CIVIL & LANDSCAPE ARCHITECTURE

ADDENDUM NO. ONE

FAIRFIELD COUNTY RECREATION, FIRE AND EMS STATION CAPITAL PROJECTS

FAIRFIELD COUNTY, SOUTH CAROLINA

PREPARED BY:

Kenneth B. Simmons Associates
2711 Middleburg Drive, STE 210
Columbia, SC 29204

DATE OF ISSUE: JULY 1, 2015

TO: ALL BIDDERS OF RECORD

This addendum modifies the Contract Documents only in the manner and to the extent stated herein and shown on any accompanying drawings and will become a part of the Contract Documents. Except as specified or otherwise indicated by this addendum, all work shall be in accordance with the basic requirements of the Contract Documents.

BIDDER SHALL ACKNOWLEDGE RECEIPT OF ADDENDUM IN THE SPACE PROVIDED ON THE BID FORM. FAILURE TO DO SO MAY CONSTITUTE INFORMALITY IN THE BID.

The following addendum consists of ten (10) pages plus the following attachments:

1. Revised Bid Tabulation Form/Microsoft Excel File.
2. Geotechnical Reports
    - District #1 Smallwood
    - District #4 Ladd
    - District #7 Genealogy
    - Ridgeway Fire Station
    - Ridgeway EMS Station
    - Jenkinsville Fire & EMS Station
3. Spec Section 32-2000 – Water Supply Wells, 19 pages.
4. Sheet 1C300 Grading Plan – Smallwood 1 page.
5. Sheet 13C300 Grading Plan – Jenkinsville Fire & EMS Station, 1 page.
6. LA-SKI - Pedestrian Asphalt Detail, 1 page.
7. CAD files – Via Dropbox Link, contractors can download CAD files to their use.

I. GENERAL DIVISION 0-BIDDING AND CONTRACTING REQUIREMENTS:

Item No. **Description**

1. **Miscellaneous Clarifications:**
The following is a list of civil and landscape architecture related questions that have been received for clarification:

1. Would it be possible to turn in the lump sum price at 2:00pm and the breakdown and unit prices later? The problem is we will not receive many of the prices until a few minutes before 2:00 pm making it impossible to fill out a 17 page bid form.

THE PROJECT IS A UNIT PRICE BID – NOT HAVING THE UNIT PRICES WOULD MAKE THE BID DIFFICULT TO ANALYZE. WE MUST HAVE THE UNIT PRICES.

2. Where in the breakdown of costs should the allowances be included? A LINE ITEM IS INCLUDED IN REVISED BID TABULATION SHEETS FOR THESE.

3. Table of Contents lists Geotech reports but they are not included in spec's. Are they available? GEOTECHNICAL REPORTS INCLUDED THIS ADDENDUM ONE SEE ATTACHMENTS.

4. Are construction fences required for each job site? CONSTRUCTION FENCES ARE NOT REQUIRED FOR EACH JOB SITE. CONTRACTOR IS RESPONSIBLE FOR SECURING HIS/HER SITE UNTIL PROJECT IS ACCEPTED BY THE OWNER.

5. Sheet 4C200 Title Block reads Blair. Should it be Blackstock? YES, SHEET 4C200 SHOULD READ DISTRICT #3-BLACKSTOCK.

6. What is the height of the mechanical fence? 4' CHAIN-LINK. SEE CHAIN LINK DETAIL ON SHEET DT1. ALL AC/MECHANICAL ENCLOSURES SHALL INCLUDE A 4'X 6' (WIDE) GATE. CONTRACTOR SHALL PROVIDED SHOP DRAWINGS FOR APPROVAL.

7. Will irrigation plans be provided by the Landscape architect? PERMANENT IRRIGATION NOT IN CONTRACT. SEE GENERAL NOTE ON DT3. CONTRACTOR IS RESPONSIBLE TO MAINTAIN PLANT MATERIAL UNTIL PROJECT IS ACCEPTED BY THE COUNTY.

8. District 3 Blair has two existing sheds, is one to be relocated? YES, ONE SHED TO REMAIN OTHER TO BE RELOCATED TO DISTRICT 3 BLACKSTOCK.

9. Should we bid these projects based on all the quantities listed on the bid form? PLEASE LET OWNER'S REPRESENTATIVE KNOW OF ANY MAJOR DISCREPANCIES BETWEEN PLANS AND BID FORM. CONTRACTOR SHALL BASE BID ON QUANTITIES SHOWN ON THE BID FORM.

10. Item 1 - District 5 under Basketball court you show 4 goals should this be NIC? ALL EXTERIOR BASKETBALL GOALS ARE NOT IN CONTRACT.

11. Item 1 - District 7 item 8 – No quantity listed for inlet protection – PLEASE SEE REVISED BID FORM INCLUDED IN ADDENDUM ONE.

12. Are there any hazmat reports for existing building requiring demo or work? NO. IF HAZMAT ENCOUNTERED, PLEASE STOP WORK AND CONTACT OWNER'S REPRESENTATIVE IMMEDIATELY. IF ENCOUNTERED IT WILL BE HANDLED UNDER A SEPARATE CONTRACT.

13. Are all projects required to be completed in 365 days? YES. CONTRACTOR'S PREFERENCE AS TO ORDER OF WORK.

14. What is the total budget for this project? (need for bonding purposes) THAT INFORMATION IS NOT BEING DISCLOSED.

15. Bid form shows 1,500 gallon septic tank but drawing show 1,000 gallon septic tank –PLEASE SEE REVISED BID FORM INCLUDED IN ADDENDUM ONE.

16. In some cases the form request Water – well but the plans show drawings are showing water to be tied into an existing main – THREE LOCATIONS THAT CONNECT TO PUBLIC WATER SYSTEM – GENEALOGY, SMALLWOOD, AND THE MAINTENANCE BUILDING. ALL OTHER SITES WITH WATER CONNECTION HAVE WELLS.

