

DIVISION 1
MTC GENERAL
REQUIREMENTS

1. GENERAL

- 1.1. This document defines the general requirements that govern all work at Midlands Technical College (MTC). It is a part of the Contract and shall have full force and effect and shall be as a part thereof.
- 1.2. Scope of Work of this construction project includes:
 1. Installation of a new Type 16 Catch Basin and section of 15” RCP within an existing sidewalk/parking lot and associated pavement/sidewalk removal and replacement.
- 1.2.1. Contractor will provide construction work to the Beltline Campus located at 316 South Beltline Blvd. Columbia, SC 29205, as described in this paragraph, the referenced drawings and specifications, as directed by Owner/Operations Department. Work will include but not be limited to:
 - 1.2.1.1. Remove and replace existing asphalt parking and concrete sidewalk, curb and gutter as necessary to install a new Type 16 Catch Basin, and associated 15” RCP. Work will also include video inspection of existing roof drain line in this area.

2. PERSONNEL:

- 2.1. The Contractor is fully responsible for the performance and conduct of his employees at all times while on MTC campuses. The Contractor shall be responsible for selecting personnel who are well qualified to perform the required services, for supervising techniques used in their work and for keeping them informed of all improvements, changes, methods of operations.
- 2.2. The Contractor shall not allow any employee to perform work under this contract while under the influence of alcohol, drugs, or any other incapacitating agent. Use of any possession of alcoholic beverage and / or illegal drugs is prohibited on all State property. Violators will be dealt with according to law.
- 2.3. All personnel employed by the Contractor or any representative of the Contractor entering the site(s) shall comply with all security regulations which may be in effect during the contact period and shall be subject to such checks as may be deemed necessary. The Owner has authority to bar an individual from entry onto the site. Such action by the Owner shall not excuse the Contractor from fulfilling all requirements under this contract and shall not be the cause of any claim for additional compensation by the Contractor or claim by the individual.
- 2.4. No weapons of any type (guns, rifles, etc.) are brought on site or any MTC College property.

3. UTILITIES

- 3.1. When available, the Owner will provide utilities for use by the Contractor. The Contractor will provide for all connections, extensions, adaptations, and safety precautions needed in these connections. Utilities in this paragraph are limited to: (1) electrical, (2) water, (3) sanitary, and (4) storm sewer (if applicable). Contractor shall use all appropriate conservation measures. Temporary power, when needed, shall be the Contractor's responsibility.

4. SCHEDULES:

- 4.1. If the scope of work or specifications require a schedule, a bar type progress chart will be submitted within 5 working days, identifying the proposed construction schedule. Thereafter a revised chart should be submitted as least every two weeks identifying the original schedule, amended schedule (if any) as well as completed work.

5. OWNER'S USE OF PREMISES

- 5.1. The Owner may continue to use the areas adjacent to the Work site for their intended purpose. The walk paths, sidewalks, and parking areas in the area of the project must be kept clear of materials, dirt, debris, etc., to allow for College traffic. If this is not possible, an approved alternate route of travel must be provided by the Contractor.
- 5.2. Occupancy of buildings: The building(s) will remain occupied during the work. The Contractor is responsible for taking necessary precautions to protect building, contents and personnel from damage to injury from their operations and from water entry into building during operations.
- 5.3. Any requests received by the Contractor from occupants to change the sequence or work must be referred to the Owners project manager for determination. No changes will be made unless agree in writing by both the contractor and Owner prior to the execution of any agreed upon changes to work sequence.

6. CONTRACTOR'S USE OF PREMISES

- 6.1. No job sign is required. If indicated on the Campus Map, furnish and install material delivery signs as shown. Signs shall be of approved size and color with lettering of approved style and contrasting color so as to be easily visible and readable.
- 6.2. An on-site Construction Office is not required for this work.
- 6.3. Contractor's personnel shall use Contractor provided facilities (toilet, water, vending and break) for all workers.
- 6.4. See Campus Map for site access and Contractor parking. Trucks may not drive on campus sidewalks. Except for permitted deliveries to the facility, and vehicles used in pursuit of

the work (as opposed to transport of personnel or materials), vehicles of Contractor and Contractor's personnel shall park only in the area designated.

- 6.5. Lay-Down Areas: Prior to beginning operations, Contractor shall obtain approval of Owner for areas to be used as material storage, hoisting, holding, dumping, porta-pots, etc. Work will be restricted to approved locations.
- 6.6. Dumpsters located on the College Campuses are not for the disposal of construction debris. The Contractor shall be responsible for the disposal construction materials unless specified otherwise in the scope of work.
- 6.7. Contractor may work on the premises at any time. The Owner will be notified in writing if work is planned after normal working hours, on weekends or on holidays. Normal work hours are 7:00 AM until 5:00 PM. Work bid on a lump sum price will include a scheduled completion date and the contractor will be responsible for completing the work by the scheduled date at the bid price unless the Owner causes a delay which must be agreed in writing when a change or delay is made to the contractor.
- 6.8. Excessively noisy operations shall not be conducted between 8:00 am and 10:00 pm, and otherwise as required by the Owner from time to time. Work at times other than Owner's normal work hours shall be coordinated in advance so the Owner may notify appropriate parties.
- 6.9. The Contractor shall schedule utility interruptions with Owner at least 48 hours in advance. Scheduled interruptions shall be at the Owner's convenience. Do not interrupt any utility service without prior approval for each specific instance. Reschedule any interruption which must be handled other than as originally coordinated.
- 6.10. Before starting excavation, establish location and extent of underground utilities occurring in the area where digging will occur by careful hand excavation.
- 6.11. Immediately report damage to any existing utility encountered. Repair all damage to any active utility. Repair shall be handled as an emergency unless approved by the Owner for handling otherwise. The Contractor shall be responsible for all damage to all underground utilities.

