A

SEDIMENT TUBE INLET PROTECTION

STANDARD DRAWING NO. SC-07A PAGE 2 of 2

NOT TO SCALE

FEBRUARY 2014
DATE

DOCUMENT 000115 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled **USC Horseshoe Brick Repairs Project Manual**, dated April 27, 2015, as modified by subsequent Addenda and Contract modifications.

B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

L-1 General Site Map

L-2 Site Plan: Rutledge

L-5 Site Details

END OF DOCUMENT 000115

SECTION 033053 - MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture.

1.3 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. Comply with ACI 301 (ACI 301M).

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I.
 - 2. Fly Ash: ASTM C 618, Class C or F.
- B. Normal-Weight Aggregate: ASTM C 33/C 33M, 1-inch nominal maximum aggregate size.

- C. Air-Entraining Admixture: ASTM C 260/C 260M.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: ASTM C 94/C 94M.

2.4 FIBER REINFORCEMENT

- A. Synthetic Micro-Fiber: polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

2.5 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.6 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.7 CONCRETE MIXTURES

- A. Normal-Weight Concrete:
 - 1. Minimum Compressive Strength: 4000 psi (27.6 MPa) and 3000 psi (20.7 MPa) as indicated at 28 days.
 - 2. Cementitious Materials: Use fly ash as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
 - 3. Slump Limit: [4 inches (100 mm)] plus or minus 1 inch (25 mm).

4. Air Content: Maintain within range permitted by ACI 301 (ACI 301M). Do not allow air content of trowel-finished floor slabs to exceed 3 percent.
- B. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than a rate of 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116 and furnish batch ticket information.
 1. When air temperature is between 85 deg F 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 (32 deg C), reduce mixing and delivery time to 60 minutes.
 - 2.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301 (ACI 301M).

3.2 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT INSTALLATION

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

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

3.5 CONCRETE PLACEMENT

- A. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M).
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Consolidate concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).

3.6 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch (13 mm).
 1. Apply to concrete surfaces not exposed to public view.
- B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.7 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
 1. Do not further disturb surfaces before starting finishing operations.
- C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes unless otherwise indicated.

- D. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 (ACI 301M) for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests: Perform according to ACI 301 (ACI 301M).
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

END OF SECTION 033053

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for walks.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

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

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

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

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

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

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

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 INFORMATIONAL SUBMITTALS

- A. Material test reports.

1.4 FIELD CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.
- B. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and zero to 5 percent passing a No. 8 (2.36-mm) sieve.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 SUBGRADE INSPECTION

- A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck or roller to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Architect.
 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.7 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 1. Under grass and planted areas, use satisfactory soil material.

2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

3.9 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.10 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 92 percent.
 3. Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.11 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).
 2. Walks: Plus or minus 1/2 inch (25 mm).
 3. Pavements: Plus or minus 1/2 inch (13 mm).

3.12 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - 2. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 - 3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.13 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 - 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.15 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 321400 - UNIT 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:

1. Brick pavers set in aggregate and mortar setting beds.
2. Metal edge restraints.

1.3 ACTION SUBMITTALS

- A. Product Data: For materials other than water and aggregates.
- B. Samples: For each type of unit paver indicated and the following:
 1. Joint materials involving color selection.
 2. Exposed edge restraints involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For unit pavers. Include statements of material properties indicating compliance with requirements, including compliance with standards. Provide for each type and size of unit.

1.5 FIELD CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- B. Weather Limitations for Mortar and Grout:
 1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6. Provide artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F (38 deg C) and higher.

PART 2 - PRODUCTS

2.1 BRICK PAVERS

- A. Brick Pavers: Light-traffic paving brick; ASTM C 902, Class SX, Type I Application PS. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.

For McKissick Area:

1. Thickness: 2-1/4 inches (57 mm)
 2. Face Size: 4 by 8 inches (102 by 203 mm)
 3. "Color" Subparagraph below may be deleted if manufacturer's product designation is used and specifies color.
 4. Color: Equal to 'Pathway Red' by Pine Hall Brick
- B. For Rutledge Area: Use existing brick and/or brick to be provided by Owner.
- C. Temporary Protective Coating: Precoat exposed surfaces of brick pavers with a continuous film of a temporary protective coating that is compatible with brick, mortar, and grout products and can be removed without damaging grout or brick. Do not coat unexposed brick surfaces; handle brick to prevent coated surfaces from contacting backs or edges of other units. If, despite these precautions, coating does contact bonding surfaces of brick, remove coating from bonding surfaces before setting brick.
- D. Steel Edge Restraints: Manufacturer's standard painted steel edging 3/16 inch (4.8 mm) thick by 4 inches (100 mm) high] with loops pressed from or welded to face to receive stakes at 36 inches (900 mm) o.c. and steel stakes 15 inches (380 mm) long for each loop.
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. Border Concepts, Inc.
 - b. Collier Metal Specialties, Inc.
 - c. J. D. Russell Company (The).
 - d. Sure-loc Edging Corporation.
- E. Aluminum Edge Restraints: Manufacturer's standard [L-shaped, 1/8-inch- (3.2-mm-) thick by 1-3/8-inch- (35-mm-) high extruded-aluminum edging with loops pressed from face to receive stakes at 12 inches (300 mm) o.c. and aluminum stakes 12 inches (300 mm) long for each loop.
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. Curv-Rite, Inc.
 - b. Permaloc Corporation.
 - c. Sure-loc Edging Corporation.