17. Enclosure of the AC yard is shown on the plans – what kind, height etc. – 4' CHAIN-LINK. SEE CHAIN LINK DETAIL ON SHEET DT1. ALL AC/MECHANICAL ENCLOSURES SHALL INCLUDE A 4'X 6' (WIDE) GATE. CONTRACTOR SHALL PROVIDED SHOP DRAWINGS FOR APPROVAL.

18. In district 1 and district 3 show the same quantity of CY for the basketball court even though district 1 has 1 full court and district 3 has 1 1 /2 courts. PLEASE SEE REVISED BID FORM INCLUDED IN ADDENDUM ONE.

19. District 3 and 4 have items shown on the plans but not listed on the bid form (3 rail vinyl fence) PLEASE SEE REVISED BID FORM INCLUDED IN ADDENDUM ONE.

20. District 1 is a "LS" price for the walkway trail while District 4 requires to use unit quantities. PLEASE SEE REVISED BID FORM INCLUDED IN ADDENDUM ONE.

21. There are other various discrepancy found but not listed here – PLEASE LET OWNER'S REPRESENTATIVE KNOW OF ANY MAJOR DISCREPANCIES BETWEEN PLANS AND BID FORM. CONTRACTOR SHALL BASE BID ON QUANTITIES SHOWN ON THE BID FORM.

22. On the Alternate for the county to move the dirt to the fire station, what happens to the remaining 3,000 cy? Is it allowed to remain on site? Is burning allowed on site? YES, IT IS ALLOWED TO STAY ON SITE OR BE USED FOR BORROW WITH OTHER PROJECTS. YES, CONTRACTOR SHALL SECURE THE BURNING PERMIT.

23. There are no plans for the picnic shelter that has to be moved. Where is it? What type of foundation if any? (1) PICNIC SHELTER TO BE RELOCATED FROM DISTRICT 3 BLAIR TO DISTRICT 3 BLACKSTOCK AS SHOWN ON SHEET 4C200. SHELTER TO BE PLACED ON CONCRETE SLAB SEE DETAIL SHEET DT4, TYPICAL SIDEWALK DETAIL. SLAB SHALL EXTEND TO DRIPLINE OF ROOF.

24. The bid sheet for District 3 has 4 construction entrances, the plans only show 2. Due we bid 4 since this is supposed to be a unit cost bid? BID WHAT IS ON THE BID FORM – IT HAS BEEN MODIFIED TO 2.

25. There is a total listed of 1500 cy of dirt to be moved in District 3, how do we adjust this for the grading unit cost asked for at the basketball fields and the playground? THIS QUANTITY INCLUDES ALL THE GRADING – I.E. MOVING DIRT FOR THE SITE. IT COVERS THE GRADING ACTIVITIES FOR THE PARKING, BUILDING, BASKETBALL COURTS, ETC. REFER TO SECTION 1.03 MEASUREMENT AND PAYMENT FOR EARTHWORK IN THE TECHNICAL SPECIFICATIONS.

26. On the district 3 bid sheet there is listed a water well and septic system. None are shown on the plans, due we bid this anyway? THESE WILL BE ZEROED OUT ON THE BID FORM.

27. On district 3 Blair, the existing plans show 2 sheds and a house, the layout plans do not show the shed to the left of the house to be demolished. What happens to the shed? Due we include it in the house demo? "SHED"/PICNIC SHELTER TO BE RELOCATED TO DISTRICT 3 BLACKSTOCK. SEE QUESTION #23 ABOVE.

28. On district 3 Blair, what detail is used for the concrete pad at the existing picnic shelter? DISTRICT 3 BLAIR & DISTRICT 3 BLACKSTOCK SEE DETAIL SHEET DT4, TYPICAL SIDEWALK DETAIL, SLAB SHALL EXTEND TO DRIP LINE.

29. On district 7 Old Camden, what details are used for the concrete pad at the existing picnic shelter? IF EXISTING CONCRETE SLAB IS FLUSH WITH GRADE SEE DETAIL SHEET DT4 TYPICAL SIDEWALK DETAIL. IF EXISTING CONCRETE SLAB IS NOT FLUSH WITH GRADE PLEASE SEE DETAIL SHEET DT4 TYPICAL SIDEWALK WITH TURNDOWN EDGE.

30. On Jenkinsville Fire & EMS, bid sheets do not list the water line outside the building, nor the sewer line or the grease trap. Where are these items to be included? INCLUDE IN THE LUMP SUM PRICE FOR THE WATER WELL AND THE GREASE TRAP.

31. Jenkinsville site Fire & EMS, where do we put the cost for the parking lines? THE SIGNAGE LINE ITEM HAS BEEN MODIFIED TO BE PAVEMENT MARKING AND SIGNAGE. REFER TO SECTION 1.04 PAVEMENT MARKING AND SIGNAGE TECHNICAL SPECIFICATIONS.

32. On Jenkinsville site, the silt fence is listed at 100 lnft. This is not consistent with the plans. THE NUMBER HAS BEEN CHANGED TO 500, THE ACTUAL AMOUNT INSTALLED WILL BE PAID.

33. On Jenkinsville site, where do we put the cost for the trash pad and the generator pad and gates & fence? IN THE LUMP SUM FOR THE BUILDING.

34. On Ridgeway EMS bid sheets do not list the water line outside the building, nor the sewer line or the grease trap. Where are these items to be included? INCLUDE IN THE LUMP SUM PRICE FOR THE WATER WELL AND THE GREASE TRAP.

35. On ridgeway EMS, where do we put the cost for the parking lines? THE SIGNAGE LINE ITEM HAS BEEN MODIFIED TO BE PAVEMENT MARKING AND SIGNAGE. REFER TO SECTION 1.04 PAVEMENT MARKING AND SIGNAGE TECHNICAL SPECIFICATIONS.

36. On Ridgeway EMS, the silt fence is listed at 100 lnft. This is not consistent with the plans. THE NUMBER HAS BEEN CHANGED TO 500, THE ACTUAL AMOUNT INSTALLED WILL BE PAID.