7. DIFFERING SITE CONDITIONS:

- 7.1. The Contractor must promptly and before the conditions are disturbed, notify the Owner in writing of any of the following:
- 7.2. Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract document and the contract specifications and drawings.
- 7.3. Previously unknown physical conditions at the site of an unusual nature differing materially from those which may be ordinarily encountered and generally recognized as inherent in work of the character required in this Contract. The Contractor shall take proper measures to prevent damages to underground utilities located in the area of this

project. The Contractor shall contact the Owner prior to penetrating the ground for a utility location check.

- 7.4. The Owner will promptly investigate the conditions. If the conditions are found to differ materially from those indicated or anticipated and will cause a change in the date of completion of the work quantity of materials called for in the work of this contract, the Contractor will be entitled to an equitable adjustment.
- 7.5. No claims for adjustment under the previous clause will be considered after completion of the work or following application for payment.
- 7.6. Parking Limitations: Contractor is to confine his operations at the site(s) to only those designed parking areas. There may not be adequate parking for Contractor and his personnel at each site(s).
 - 7.6.1. The Contractor shall not park on the grass or block entrances/exits to buildings. The Contractor will be held responsible for damage to shrubs, lawn and landscape damaged by their personnel. Temporary parking permits are required and will be provided by Operations or Campus Police.

8. EXIT DOOR ACCESS AND EMERGENCY EGRESS

- 8.1. The Contractor shall keep fire exits free of obstructions at all time. When work occurs within the exit access corridors or within the exit itself, alternate routes for emergency exiting shall be identified by the Owner and appropriate temporary signage posted by the Contractor for the duration of exit access interruption.

9. INSURANCE

- 9.1. Contractor shall add the following wording to their Liability Insurance as required by the State of South Carolina and Midlands Technical College. *“Midlands Technical College, including its current and former trustees, officers, directors, employees, volunteer workers, agents, assigns and students.”*

10. MATERIALS

- 10.1. Unless specified otherwise, all materials incorporated into the work shall be new and of first quality.
- 10.2. The Contractor shall closely coordinate all deliveries. Owner will not be responsible for any material delivered to Owner or for any charges arising from Owner's acceptance or refusal of deliveries.
- 10.3. The Contractor shall coordinate deliveries of significantly large, dangerous or otherwise unusual materials with Owner beforehand.
- 10.4. The Contractor shall store materials in a manner that will properly protect them from all contamination and hazards until used or removed from site. Labeled materials shall be

kept in original containers until used.

- 10.5. The Contractor shall handle materials in such a manner as to deliver them to the point of use free of all damage, contamination, corrosion, etc.
- 10.6. In handling, storing, and/or disposing of any materials or chemicals considered hazardous or dangerous by South Carolina Department of Health and Environmental Control (SCDHEC), Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), or National Fire Protection Agency (NFPA) and where these governing bodies require special handling, storage, or disposal of the material or chemical, abide by the procedures set forth by the governing body. If the material or chemical is encountered by demolition, excavation, or accident, and the Bidding Documents did not indicate its presence, or probable presence, immediately notify the Owner and proceed as directed. In such an event compensation will be handled by Change order.
- 10.7. The Contractor shall not order/purchase materials, equipment or products that are required to be submitted for Owner/Architect review. Submittals will be specified by the Owner/Architect and must be approved in writing before the Contractor procures the items identified in the submittal listing. It is the Contractor's responsibility to ensure the timeliness of the submittal process allowing adequate time for the Owner to review and approve the submittal documents.

11. SAFETY

- 11.1. Vehicles are to be locked when parked and unattended. Do not leave vehicles or equipment unattended with motor running or ignition keys in place.
- 11.2. Do not leave tools, materials, or trash unattended, unless secured in a safe manner.
- 11.3. Open fires are prohibited.

12. SECURITY

- 12.1. Contractor personnel are to limit fraternization with faculty, staff and students to the work of this Contractor only as necessary to coordinate activities of this Contract.
- 12.2. The Contractor is required to keep the site safe from intrusion(s) by public or College personnel. The Contractor shall notify the Owner immediately of unsafe conditions and incidents. Contractor's employees will not fraternize with occupants. If a problem occurs with a particular occupant the Contractor shall contact the Owner's designated representative.
- 12.3. The Owner and Occupants are not responsible for equipment, tools or materials lost from the result of being left unattended, misplaced or unsecured. Contractor's materials and tools are subject to theft. It is suggested that materials be kept in one location where practical and under lock and key.

13. SUBMITTALS

- 13.1. Submittals will be required by the technical sections of the design documents issued to the Contractor by the Owner in the contract documents. This paragraph governs the form of the required submittals.
- 13.2. Make submittals of shop drawings, product data, samples and other items required by the Contract Documents in accordance with the provisions of this paragraph, and revise and resubmit as necessary to establish compliance with the specified requirements. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted. Verify that each item, and the submittal for it, conform in all respects with the specified requirements. Determine and verify field measurements, field construction criteria, catalog numbers and similar data, and conformance with specifications. By affixing the contractor's signature to each submittal, certify that this coordination has been performed.
- 13.3. Begin no fabrication or work which requires submittals until return of submittals with Architect's approval.