2.2 ACCESSORIES

- A. Compressible Foam Filler: Preformed strips complying with ASTM D 1056, Grade 2A1.

2.3 AGGREGATE SETTING-BED MATERIALS

- A. Graded Aggregate for Base: Sound, crushed stone or gravel complying with ASTM D 448 for Size No. 8.
- B. Leveling Course: Sound, sharp, washed, natural crushed stone complying with gradation requirements in ASTM C 33/C 33M for fine aggregate.
- C. Stone Screenings for Leveling Course: sound stone screenings complying with ASTM D 448 for size No. 10.
- D. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 (1.18-mm) sieve and no more than 10 percent passing No. 200 (0.075-mm) sieve.
- E. Drainage Geotextile: Nonwoven needle-punched geotextile fabric, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
- F. Herbicide: Commercial chemical for weed control, registered with the EPA. Provide in granular, liquid, or wettable powder form.

2.4 MORTAR SETTING-BED MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or Type II.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Sand: ASTM C 144.
- D. Water: Potable.

2.5 GROUT MATERIALS

- A. High-Performance Cement Grout: ANSI A118.7, sanded.
- B. Grout Colors: As selected by Architect from manufacturer's full range.
- C. Water: Potable.

2.6 MORTAR AND GROUT MIXES

- A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other

procedures needed to produce setting-bed and joint materials of uniform quality and with optimal performance characteristics. Discard mortars and grout if they have reached their initial set before being used.

- B. Mortar-Bed Bond Coat: Mix neat cement or cement and sand with to a creamy consistency.
- C. Portland Cement-Lime Setting-Bed Mortar: Type M complying with ASTM C 270, Proportion Specification.
- D. Job-Mixed Portland Cement Grout: Proportion and mix job-mixed Portland cement and sand to match setting bed mortar, **except** omit hydrated lime and use enough water to produce a porable mixture.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures. Where existing pavers are re-used, clean old mortar joints from pavers. Mix any batches of varying colors to produce an overall blend.
- B. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Avoid small pieces less than one-half brick by distributing cuts across several bricks. Hammer cutting is not acceptable.
- C. Joint Pattern:
 - 1. McKissick area: Basket weave
 - 2. Rutledge area: Match and continue existing unit paver joint pattern.
- D. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide compressible foam filler as backing for sealant-filled joints unless otherwise indicated; Install joint filler before setting pavers. Sealant materials and installation are specified in Section 079200 "Joint Sealants."
- E. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

3.2 AGGREGATE SETTING-BED APPLICATIONS

- A. Compact soil subgrade uniformly to at least 95 percent of ASTM D 698 laboratory density.
- B. Place aggregate base, compact by tamping with plate vibrator, and screed to depth indicated.
- C. Place drainage geotextile over compacted base course, overlapping ends and edges at least 12 inches (300 mm).
- D. Place leveling course and screed to a thickness of 1 to 1-1/2 inches (25 to 38 mm), taking care that moisture content remains constant and density is loose and uniform until pavers are set and compacted.

- E. Treat leveling course with herbicide to inhibit growth of grass and weeds.
- F. Set pavers with a minimum joint width of 1/16 inch (1.5 mm) and a maximum of 1/8 inch (3 mm), being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
- G. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf (16- to 22-kN) compaction force at 80 to 90 Hz. Use vibrator with neoprene mat on face of plate or other means as needed to prevent cracking and chipping of pavers. Perform at least three passes across paving with vibrator.
 - 1. Vibrate after edge pavers are installed and there is a completed surface, or before surface is exposed to rain.
 - 2. Before ending each day's work, fully compact installed pavers to within 36 inches of the laying face. Cover pavers that have not been compacted, and any exposed leveling course, with non-staining plastic sheets to protect them from rain.
- H. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.
- I. Repeat joint filling process 30 days later.

3.3 MORTAR SETTING-BED APPLICATIONS

- A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.
- B. Apply mortar-bed bond coat over surface of concrete subbase about 15 minutes before placing mortar bed. Do not exceed 1/16-inch (1.6-mm) thickness for bond coat. Limit area of bond coat to avoid its drying out before placing setting bed.
- C. Apply mortar bed over bond coat; spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.
- D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Before placing pavers, cut back, bevel edge, and remove and discard setting-bed material that has reached initial set.
- E. Wet brick pavers before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- F. Place pavers before initial set of cement occurs. Immediately before placing pavers on mortar bed, apply uniform 1/16-inch-thick bond coat to mortar bed or to back of each paver with a flat trowel.
- G. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single

operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.

- H. Spaced Joint Widths: Provide 3/8-inch (10-mm) nominal joint width with variations not exceeding plus or minus 1/8 inch (3 mm).
- I. Grouted Joints: Grout paver joints complying with ANSI A108.10.
- J. Grout joints as soon as possible after initial set of setting bed.
 - 1. Force grout into joints, taking care not to smear grout on adjoining surfaces.
 - 2. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- K. Cure grout by maintaining in a damp condition for seven days unless otherwise recommended by grout or liquid-latex manufacturer.

3.4 MORTAR SETTING-BED APPLICATIONS

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in the same manner as original units, with same joint treatment and no evidence of replacement.
- B. Pointing. During tooling of joints, enlarge voids or holes and completely fill with grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.
- C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.
 - 1. Remove temporary protective coating as recommended by coating manufacturer and as acceptable to paver and grout manufacturers.

END OF SECTION 321400