37. On Ridgeway EMS site, where do we put the cost for the trash pad and the generator pad and gates & fence? IN THE LUMP SUM FOR THE BUILDING.

38. On Ridgeway Fire Station where do we list the cost for the demo? LIST THIS IN THE CLEARING AND GRUBBING LINE ITEM.

39. On Ridgeway Fire station bid sheets do not list the water line outside the building, nor the sewer line or the grease trap. Where are these items to be included? INCLUDE IN THE LUMP SUM PRICE FOR THE WATER WELL AND THE GREASE TRAP.

40. On ridgeway Fire station, where do we put the cost for the parking lines? THE SIGNAGE LINE ITEM HAS BEEN MODIFIED TO BE PAVEMENT MARKING AND SIGNAGE. REFER TO SECTION 1.04 PAVEMENT MARKING AND SIGNAGE TECHNICAL SPECIFICATIONS.

41. On Ridgeway Fire station, the silt fence is listed at 100 lnft. This is not consistent with the plans. THE NUMBER HAS BEEN CHANGED TO 500, THE ACTUAL AMOUNT INSTALLED WILL BE PAID.

42. On Ridgeway Fire station site, where do we put the cost for the trash pad and the generator pad and gates & fence? IN THE LUMP SUM FOR THE BUILDING.

43. On sheet 8L100 Multi Field, what does 3 rail fencing mean? MULTI-PURPOSE FIELD SHALL BE 3 RAIL VINYL FENCE (SEE DETAIL SHEET DT1) WITH BLACK VINYL COATED CHAIN-LINK ATTACHED. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL.

44. On sheet 7C200 the scale is incorrect. IT SHOULD BE 1"-30'. ADJUST ACCORDINGLY.

45. On sheet 7C200 is the fencing shown existing? IT SHOULD BE 1"-30'. ADJUST ACCORDINGLY.

46. On sheet 7C200 is the stripped handicap area concrete? If so, the bid form does not include a line for any concrete paving. INCLUDE THIS MINOR SITE IMPROVEMENTS LINE ITEM FOR DISTRICT 6.

47. Where are the plans for the site lighting of the soccer/football field listed on bid sheet district 6? THESE WILL BE PLACED ON THREE EXISTING POLES ON THE FOOTBALL FIELD ON THE WEST SIDE OF THE MAINTENANCE FACILITY, SHEET 7C200. TWO NEW POLES WILL BE INSTALLED ON THE EAST SIDE OF THE FIELD (AGAINST THE MAINTENANCE FACILITY SIDE). WE UNDERSTAND MORE CLARITY IS NEEDED AND WE WILL PROVIDE IN ADDENDUM #2.

48. On Alternate to Genealogy B-1, where are the plans that show the framing? How is the underside of the roof finished? Does the concrete block stay there and is painted or is brick put in its place? Is there a door? IF STORAGE IS ELIMINATED, REAR WILL INCLUDE DOOR AND STORAGE ROOF WILL BE ELIMINATED. FACE OF REAR BUILDING BE BRICK VENEER MATCHING ADJACENT SIDES.

49. Will the contractor be required to pay plan review fees? If so will all buildings falling in the same jurisdiction be paid for under one plan review fee? (I.E Will the plan review fee be based on the total value of all projects in that jurisdiction combined or as individual buildings). NO REVIEW FEES, ALL BUILDINGS ARE UNDER THE JURISDICTION OF FAIRFIELD COUNTY, CONTACTORS WILL HAVE TO PAY ALL BUILDING PERMIT FEES.

50. There are no drawings available for District 5. Are we to bid the unit price items on the bid tabulation? If so how are we to bid items that are LS such as storm drainage? (I.E. There are no quantities for LF of pipe, size of pipe, etc.) Are we to use the storm drainage pricing from another district? YES, USE DISTRICT ONE AS THE BASIS FOR DISTRICT 2 AND 5. NOTE THAT ONCE A LOCATION IS IDENTIFIED, THE CONTRACTOR WILL HAVE

THE OPPORTUNITY TO REVISIT THAT COST WITH AN ACTUAL DRAWING

51. The bid tabulation for District 5 list four (4) outdoor basketball goals. All other outdoor basketball goals in other districts are NIC. Are we to include the pricing for the goals or will these be NIC? ALL EXTERIOR GOALS ARE NIC.

52. The surface for basketball court in District 5 is listed as concrete but all other locations the court surface is asphalt. Is the surface going to be concrete as listed or asphalt? If the surface will be concrete please provide a concrete spec for the surface. (I.E. Psi, thickness, base, etc. SURFACE WILL BE ASPHALT. SEE COURT SURFACE DETAIL SHEET DT2.

53. The basketball court shown on sheet DT2 has outside dimensions of 90'x56'. The bid tabulation has a quantity of 722SY. The math works out to +/- 560SY. Are we to bid the 722SY as listed on the bid tabulation? BID AS SHOWN CONTRACTOR WILL BE PAID ON ACTUAL AMOUNT INSTALLED.

54. Is it possible to schedule a time to visit the District 6 Maintenance building and get inside to take a look at the scope of work? There are multiple notes to field verify scopes of work. MAINTENANCE BUILDING IS SCHEDULED TO BE OPEN TO CONTRACTORS ON THURSDAY, JULY 2 AND TUESDAY JULY 7, 2015 AT 10:00 AND 2:00 PM.

55. There is a note on drawing 16A200 to provide an alternate for a new roof but there is no information on what the current roof is or what the new roof will be to complete the alternate pricing? Please provide associated information if we are to price the alternate for a new roof. DELETE ALTERNATE NEW ROOF SHOWN ON SHEET 16A200.

56. There is not a quantity for inlet protection for the Genealogy Building in the bid tabulation. Please provide quantity. SEE REVISED BID FORM ADDENDUM #1.