14. SHOP DRAWINGS

- 14.1. Shop Drawings will be submitted for approval when required by the technical section(s) of the contract documents.
- 14.2. Shop Drawings will include fabrication, erection, and setting drawings, schedule drawings, manufacturer's scale drawings, wiring and control diagrams, cut sheets of products, entire catalogs, pamphlets, descriptive literature, and performance and test data.
- 14.3. Shop Drawing(s), other than printed materials, (i.e. catalogs, pamphlets, etc.) shall be submitted in form approved by Owner. Upon approval, any reproducible shop drawing will be returned to the Contractor, who will then distribute to subcontractor(s) and manufacturer(s) as necessary and two "approved" print copies to Owner.
- 14.4. The Contractor shall allow ten working days for approval of all shop drawings. Sprinkler shop drawings, if applicable to the project, should be submitted to the Division of State Fire Marshall for their review and approval as required by codes and laws.
- 14.5. Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
- 14.6. If not specified otherwise for a particular item or a particular division in the technical specifications submit shop drawings in the form of one sepia transparency of each sheet. Blueprints only will not be acceptable. Review comments by the Architect will be shown on the sepia transparency when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purpose.

15. MANUFACTURERS' LITERATURE (PRODUCT DATA)

- 15.1. The Contractor shall clearly show which portions of the data sheet contents are being submitted for review, especially when contents of submitted literature from manufacturers includes data not pertinent to the submittal.
- 15.2. The Contractor shall modify the manufacturer's standard schematic drawings and diagrams to delete information that is not applicable to the Work. Supplement standard information to provide information specifically applicable to the Work.
- 15.3. If not specified otherwise for a particular item or a particular division in the technical specifications, submit the number of copies that are required to be returned, plus two copies that will be retained by the Architect. Coordination Drawings: Coordination Drawings are required where work of trades involves scheduling sequences of materials, finishes or testing when necessary for proper coordination of trades, timely progress of the work or necessary sequencing of work by time, by area or by trade for the convenience of the occupants, if indicated by the Owner.

16. SAMPLES

- 16.1. If not specified otherwise for a particular item or a particular division in the technical specifications, submit required samples, free of all charges and encumbrances, at the Architect's office, the Owner's office, the project site, or the Owner's warehouse, as arranged with the Architect in each instance. Sample shall be accurate in every detail as a representation of the finished article in the Work, and shall be retained by the Architect for duration of the Work. Upon completion, arrange to have the sample picked up at no expense to the Architect or to the Owner and removed from the Architect's or Owner's premises.
- 16.2. The Contractor shall accompany each submittal with a letter of transmittal showing all information required for identification and checking, and listing all deviations from the requirements of the Contract Documents. Also list all changes in the Work required to accommodate any deviations proposed in the submittal.
- 16.3. Approval by the Architect does not relieve the Contractor from responsibility for errors that may exist in the submittal, or for deviations which are not specifically listed prior to approval.
- 16.4. Any changes in the Work required to accommodate deviations from the Contract Documents shall be made at no additional cost to the Owner unless specifically approved by a Change order issued in conjunction with approval of the deviation
- 16.5. The Contractor shall deliver all submittals to the Architect for consideration as soon as possible after award of Contract.
- 16.6. The Contractor shall make submittals of all related materials and equipment at the same time.

17. WORKMANSHIP

- 17.1. State design and construction must comply with the codes and standards, along with their published errata and other requirements listed in this Chapter. If there is any conflict between the codes, standards, and/or regulations listed herein, the more stringent requirement controls. Designers and Agency reviewers should ensure they have the latest errata for indicated editions to International Codes, other codes and standards.
- 17.2. Codes editions in force at the time of first submittal govern throughout the project, unless: (1) Otherwise permitted by OSE; or (2) Design is delayed for more than 6 months and OSE adopts editions that are more current in the interim. No project may use a code that is older than one previous adopted edition.
- 17.3. In accordance with SC Code Ann §§ 1-34-10 thru 70 & § 10-1-180, OSE has adopted the following codes:
- A. International Building Code (IBC), 2015 Edition,
 - B. International Existing Building Code (IEBC), 2015 Edition,
 - C. International Fire Code (IFC), 2015 Edition,
 - D. International Energy Conservation Code (IECC), 2009 Edition,
 - E. International Fuel Gas Code (IFGC), 2015 Edition,
 - F. International Mechanical Code (IMC), 2015 Edition,
 - G. International Plumbing Code (IPC), 2015 Edition, with the following insertions:
 - 1. Section 305.4.1, insert “18” and insert “18”
 - 2. Section 903.1, insert “8”
 - H. International Private Sewage Disposal Code (IPSDC), 2015 Edition,
 - I. International Property Maintenance Code (IPMC), 2015 Edition,
 - J. International Residential Code for One and Two Family Dwellings (IRC), 2015 Edition, with the following insertions: 1. P2603.5.1, insert “12” and insert “24”
 - K. International Wildland – Urban Interface Code (IUWIC), 2015 Edition,
Note: The IUWIC does not supersede existing statutory requirements.
 - L. International Code Council Performance Code (ICCPC), 2015 Edition, upon State Engineer’s approval.
 - M. International Swimming Pool and Spa Code (ISPSA), 2015 Edition,
 - N. Standard for Bleachers, Folding and Telescopic Seating, and Grandstands, ICC 300-2015 Edition
 - O. National Electrical Code (NEC) [NFPA-70], 2014 Edition
 - P. National Electrical Safety Code, IEEE-C2-2012 Edition
 - Q. Latest edition of the American National Standards Institute, Inc. (ANSI) document A117.1, Accessible and Useable Buildings and Facilities. Note that this standard is the standard adopted by the South Carolina Accessibility Act but this requirement does not relieve the Agency or the design professional from the Federal Statutory requirements that design and construction comply with the Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities. See <http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/ada-standards>
 - R. State Fire Marshal rules, regulations, and policies. See <http://www.scfiremarshal.llonline.com>

S. South Carolina Elevator, Code, & Regulations.^[1]: See

<http://www.llr.state.sc.us/Labor/ElevatorAmusement/index.asp?file=bungee.htm>

T. State of SC Telephone Equipment Room and Communications/Data Systems Policies as formulated by the Division of State Information Technology (DSIT).

U. Governors executive Order No. 82-19 (April 1982) – State of SC Building Standards in Floodplain Areas.

V. The South Carolina Modular Buildings Construction Act S.C. Code § 23-43-10 et. Seq.

17.4. All items shall be installed in a workmanlike manner in accordance with best-recognized practice in the field concerned. Manufactured items shall be installed in strict accordance with manufacturer's printed directions, specifications, and/or recommendations for an installation of highest quality. All working parts shall be properly adjusted after installation and be left in perfect working order. Unless otherwise indicated, items exposed to weather, or subject to flooding or wetting shall be installed so as to shed and not hold water. Items shall in all cases be installed plumb and true and/or in a proper relationship to surrounding materials.

17.5. The State Engineer shall determine the enforcement and interpretation of all the codes and referenced standards on State Buildings.

18. PROGRESS INSPECTIONS

18.1. The Contractor shall notify Architect prior to covering up any work. Provide adequate time notification for an inspection with the Architect's representative.

18.2. The Contractor shall provide labor, tools, and materials for immediate correction of any discrepancy noted at the time of the inspection.

18.3. The Contractor shall correct deficiencies and have the work found deficient re-inspected prior to covering up the work inspected.

19. RECORD DOCUMENTS

19.1. Contractor shall maintain one set of plans and specifications onsite in a secure area that is protected from deterioration or loss. Job set of blue or black line white-prints of contract drawings, shop drawings shall be kept clean and undamaged and presentable for scanning/reproduction. The Contractor shall provide access to the record documents for the Architect and Owner's reference during normal working hours.

19.2. Record Product data and Record Maintenance Manuals collectively shall show name, address and telephone number (if available) of the manufacturer and supplier of every non-generic item used in the Work, as well as the names, addresses, telephone number,

and person to contact for every subcontractor, fabricator, and supplier used in the Work, together with the **specific** nature of the work performed or supplies furnished by each. One complete set of approved Record Product data submittals will be required. Three sets of Maintenance Manuals will be required; two shall be complete but the third need not duplicate submittals in the record product data submittal.

- 19.3. Mark the job set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where shop drawings are used, record a cross-reference at the corresponding location on the contract drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. **Post changes within 24 hours, or before work is covered up.** Mark job sets with colored erasable pencil; use various colors to distinguish between variations in separate categories of the work. Mark new information that is important to the Owner, but was not shown on contract drawings or shop drawings. Note related change order numbers where applicable. As-built drawings include but are limited to; site work, civil, architectural, mechanical, electrical, plumbing, fire protection, communication, ventilation, etc.
- 19.4. Show job set of record drawings, by dimension accurate to within one inch, the actual location of all elements of the Work (such as but not limited to piping, conduit, terminal boxes, etc.) concealed underground or in construction, referenced to visible and accessible features of the structure or permanent surface improvements. Include items above ceilings. Clearly identify the item by accurate note.
- 19.5. The Architect and/or Owner will inspect the final as-built drawings for accuracy and neatness.
- 19.6. If changes to the as-built drawings are required, the Architect and/or Owner will return them to the Contractor with a list of the required changes. Make required changes and promptly deliver the final project record drawings to the Architect/Owner.
- 19.7. Maintain one complete copy of the project manual, including addenda, and one copy of other written construction documents such as change orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the rest of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawings information and product data. Upon completion of the Work, submit record Specifications to the Architect/Owner for the Owner's records.
- 19.8. Maintain one copy of each product data submittal. Mark these documents to show significant variations in the actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change orders and mark-up of record drawings and Specifications. Upon completion of mark-up, submit complete set of record Product data to the Architect/Owner for the Owner's records.

- 19.9. These requirements shall be observed as minimum requirements for maintenance manuals required in this and other sections of the specifications. Additional requirements imposed by other sections shall be observed as to the specific section by which imposed. The requirements imposed by this and other sections do not require separate sets of manuals in order to satisfy both; submit the minimum number of manuals required to comply with the most demanding and include all information needed to comply with both.
- 19.10. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 3-ring vinyl-covered binders of proper capacity, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
- A) Manufacturer's name and address,
 - B) Supplier's name and address,
 - C) Model number of each item included,
 - D) All nameplate data for each item; identify item by use/location for each nameplate for multiple items; show for each nameplated component of item,
 - E) Spare parts list,
 - F) Copies of warranties,
 - G) Wiring diagrams,
 - H) Shop Drawings and Product data,
 - I) Fixture lamping schedule,
 - J) Filter schedule,
 - K) Inspection procedures,
 - L) All applicable maintenance procedures,
 - M) All recommended maintenance cycles,
 - N) All operating procedures, and
 - O) Emergency instructions.
- 19.11. Provide three copies of each maintenance manual including all such pertinent information as is applicable, collectively including each item of equipment or material installed in the Work which can be operated and/or maintained, or, if non-generic, replaced.