57. Is the contractor responsible for paying water or sewer impact and tap fees? NO, THESE WILL BE PAID BY OWNER.

58. At the District 7 Multi-field site drawing 8L100 shows 3 rail fence with vinyl chain link backing. The bid tabulation has listed 4' vinyl coated chain link fence 4' high for the multi-field site and 3 rail

vinyl fence for Genealogy building. Please clarify what style fencing is to be quoted for the Multi-field site. Bid per Bid Tabulation Form. MULTI-PURPOSE FIELD SHALL BE 3 RAIL VINYL FENCE (SEE DETAIL SHEET DT1) WITH BLACK VINYL COATED CHAIN-LINK ATTACHED. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL. GENEALOGY SITE SHALL BE 3 RAIL VINYL FENCE ONLY (SEE DETAIL SHEET DT1).

59. There is no detail provided for the oil/water separator. Please provide. WILL BE PROVIDED IN ADDENDUM #2.

60. There is only one sanitary line shown for sites that have grease traps. There is not a separate line shown for the grease traps. Is this correct? NO, DOMESTIC SANITARY LINES DO NOT GO THROUGH THE GREASE TRAPS. THE ONLY GREASE TRAPS ARE AT THE EMS BUILDINGS. A SEPARATE LINE MUST BE RUN.

61. District 2 Community Building does not have a known site at this point. How are we to price the Lump Sum items listed on the bid tabulation with no information on the site? For example the LF of pipe for sewer and water can vary from the location of the septic tank and the well. Should we use the same as one of the determined sites such as District 1 or District 4? USE DISTRICT ONE AS THE BASIS FOR DISTRICT 2 AND 5. NOTE THAT ONCE A LOCATION IS IDENTIFIED, THE CONTRACTOR WILL HAVE THE OPPORTUNITY TO REVISIT THAT COST WITH AN ACTUAL DRAWING.

62. SCDHEC REQUIRES THE SEPTIC TANK AREAS TO BE CLEARED AND A BACKHOE AVAILABLE TO DIG FOR SOIL SAMPLES. THE CONTRACTOR SHALL ASSIST SCDHEC AND THE OWNER WITH THIS TASKS TO SECURE THE FINAL SEPTIC TANK PERMIT. THIS SHOULD BE INCLUDED IN THE LUMP SUM FOR SEPTIC TANKS.

63. SPECIFICATION SECTION 33-2000 – WATER SUPPLY WELLS HAS BEEN REPLACED WITH THE NEW SPECIFICATION SECTION PROVIDED.

II. PROJECT MANUAL:

1. Specification Table of Contents: Add the following specification Sections:

- **Division 32:**
  32-2000 – Water Supply Well, 19 pages

III PROJECT DRAWINGS:

1. Civil/LA Drawings:

- Add the attached Sheet 1C300 Grading Plan-Smallwood
- Add the attached Sheet 13C300 Grading Plan-Jenkinsville Fire/EMS
- Add the attached Pedestrian Paving Detail LA_SK1

END OF ADDENDUM NUMBER ONE

SECTION 33-2000

WATER SUPPLY WELLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Drilling and casing water well.
2. Pump and controller.
3. Water Well development and Testing.
4. Water and system testing and certification.

B. Related Sections:
1. Section 02324 – Trenching and 02315 - Excavation and Fill: Excavating for conduit and pipe from well head to building.
2. Section 02324 – Trenching and 02320 - Backfill: Backfilling for conduit and pipe from well head to building.
3. Section 02512 - Site Water Distribution: Well piping.
4. Section 02516 - Disinfection of Water Distribution.
5. Section 15450 - Potable Water Storage Tanks: Water storage tank.
6. Section 16123 - Building Wire and Cable.
7. Section 16130 - Raceway and Boxes.
8. Section 16150 - Wiring Connections: Wiring and power supply to well pump and controller.
9. Section 16225 - Motors.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Water Well:
1. Basis of Measurement: By lump sum each.
2. Basis of Payment: Includes drilling, casing, backfilling, pump test, and water quantity and quality tests.

B. Pump:
1. Basis of Measurement: By each as part of the water well.
2. Basis of Payment: Includes pump controller, motor drive, fittings, sensor, and accessories; conduit, wire, pipe and pipe fittings from well to building service line; accessories and pump.
3. BASE, LUMP SUM BID for the Well at each of the sites assumes a 125 foot deep cased and screened drinking water well equipped with a 3 horse power motor and pump, including but not limited to all specified and necessary enclosures, pump controllers, piping, grading, high and low voltage controls, switches, disconnects, and wiring, tank, lift cable, concrete, grout, equipment, etc. to produce a minimum of 25 gallons per minute at pressure ranging between 25 psig to 45 psig to each of the proposed buildings.

1.3 REFERENCES

A. All codes and standards referenced in this Section shall be the latest approved edition or tentatively adopted edition published at the date of receipt of bids, unless specifically stated

otherwise. The latest revisions of laws, regulations, codes, specifications, details or standards of SC DHEC, ASME, ASTM, AWWA, ANSI, NSF, and NEMA shall apply as referenced herein. Standards shall include, but are not restricted to the following:

B. American Society of Mechanical Engineers:
   1. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

C. American Society for Testing and Materials (ASTM International):
   1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM C150 – Standard Specification for Portland cement.
   3. ASTM F-480-90 – Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80.
   4. ASTM D-1784-75 – Standard Specifications for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds

D. American Water Works Association (AWWA):
   1. AWWA A100 - Standard for Water Wells.
   2. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., for Water Distribution.

E American National Standards Institute (ANSI):
   1. ANSI B36.19 – Stainless Steel Pipe.

F. National Science Foundation (NSF):
   1. NSF 14 – Plastic Piping System Components and Related Materials.
   2. NSF 61 – Drinking Water System Components – Health Efforts.

G. National Electrical Manufacturers Association (NEMA):
   1. NEMA MG 1 - Motors and Generators.
   2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

H. South Carolina Department of Health and Environmental Control (SC DHEC):
   1. State Primary Drinking Water Regulation R61-58.1 – Construction and Operation Permits.
   2. State Primary Drinking Water Regulations R61-58.2 – Ground Water Sources and Treatment.
   3. All additional laws, regulations, standards, specifications, details, and requirements of SC DHEC.