20. CLEANING

- 20.1. Store items in an orderly arrangement and in a place suitable to the Owner. Daily, and more often if necessary, restack, tidy, or otherwise service stored materials to maintain orderly arrangement.
- 20.2. Maintain the site in a neat and orderly condition at all times. Do not allow accumulation of scrap, debris, waste material, or other items not required for this work.
- 20.3. Provide suitable containers for trash of any nature generated by the Contractor's operations or his personnel and dispose of said trash daily. Immediately recover any such trash carried or blown beyond the site of the work. Owner's trash cans and dumpsters are not for Contractor's use. All waste materials and trash shall be disposed of off-campus.
- 20.4. Contractor's personnel shall ensure their routes of travel and College-owned facilities,

especially sidewalks, floors, door handles, fixtures, etc., are not inordinately fouled by substances such as grease, mud, tar, etc., which makes use of the facility less pleasant for others. Immediately clean up any such substances resulting from Contractor's presence. Cleaning by Owner, if necessary, will be done without further notice. Damage which requires a special effort on the Owner's part to clean up, repair, or replace will be at the Contractor's expense.

- 20.5. Remove all leftover materials, waste, scrap and debris generated by Contractor or his personnel.
- 20.6. Remove all traces of soil, grease, mastic, waste materials, adhesives, dust, dirt, and other foreign materials from sight-exposed surfaces.

21. PROTECTION OF EXISTING PROPERTY

- 21.1. The Contractor shall be responsible for all damages caused by the Contractor, the Contractor's subcontractors, or the Contractor's or subcontractors' suppliers, suppliers' shippers, and/or delivery men to trees, shrubs, sod, soil, utilities, buildings, sidewalks, gates, roadways, bodies of water, or any other property of the Owner.
- 21.2. The Contractor shall remedy damages by returning the property to its "pre- construction" state. Any College property damaged shall be repaired, reconstructed, or replaced by the Contractor or at the Contractor's expense to quality standards set by the Architect.
- 21.3. Damages which disrupt the Owner's conduct of business or the usefulness of Owner's facilities which remain in use during the term of this Contract shall be repaired immediately, as an emergency, or as otherwise approved by the Owner,
- 21.4. If the Contractor does not diligently pursue repairs to damaged property, the Owner may pursue repairs by the Owner's own forces or by another contract. All costs incurred by the Owner pursuant to such repairs will be passed on to the Contractor by Change order.
- 21.5. The Architect shall make the final determination as to the acceptability of the results of any action necessary by the Contractor to return the property to its "pre- construction" state.
- 21.6. Guarantee under the Contractor's General Warranty any property replaced or repaired by the Contractor.

22. OPERATING AND MAINTENANCE INSTRUCTIONS

- 22.1. Prior to Substantial Completion arrange for each installer of equipment that requires operation or regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Provide adequate time for proper instruction. Do not short-schedule too many too close together. Include a detailed review of each of the following items which is applicable:

- A) Maintenance manuals,
- B) Record documents,
- C) Spare parts and materials,
- D) Tools,
- E) Lubricants,
- F) Fuels,
- G) Identification systems,
- H) Control sequences,
- I) Hazards,
- J) Cleaning,
- K) Warranties and bonds,
- L) Maintenance agreements and similar continuing commitments, and
- M) Other items/matters applicable to the item in question.

22.2. As part of instruction for operating equipment, demonstrate each of the following procedures which is applicable:

- A) Start-up,
- B) Shut down,
- C) All operating adjustments and procedures,
- D) All maintenance procedures,
- E) All diagnostic procedures,
- F) Emergency operations,
- G) Safety procedures,
- H) Noise and vibration adjustments,
- I) Economy and efficiency adjustments,
- J) Effective energy utilization, and
- K) Other procedures applicable to the item in question.

23. SUBSTANTIAL COMPLETION

- 23.1. Substantial Completion requires all materials and equipment to be installed and operational to the extent the Owner can use the Work for its intended purpose.
- 23.2. When the Contractor feels the project is substantially complete, the Contractor shall notify the Architect and the Owner in writing.
- 23.3. Within a reasonable time after receipt of the list, the Architect will inspect to determine status of completion.
- 23.4. Should the Architect determine that the work is not substantially complete the Architect promptly will so notify the Contractor.
 - 23.4.1 The Contractor shall remedy the deficiencies and notify the Architect when ready for re-inspection.
 - 23.4.2 The Architect will re-inspect the Work.

23.5. When the Architect concurs that the work is substantially complete:

23.5.1 The Architect will prepare a "Certificate of Substantial Completion" on AIA Form G704, accompanied by the Contractor's list of items to be completed or corrected, as verified by the Architect.

23.5.2 The Architect will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

24. FINAL COMPLETION

24.1. Final Completion shall be achieved no later than thirty (30) days after Substantial Completion, unless a later date is established on the Certificate of Substantial Completion.

24.2. When the Contractor corrects all deficiencies on the punch list generated from the Substantial Completion Inspection Section above, the Contractor shall notify the Architect and Owner in writing.

24.3. Before notifying the Architect of Final Completion status, certify that:

24.3.1 The Contract Documents have been reviewed.

24.3.2 Work has been inspected for compliance with the Contract Documents.

24.3.3 Work has been completed in accordance with the Contract Documents.

24.3.4 All systems have been tested and are operational.

24.3.5 Work is completed and ready for final inspection.

24.4. The Architect will make an inspection to verify status of completion.

24.5. Should the Architect determine that the work is incomplete or defective:

24.5.1 The Architect promptly will so notify the Contractor.

24.5.2 The Contractor shall remedy the deficiencies promptly, and notify the Architect when ready for re-inspection.

24.5.3 The Architect will re-inspect the work.

24.6. When the Architect determines that the work is acceptable under the Contract Documents the Architect will request the Contractor to make closeout submittals.

25. CLOSEOUT SUBMITTALS

25.1. Before applying for **final** payment, furnish to the Owner:

25.2. A hard-backed binder (3-hole punch/tabbed binder) containing the following:

A) a typewritten materials list, in triplicate, showing every manufacturer item/material used in the job. Include catalog number, manufacturer's name and address, distributor's name and address. Type lists neatly and index according to respective specification

sections of work,

- B) a list of all subcontractors, including fabricators, used in the work, and the nature of the work performed by each. Show company name, address, and telephone number. If Company has more than one office, show data for the office handling the work and the home office,
- C) a properly executed Contractor's General Warranty form, and
- D) all other warranties, forms, certifications, and other documents required by the technical specifications.

25.3. Project Record Documents described within these General Requirements.

25.4. All keys and control or security components that are not a permanent part of installed equipment.

26. WARRANTY

- 26.1. The Contractor warrants to Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.
- 26.2. The period of the warranty shall be for one year (365 calendar days) from the date of Substantial Completion for all work described in the contract documents and any approved change orders. The Contractor is required to honor any special warranties which may be required in the scope of work as described in the specifications and contract documents.

SECTION 311000 - SITE CLEARING

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 above- and below-grade site improvements.

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. 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.
- C. 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 1 inch in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

- A. Cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 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 demo activities.

1. Contractor to take detailed photographs or videotape of any damage to existing pavement/curb etc. that may existing within project area.

1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project Site.

1.7 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.
- B. Utility Locator Service: Contractor to include private utility locate for area where excavation will occur prior to beginning construction.
- C. 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.
- D. Do not direct vehicle or equipment exhaust towards protection zones.
- E. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- F. 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.

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. Flag 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 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

3.3 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. Neatly saw-cut along line of existing pavement at existing joints to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.4 DISPOSAL OF SURPLUS AND WASTE MATERIALS

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

END OF SECTION 311000

SECTION 321313 – CONCRETE WALKS, CURB, & PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. SCDOT Standard Specifications, Latest Edition.

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
 - 1. Sidewalks
 - 2. Curbs and gutters.

1.3 SUBMITTALS

- A. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Perform Concrete Work in accordance with SCDOT Spec Section 720.
- C. Contractor performing Concrete installations must meet the Qualifications noted in bid manual.

1.5 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. SCDOT Qualified Manufacturer of Concrete. Batch and Mix concrete in accordance with SCDOT Section 701.

2.2 FORMS

- A. Forms to be in accordance with SCDOT Standard Specification 720.4.2. for Concrete sidewalk and curb. Forms for Concrete pavement to be in accordance with SCDOT Standard Specification 501.3.8.
- B. In lieu of wood or metal forms, curb may be placed by a curb extrusion or slip form machine. Construct expansion and contraction joints at the same locations as required when form construction is used. Make contraction joints, spaces at 10 ft intervals, by cutting the concrete with a trowel or by other means to ensure the joints has a workmanlike finish after edging.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland Cement: per SCDOT Standard Specification 701.2.1
 - 2. Normal-Weight Aggregates: per SCDOT Standard Specifications SC-M-501.
- B. Water: SCDOT Specification 701.2.11.
- C. Air-Entraining Admixture: In accordance with SCDOT Specification 701.2.5.1.

2.4 CURING MATERIALS

- A. Liquid membrane-forming compounds meeting the requirements of SCDOT Section 702.2.2.11.

2.5 CONCRETE MIXTURES

- A. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Concrete Walks and Curbs and Gutters: Class 3000 per SCDOT Table 701.2.12.2.
 - 2. Concrete Pavement: Class 4000 per SCDOT Table 701.2.12.2.
- B. Add air-entraining admixture per SCDOT Specifications.
- C. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use plasticizing and retarding 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.

2.6 CONCRETE MIXING AND PLACING

- A. Batch and mix the concrete in accordance with SCDOT Section 701.
- B. Construct concrete curbs and curb and gutter in uniform 10 ft. sections, except where shorter sections are necessary for closure. Ensure that no section is less than 4 feet. Separate the sections by sheet steel templates or dividing plates set normal to the face and top of curb. Carefully set the plates during the placing of concrete and keep in place until the concrete has set sufficiently to hold its shape. Remove the plates while the forms are still in place.
- C. Deposit concrete in forms so that the forms do not displace out of grade or alignment. During placing operations, spade or vibrate the concrete throughout the entire mass and especially against forms and joints. Tamp, float, trowel, broom, edge, and finish the surface of the concrete to the typical section, lines, and grades as soon as practicable after the placing of concrete.
- D. Extruded or Slip Form Curb may be used in lieu of wood or metal forms. Construct expansion and contraction joints at the same locations as required when form construction is used. Make contraction joints, spaces at 10 ft intervals, by cutting the concrete with a trowel or by other means to ensure the joints has a workmanlike finish after edging.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances. Recompact subgrades after existing concrete has been removed.

3.2 PREPARATION FOR SIDEWALKS AND CURB

- A. Thoroughly compact the subgrade and finish to a smooth, firmly compacted surface, which is moist at the time the concrete is placed. In areas where it is impractical to use standard type rollers, compact by vibratory hand compactors. Remove and replace any concrete that settles or cracks after placement due to poor compaction at no expense to the Owner.

3.3 CONCRETE PAVEMENT PLACEMENT

- A. Place concrete pavement to allow continuous placement for the working period.