1.4 PERMITS

A. Obtain any additional Federal, State, or local permits required for constructing the well, discharging water from the site, or clearing the site for work or access.

B. Do not perform any work on the well or site until all permits are obtained.

C. Furnish separate copies of all permits to the Owner and the Engineer as the permits are received.

1.5 UNDERGROUND AND OVERHEAD UTILITIES

A. Contact all Utility Owners and Utility Location Services a minimum of three days prior to initiating any work on the sites.

B. Secure information concerning the location of all underground and overhead utilities at the site prior to the start of well construction.

C. Any and all damage to underground and overhead utilities and all other persons or property of others resulting from the actions of the Contractor or his subcontractors are the sole responsibility of the Contractor

1.6 GENERAL DESCTIPTION OF PRODUCTION WELL AND SITE

A. The work to be performed under this Section includes the furnishing of all labor, materials, equipment, and all other facilities and incidentals necessary to construct one 25 gpm water well (minimum) at the locations shown on the Drawings.

B. Water well with the following characteristics: The Drill Hole of the finished well will be a minimum of 10 inches in diameter for the outer casing, 8 inches in diameter for the upper inner casing, and 6 inches in diameter for the lower inner casing. The grout seal is estimated to be 50 feet deep. The entire well depth is estimated to be 125 feet deep. The entire pump depth is estimated to be 120 feet deep.

C. The approximate location of each of the well sites is shown on the Drawings. The Contractor shall verify access to the site and adequate access for set-up and drilling equipment including location of existing utilities. Damage to existing utilities resulting from the actions of the Contractor is the sole responsibility of the Contractor. The Contractor shall be responsible for providing all required temporary utility service.

1.7 PERFORMANCE REQUIREMENTS

A. Water well capable of producing minimum 25 gallons of water per minute.

B. Maximum Suspended Solids in Delivered Water: 5 ppm.

C. Maximum Turbidity in Delivered Water: 5 NTU.

D. The well is substantially free of sand defined as no more than 5 ppm as tested by a Rossum Sand Tester when pumping at the rated capacity of the well.

1.8 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Within ten days following the preconstruction conference, the Contractor shall submit in writing a complete list of construction materials and supplies including (where applicable) the name of the manufacturer for the following listed items:
   1. Casings, well screen, gravel pack, grout, centralizers, packers, data logger, drilling fluids, sample bags, and other submittals pertinent to this project as requested by the Engineer
   2. Type of drilling equipment to be used
   3. The method of drilling fluid disposal in accordance with SC DHEC requirements

4. The geophysical logging subcontractor to be used for well logging
5. The company to perform sieve analysis upon the formation samples for gravel pack selection and sieve analysis for screen selection
6. Well screen manufacturer that will provide the screen, recommend screen depth, length, and slot size, prior to shipment from the manufacturer
7. The company that will provide the gravel pack
8. A drilling plan, including the method of installation of grout

C. Product Data: Include data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

D. Manufacturer's Installation Instructions: Indicate rigging, assembly, and installation instructions.

E. Following the preconstruction conference and prior to initiation of work, the Contractor shall submit a complete list of construction materials and supplies including the name of the manufacturer (if applicable).

F. Driller's Reports: During all well drilling, a detailed, daily driller's report shall be maintained and submitted by the Contractor to the Engineer to document all work completed. At a minimum, the report shall give a complete description of all formations encountered, number of feet drilled, number of hours on the job, shutdown due to breakdown, feet of casing set, the reference point for all depth measurements, the depth at which each change of formation occurs, identification of material of which each stratum is composed, the depth interval from which formation samples (cuttings and cores) were taken, the depth at which hole diameters (bit sizes) change, and other pertinent data requested by the Engineer

G. Driller's Log: A daily log shall be maintained and submitted by the Contractor to document depth of formation changes, formation samples, hole diameter changes and other pertinent data requested by the Engineer.

H. Formation samples shall be collected at no less than 10-foot intervals and at each change in formation material, preserved immediately, and labeled (depth, date, etc.).

I. The complete description, including all well screen manufacturers' recommendations, of the well screens.

J. The complete description and analysis of the filter material.

K. Geophysical logs of the full depth of the pilot hole unless directed otherwise by the Engineer in writing.

1.9 CLOSEOUT SUBMITTALS

A. Section 01700 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of well, depth, subsoil strata, and drilling difficulties encountered, the total depth of the completed well, the depth or location of any lost drilling fluid, drilling materials, or tools, amount of drilling fluid and additives, the depth of the surface casing seal, the nominal hole diameter of the well bore (above in the cased section and below in the screened section), the amount of cement used (number of bags),

C. Drill cutting samples from the hole, properly identified.

D. Submit signed copy of driller's report book and log book to include as a minimum: the total depth of the completed well; the depth or location of any lost drilling fluid, drilling materials or tools; amount of drilling fluid and additives; depth of surface casing seal; nominal hole diameter of the well bore.

E. Submit Hydrological data report associated with well installation and testing.

F. Submit executed certification of well pump after performance testing.

G. Submit documents required by SC DHEC and local authorities having jurisdiction.

H. Provide certificate of compliance from SC DHEC and local authority having jurisdiction indicating suitability of water for human consumption.

I. Any other pertinent data requested by the Engineer.

J. Operation and Maintenance Data: Submit equipment manuals.

1.10 QUALITY ASSURANCE

A. Perform all Work in accordance with AWWA A100, all SC DHEC applicable laws, regulations, standards, specifications, details, and requirements, and, specifically, all applicable portions of the South Carolina Primary Drinking Water Regulations and those of the local jurisdiction.

B. The Contractor shall have available and use an adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts, all applicable laws, regulations, standards, specifications, details, and requirements including all applicable portions of the South Carolina Primary Drinking Water Regulations and those of the local jurisdiction, and who are familiar with the specified requirements and the methods needed for the proper performance of the Work.