- B. Deposit concrete in a manner requiring as little handling as possible. Do not allow workers to walk on fresh concrete with footwear coated with earth or foreign matter.
- C. Take precautions to prevent segregation of the concrete ingredients while being placed. Provide baffles or other equipment in the discharge end of depositing equipment if necessary.
- D. Place concrete over and against the joints to ensure that joints, dowel bars, and/or load transfer assemblies are retained in correct position.
- E. Thoroughly consolidate concrete against the face of all forms and joints, including against previously constructed pavement, by means of vibrators inserted into the concrete. Do not permit vibrators to contact a joint assembly, the grade, or side form. Do not operate the vibrator more than 15 seconds in any one location. Do not operate the vibrator in a way that brings excess mortar to the surface or causes segregation in the mix. Use vibrators that meet SCDOT section 501.3.9.2.
- F. Do not place concrete around a manhole or structure until it has been adjusted to proper grade or alignment and keep the casting surrounded by preformed joint material.
- G. Repair or replace any damage caused by the operation of mechanical equipment on existing pavement at no cost to the Owner. If concrete material falls on or is worked into the surface of a completed slab or existing pavement, remove the material immediately.
- H. In order that the concrete be properly protected against the effects of rain before the concrete is sufficiently set, have available at all times the necessary material for the protection of the surface and edges of fresh concrete. When rain appears imminent, cease all paving operations and direct personnel to begin placing materials to protect the fresh concrete. Immediately after rain ceases, if any damage occurs, make all repairs to pavement caused by a rain event.

3.4 JOINTS FOR SIDEWALKS

- A. Expansion Joints: Ensure that preformed expansion joints are $\frac{3}{4}$ inch thick and extend the full depth of the concrete. Construct joints at the following locations:
 - 1. Wherever a sidewalk is constructed between an adjoining structure on one side and curbing on the other side, form an expansion joint adjacent to the curbing.
 - 2. Place an expansion joint between the sidewalk and the radius curbing at street intersections.
 - 3. Where existing structures such as light poles, bases, fire hydrants, etc. are within the limits of sidewalk or curb.
 - 4. Where concrete sidewalks are constructed adjacent to existing or new concrete pavement or structures, place a transverse expansion joint in the sidewalk opposite such joints in the concrete pavement or structure.
 - 5. Place expansion joints at intervals of not more than 100 feet in all concrete.
- B. Contraction Joints:
 - 1. Divide concrete slabs in sidewalks between expansion joints into square blocks equal to sidewalk width (i.e. 6' wide sidewalk to have joints every 6' in length), by scoring transversely after floating operations are complete. Where the sidewalk slabs are more than 10 feet in width, score them longitudinally in the center. Extend transverse and

- longitudinal scoring for a depth of 1 inch and not less than ¼ inch or more than ½ inch in width. Edge and finish joints smooth and true to line.
 2. Form weakened-plane contraction joints, sectioning concrete into areas as indicated above for curb and gutter.
- C. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.5 JOINTS FOR CONCRETE PAVEMENT

- A. Construct longitudinal and transverse joints at all locations and in accordance with the dimensions and other requirements shown on the plans. Cut all joints using a diamond-bladed saw; parting strips and tools are not acceptable.
- B. Longitudinal Joints
1. Construct longitudinal joints (sawed) in all concrete pavement 16 feet or more in width. Use suitable guides or devices to ensure cutting the joint on the true line shown on the plans. Saw the longitudinal joint before the end of the curing period, or immediately thereafter, and before equipment is allowed on the pavement. Seal the joint in accordance with SCDOT section 501.4.14.
- C. Transverse Contraction Joints
1. Construct transverse contraction joints to the dimensions, lines, and spacing shown on the plans. Only sawed transverse contraction joints are permitted.
 2. Establish sawed joints by sawing grooves in the surface of the pavement with an approved concrete saw. After each joint is sawed, clean the saw cut and adjacent concrete.
 3. Commence sawing of the joints as soon as the concrete has hardened sufficiently, usually 4 to 6 hours after placement.
 4. Continue sawing until all joints in the days paving have been sawed, regardless of time and weather conditions.
 5. If uncontrolled cracking is observed due to late sawing, replace the pavement at no cost to the Owner.
- D. Expansion Joints
1. Construct expansion joints of the type specified, at the locations shown on the plans, or as directed by the field engineer.
 2. Use expansion joint filler that is continuous from form to form and shaped to the subgrade along the form. Furnish preformed joint filler in lengths equal to the pavement width. Do not use damaged or repaired joint filler.
 3. Ensure that expansion joint filler is held in position normal to the surface. Use and approved installing bar or other device to secure preformed expansion joint filler at the proper grade and alignment during placing and finishing of concrete. Allow finished joints to deviate not more than ¼ inch in the horizontal alignment from a straight line. Plugs of concrete are not allowed anywhere within the expansion space.

3.6 CONCRETE PAVEMENT FINAL STRIKE OFF, CONSOLIDATION, AND FINISHING

- A. Contractor to Consolidate, Float, and Finish Concrete Pavement in accordance with SCDOT specification 501.4.10.

3.7 CONCRETE WALK/CURB PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Protect the concrete as specified in SCDOT Section 702.4.6 and cure with liquid membrane-forming compound meeting the requirements of SCDOT Section 702.2.2.11.

3.8 CONCRETE PAVEMENT CURING

- A. Immediately after the finishing operations are complete and immediately after the surface water has disappeared, cure the entire surface of the pavement by mechanically applying a uniform coating of white-pigmented curing compound.
- B. If the compound is not applied immediately, keep the surface thoroughly wetted with water fog until the application of compound is started. Protect joints so that the compound does not enter the joint.
- C. Apply the compound in a continuous uniform film by means of a power operated pressure spraying or distributing equipment at the approved rate, but not less than 0.06 gallon per square yard of surface. If the compound is too thick for application during cold weather, warm the material in water with a temperature not exceeding 100 degrees F. Do not thin the compound with solvents.

3.9 PROTECTION OF CONCRETE PAVEMENT

- A. Exclude all vehicle traffic from newly constructed pavement for a period of 14 days. Do not count the time during weather less than 40 degrees F.
- B. Erect and maintain suitable barricades to exclude traffic from the newly constructed pavement for the above mentioned period.
- C. If needed, place and construct an earth berm adjacent to any exposed pavement to prevent undermining of the pavement slab.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports. Testing agency to perform compressive concrete strength testing in accordance with SC-T-50.

- B. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- C. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed.
- D. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.
- C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 334100 - STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings.
 - 2. Manholes.
 - 3. Stormwater structures.
 - 4. Pipe outlets.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
 - 1. Manholes: Include plans, elevations, sections, details, frames, and covers.
 - 2. Stormwater Structures: Include plans, elevations, sections, details, frames, and grates.
- C. Field quality-control reports.
- D. Record Drawings: The Contractor shall furnish to the Architect/Engineer Record Drawings of the storm drainage system. This information shall be presented electronically using the electronic file of the Grading and Utilities Plan Sheets. Marked-up Construction Document drawings are not acceptable. Record Drawings shall include, but not limited to, the following:
 - 1. Surveyed locations and invert elevations, rims, throats and/or grate elevations of structures.. Also included shall be as-built topography of any detention ponds and outlet structures.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe, pipe fittings, and seals from dirt and damage.
- B. Handle stormwater structures according to manufacturer's written rigging instructions.

1.5 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Architect no fewer than two days in advance of proposed interruption of service.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Material as specified at Contractor option unless indicated otherwise.

2.2 CONCRETE PIPE AND FITTINGS

- A. Reinforced-Concrete Sewer Pipe and Fittings Pipe sizes 12”-48”:
 - 1. RCP per SCDOT Pipe Culvert Specifications and from an approved SCDOT manufacturer
 - 2. Class III, Wall B or Class IV if cover is less than 18” per SCDOT fill height tables.

2.3 MANHOLES

- A. Standard Precast Concrete Manholes:
 - 1. Description: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for sealant joints.
 - 2. Diameter: 48 inches (1200 mm) minimum unless otherwise indicated.
 - 3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
 - 4. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (102-mm) minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
 - 5. Riser Sections: 4-inch (102-mm) minimum thickness, and lengths to provide depth indicated.
 - 6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
 - 7. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
 - 8. Resilient Pipe Connectors: ASTM C 923 (ASTM C 923M), cast or fitted into manhole walls, for each pipe connection.
 - 9. Steps: ASTM A 615/A 615M, deformed, 1/2-inch (13-mm) steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls

- at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches (1500 mm).
10. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
 11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch (150- to 225-mm) total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch (610-mm) ID by 7- to 9-inch (175- to 225-mm) riser with 4-inch- (102-mm-) minimum width flange and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."
2. Material: ASTM A 48/A 48M, Class 35 gray iron unless otherwise indicated.

C. Built in Place concrete Brick Manholes: Built in place structures in accordance with SCDOT Standard Specification 719 and in accordance with SCDOT Standard Details.

2.4 STORMWATER STRUCTURES

A. Standard Precast Concrete Stormwater Structures:

1. Description: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (102-mm) minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 4-inch (102-mm) minimum thickness, 48-inch (1200-mm) diameter, and lengths to provide depth indicated.
4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
5. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
6. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 225-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
8. Steps: ASTM A 615/A 615M, deformed, 1/2-inch (13-mm) steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches (1500 mm).

B. Frames and Grates: See Plans

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling of Storm Drainage Piping to be in accordance with SCDOT Standard Specification SC-M-714, for the respective type of pipe used with the following exceptions:
 - 1. Backfill compaction testing will be in accordance with Geotechnical Report recommendations.
 - 2. Video Inspection will be required on the storm installation. After backfill, contractor to camera inspect all site storm drainage 15” and larger and provide digital copy to Engineer.

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install gravity-flow, nonpressure drainage piping according to SCDOT Specifications.

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to SCDOT Supplemental Technical Specification SC-M-714, latest edition.

3.4 MANHOLE INSTALLATION

- A. General: Install manholes and Catch Basins in accordance with SCDOT Standard Specification Section 719, latest edition.

3.5 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.6 FIELD QUALITY CONTROL

- A. Visually inspect 100% of pipe for fractures, cracks, spalling, chips, and breaks during all phases of the installation process. Inspect joints, including tongues and grooves. Inspect installed joints for missing, damaged, or improperly installed joint sealant or gasket. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Defects requiring correction include the following:

- a. Alignment: Less than full diameter of inside of pipe is visible between structures.
- b. Deflection: Flexible piping with deflection that prevents passage of 9-Fin Mandrel.
- c. Crushed, broken, cracked, or otherwise damaged piping.
- d. Infiltration: Water leakage into piping.
- e. Exfiltration: Water leakage from or around piping.

2. Replace defective piping using new materials, and repeat inspections until defects are corrected.

B. Video Inspect Storm drainage after backfill and Provide digital copy of video inspection to Engineer.

C. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

1. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (610 mm) of backfill is in place, and again at completion of Project.

3.7 CLEANING

1. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION 334100