C. Maintain one copy of each document.

1.11 QUALIFICATIONS

A. The Drilling Firm (either Prime Contractor or Sub Contractor) shall be a licensed, certified well drilling company in the state of South Carolina as specified by SC DHEC, and shall be a company specializing in performing the Work of this section with minimum of 5 years documented experience and holding all required licenses at Project locations.

B. The Contractor shall specialize in performing the Work of this Section including identifying geologic formations, maintaining complete and current well logs and daily notes for the well completion report and developing and testing the wells.

C. The Contractor shall furnish all such supporting documentation requested by the Owner to verify ability of the Contractor to satisfactorily perform the Work.

1.12 SEQUENCING

A. Sequence Work to occur before placement of water service piping to building.

1.13 DELIVERY, STORAGE, AND HANDLING

A. All parts and materials shall be properly protected so that no damage, deterioration, or contamination occurs from the time of shipment until the time installation is completed.

1.14 NOTIFICATION

A. The Contractor shall attend a pre-construction conference with the Engineer and Owner prior to performing any Work on the site.

B. At the pre-construction conference, the Contractor shall furnish the proposed work schedule including the equipment and personnel to be used for the Work.

C. Notify the Engineer 3 days in advance of any well construction and testing activities.

1.15 WELL ACCEPTANCE CRITERIA

A. The well shall be developed until, in the opinion of the Engineer:
   1. the well is completely free of drilling fluids
   2. the water is no longer turbid during development (less than 5 NTUs—all testing to be provided by the Contractor)
   3. the gravel pack has stabilized for a minimum of eight hours
   4. the well is substantially free of sand (less than 20 milligrams per gallon—all testing to be provided by the Contractor)

B. If, as result of the pumping test analysis, the Engineer determines that the well has not been fully developed, the test pump is to be removed and the well further developed.

C. The Completed well shall be sufficiently plumb and straight so that there will be no interference with the installation, alignment, operation, or removal of the test or permanent pumps. The well shall be tested in accordance with all applicable SC DHEC criteria. Plumbness shall be corrected at the Contractor's expense.

D. The casings, screens, grout, and gravel pack shall be set to the depths approved from the Contractor's well design submittal.

1.16 WARRANTY

A. All materials and workmanship supplied under this section shall be warranted for a period of one year by the Contractor and the Material Manufacturers. The Manufacturers' warranty period shall run concurrently with the Contractor's warranty period. The warranty period shall commence upon the final acceptance of the Work. Should failure of any type occur during the warranty period, materials shall be replaced and the well restored to service by the Contractor at no expense to the Owner

B. The production well shall be warranted to remain in substantially the same condition as demonstrated upon acceptance for a period of one year. At the request of the Owner, conduct tests within the warranty period to demonstrate compliance. If the well fails to meet the well acceptance criteria during the warranty period, replace or restore the well to meet the criteria outlined herein at no expense to the Owner.

1.17 MEASUREMENT AND PAYMENT

A. BASE, LUMP SUM BID for the Well at each of the sites assumes a 125 foot deep cased and screened drinking water well equipped with a 3 horse power motor and pump, including but not limited to all specified and necessary enclosures, pump controllers, piping, grading, high and low voltage controls, switches, disconnects, and wiring, tank, lift cable, concrete, grout, equipment, etc. to produce a minimum of 25 gallons per minute at pressure ranging between 25 psig to 45 psig to each of the proposed buildings.

B. ADDITIVE UNIT PRICE ITEMS:

1. ADD for WELL PUMP increasing from 3 horse power BASE to 4 horse power.
2. ADD for WELL PUMP increasing from 3 horse power BASE to 5 horse power.
3. ADD for WELL DEPTH increasing from 125 foot BASE in 1 foot increments.

(Note: Increases in Well Depth is to include all associated casing, screens, etc.)

C. DEDUCTIVE UNIT PRICE ITEMS:

1. DEDUCT for WELL PUMP decreasing from 3 horse power BASE to 2 horse power.
2. DEDUCT for WELL PUMP decreasing from 3 horse power BASE to 1 horse power.
3. DEDUCT for WELL DEPTH decreasing from 125 foot BASE in 1 foot increments.

(Note: Increases in Well Depth is to include all associated casing, screens, etc.)

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Well Casing (Outer): The Outer Casing shall be new, minimum 8 inch internal diameter, beveled, plain end, galvanized steel pipe having perfect roundness and uniform minimum 0.375-inch wall thickness ASTM A53 Grade B. Casing ends shall be connected by proper butt field welds made by a qualified welder and developing strength equal to 100 percent of the pipe strength. Casing shall be manufactured by U.S. Steel Corporation, Bethlehem Steel Corporation, American Cast Iron Pipe Company, or Approved Equal.

B. Steel Well Casing (Upper Inner): The Upper Inner Casing shall be new, ASTM A53 Grade B, 6 inch internal diameter Schedule 80 galvanized pipe which shall be equipped with a pitless adaptor and a ventilated well cap. Casing shall have a minimum 0.375 inch wall thickness. The Upper Inner Well Casing shall be manufactured by U.S. Steel Corporation, Bethlehem Steel Corporation, American Cast Iron Pipe Company, or Approved Equal.

C. Steel Well Casing (Lower Inner): The Lower Inner Casing shall be new, 316 stainless steel having perfect roundness and uniform wall thickness. Casing shall be Schedule 40. The joints shall be properly designed threaded couplings or proper butt welds made by a qualified welder.

D. Screens: Screens shall be 6 inch internal diameter, 316 stainless steel, continuous-slot, wire wound. The total length of the screen shall be as indicated on the Drawings but for bid purposes no less than 40 percent of the total well depth. The joints shall be made with properly designed threaded couplings or proper butt welds made by a qualified welder. Threaded and coupled joints shall be API or equivalent. The screens shall be provided with

fittings necessary to seal the top of the screen tightly to the casing and to close the bottom of the screen. The screens must have adequate structural integrity to resist all forces applied to it while and after installation and as not to allow changes of alignment at any joint after installation. The screen inlet velocity must not exceed 0.1 feet per second and retain 99.0 percent of filter gravel. The slot size shall be selected by the screen manufacturer depending upon the results of the sieve analysis. No standby time will be paid for while waiting for the sieve analysis, screen selection, or delivery of the screen. The screen shall be provided with a bail plug or similar bottom fitting to close the bottom. All metal screen fittings shall be of 316 stainless steel. Blind Casing, if used between screened intervals shall be schedule 40, shall be of 316 stainless steel. Screens shall be manufactured by UPO Johnson, Cook, Houston, or Approved Equal.

2.2 CEMENT GROUT

A. Grout shall be proportioned of Type II (ASTM C150) neat Portland cement type with not more than 5.5 gallons of water per cubic foot of cement if mixed on site and 6.0 gallons of water per cubic foot if transited from a batch plant, and may contain up to 3 percent by volume Bentonite clay admixture.

B. All other additives shall have prior written approval of the Engineer.

2.3 CENTRALIZERS

A. Stainless steel centralizers shall be provided for the well screen and steel centralizers shall be provided for the inner well casing.

B. The material used for the screen centralizers shall be of the same grade and type of steel as the screen.

2.4 GRAVEL PACK or FORMATION STABILIZERS

A. The gravel pack or formation stabilizer material shall be clean, well-rounded, smooth and having uniformity coefficient of no greater than 2.25. The gravel pack size shall be determined by the screen manufacturer from the results of the sieve analysis and the selection of the screen slot size for each interval screened. No standby time will be paid while waiting for the sieve analysis, screen selection, or delivery of the gravel pack.

B. Delivery and Storage of Filter Material: The filter material shall be protected from the weather and any contamination by bagging, or covering with plastic (top and below) until installed.

2.5 DRILLING FLUIDS

A. Drilling mud shall be Aquagel (as base) or Approved Equal.

B. All water used in the construction of the wills shall be potable, chlorinated water.

C. Maintain proper fluid properties using water, soda ash, and SAPP. Do not use lime.

2.6 SAMPLE BOTTLES

A. Sample bottles submitted either to SC DHEC or a testing facility shall be new, one litter plastic bottles with screw caps. As a minimum, all sample bottles shall be clearly marked to

identify the project name and site location, the permit number, the date and time the sample was taken, the reason for the sample, and all testing to be performed.

2.7 SAMPLE BAGS

A. Sample bags submitted either to the Engineer or a testing facility shall be new cloth or reinforced plastic bags with drawstrings. As a minimum, all sample bags shall be clearly marked to identify the project name and site location, the permit number, the date and time the sample was taken, the reason for the sample, and, if testing is to be conducted, all testing to be performed.

2.8 TEST PUMP EQUIPMENT

A. The test pump shall be adequate to discharge at least100 gpm under the head conditions to the top of the proposed finish floor elevation plus 25 feet. The test pump shall have a check valve installed in the intake of the pump to prevent water from the discharge column from flowing back into the well.

B. Should a generator be used for the test pumping, it shall have adequate capacity to appropriately power the selected test pump through the entire test pumping period.

C. The temporary discharge pipe shall be of a diameter and length (150 LF minimum) adequate to transmit water from the test site to a discharge point selected by SC DHEC or the Owner. The discharge pipe shall be in good condition and shall not have any major leaks. The discharge pipe design shall be presented to and be approved by the Engineer. Discharge permitting, if required, shall be the responsibility of the Contractor. An approved rip-rap or alternative energy dissipater shall be used to slow the velocity of the discharged water such that neither flooding nor erosion shall occur.

D. A calibrated, propeller-type, totalizing flow meter shall be provided to measure discharge during the well testing. In addition, an orifice and manometer assembly shall be provided capable of accurately measuring discharge rates in a range from 0 gpm to 100 gpm.

E. A throttling valve suitable for controlling discharge through the discharge pipe shall be provided by the Contractor.

F. The Contractor shall furnish a data logger and probe for water level measurement during testing. Sufficient space shall be provided between the casing and the pump to insert the tape and probe.

2.9 TEMPORARY WELL COVER

A. A lockable, well cover shall be used to cover the well while it is not being worked on to protect against damage to the well, persons or animals, or contamination.

2.10 PUMP

A. Manufacturers:
1. [_____] Model [_____].
2. [_____] Model [_____].
3. [_____] Model [_____].
4. Substitutions: Section 01600 - Product Requirements.

B. Type: Vertical shaft, multiple-stage, close coupled, for insertion in 6 inch diameter pipe.

C. Casing: Cast Iron casting with stainless steel housing and intake screen, check valve with stainless steel stem and valve seat with rubber seal built into discharge casting.

D. Impellers and Diffusers: Bronze.

E. Shaft: Stainless steel with stainless steel shaft sleeve.

F. Motor: NEMA MG 1, submersible type:
1. Characteristics: 3 hp ; 230 volt (nominal) volt, three phase 60 Hertz.

G. Pump: Submersible type for deep well pump, water lubricated:
1. Operating Performance: 25 gpm flow capacity, 125 feet head to the well head (the Total Dynamic Head is to be calculated as the sum of the total head to the well head, plus the difference in elevation between the well head and the proposed finished floor of the building, plus an additional 25 feet of head), and 3 hp motor.
2. Pump Capacity (Base Bid Criteria): 25 gpm, 1500 gph.

H. Pump Controller: NEMA 250 Type 4X enclosure with main disconnect interlocked with door, containing across-the-line electric motor starter with starting relay and ambient compensate quick trip overloads in each phase with manual trip button and reset button; circuit breaker, control transformer, hand-off-automatic selector switches, pilot light.

I. Disconnect: NEMA 250 Type 4X enclosure.

J. Pressure Sensing Switch: Low voltage relay type, fixed settings to start at 25 psig and shut-off at 45 psig and low pressure cutoff set at 20 psig.

K. Control Voltage: 24 VDC.

L. Pump Lift Cable: Stainless steel, multi-stranded aircraft cable, high tensile strength; cable ends fitted with closed loop fittings; length of cable equals depth of shaft plus 25 feet.

2.11 TANK

A. Tank: Galvanized steel, tested and stamped in accordance with ASME Section VIII; pressurized diaphragm type with integral floor stand; tapping for installation of piping and accessories: Total Tank Volume (air and water): 100 gal.

2.12 Lead Content: No material containing more than 4 percent lead by weight is acceptable for use in this Section.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify site conditions are capable of supporting equipment for performing drilling and testing operations.

3.2 PREPARATION

A. Protect structures near well from damage.

3.3 DRILLING

A. Drill concentric well shaft to diameters and depths as indicated on Drawings or as required to meet performance criteria.

B. Place well casing immediately after drilling. Set firmly in place.

C. Clean shaft bottom of loose material.

D. Allow inspection of casing prior to placement of grout.

E. Place grout tight to surrounding work in accordance with SC DHEC's regulatory requirements.

F. Maintain well opening and casing free of contaminating materials.

G. Cut off shaft top 24 inches above the top of the concrete well slab. Do not permit metal cuttings to enter casing.

H. Disinfect well.

3.4 INSTALLATION - PUMP

A. Electrical Connections: Refer to Section 16150 as well as the Architectural Specifications and Drawings.

3.5 ERECTION TOLERANCES

A. Quality Requirements: Tolerances.

B. Maximum Variation from Plumb: In accordance with ANSI/AWWA A100, the maximum variation from plumb shall be the more restrictive of SC DHEC's requirements or one inch per 100 feet of well depth.

C. Maximum Offset from Indicated Position: The maximum offset from indicated position shall be the more restrictive of SC DHEC's requirements or a total of one inch.

3.6 COLLECTIONS OF CUTTINGS

A. After installation of surface casing and prior to construction of the pilot hole, the Contractor shall attach a side discharge pipe to the surface casing. The cuttings discharge pipe shall extend a minimum of four feet beyond the side of the drill rig with a separation distance of eighteen inches between the bottom of the discharge pipe and ground surface. In addition to collection of bagged cutting samples, a duplicate set of ground samples shall be collected at

10 foot intervals. The collected samples shall be delivered to SC DHEC, the testing facility, or preserved on site until the permit to operate the well has been issued by SC DHEC.

3.7 BOREHOLE CONSTRUCTION

A. The production well shall be drilled by conventional rotary drilling methods. The minimum diameter of the borehole shall be as indicated on the approved Drawings or specified herein. The annular space between the casings shall be a minimum of 3 inches. For bidding purposes, the complete depth of the well shall be as indicated on the approved Drawings or specified herein. The actual depth shall be more or less as dictated by field conditions to meet the minimum standards specified herein.

B. The Contractor shall obtain prior approval from SC DHEC and the Engineer for the type of drilling fluid, fluid additives, or lost circulation materials, other than potable water, to be used in the well.

C. The drilled hole shall be constructed plumb and true to line as specified in SC DHEC R.61.582.B(10). The well shall be tested at the Contractor's expense in accordance with R.61.582.B(12). If required, the well's plumbness shall be corrected at the Contractor's expense.

3.8 CASING INSTALLATION

A. The production well casing and screen shall be installed through the borehole to the depth required and shall extend a minimum of at least 24 inches above the proposed concrete well slab.

B. The casing shall be centralized in the borehole. Centralizers shall be installed as specified herein and the annular space shall be filled with cement grout.

C. The casing shall be installed by lowering in a pre-drilled hole.

3.9 GROUTING

A. The surface casing and the well casing shall be grouted in accordance with all applicable requirements of SC DHEC's State Primary Drinking Water Regulations and specifically with R.61-58.2(B)(7). The annular space between the outer well casing and borehole wall shall be filled from the bottom to the top of the well with neat cement grout and shall have a minimum annular space of 1.5 inches prepared by forced injecting grout through a minimum 1-inch diameter tremie pipe. Grout material shall be in accordance with applicable paragraphs of this Section.

B. The grouting and sealing of the well shall be performed in the presence of the SC DHEC (if requested) and the Engineer and the grout placement shall be done continuously and in such a manner that will assure the filling of the entire annular space in one continuous operation. No drilling operations or other work in the well will be permitted until at least 48 hours after grouting of the well, or a minimum of 24 hours if quick-drying cement grout has been used and the Contractor can demonstrate adequate curing of the grout.

C. Before proceeding with the placing of the grout, the Contractor shall secure the Engineer's approval of the proposed method of placement. No method will be approved that does not specify the forcing of the grout from the bottom of the space to be grouted toward the surface.

D. Should the casing collapse, or its installation not be adequate, it shall be the Contractor's responsibility and expense to repair or replace, and should the problem not be repairable, to plug and abandon the well and to drill and bring to the same level of construction a new well (at his expense) before continuing with the work.

3.10 SCREEN INSTALLATION

A. The first section of screen shall be attached to the last section of casing of the production well. Any change in screen must be approved by the Engineer prior to installation.

B. The well screen shall be centralized in the borehole. Centralizers shall be installed as specified.

C. Method of Joining Screen to Screen: Screen sections for a single interval shall be joined by threaded and coupled joints, socket-type fittings or electric arc welding. Welding rods and methods recommended by the screen manufacturer shall be employed. Resulting joint(s) must be straight, sand tight, and retain 100 percent of the screen's strength.

D. Method of Connecting Screen to Casing: The connection between the screen and casing shall be by a neoprene or rubber seal especially made for thee purpose, or by threaded and coupled joints, socket fittings, or electric arc welding. The resulting joints must be straight, water tight, and retain 100 percent of the screen's strength.

3.11 CENTRALIZED INSTALLATION

A. The casing shall be installed and fitted with centralizers placed at 0, 90,180, and 270 degrees around the well casing. The centralizers shall be attached at approximately five feet from the bottom, and at a minimum of 40-foot intervals to the top of the well.

B. The well screen shall be installed and fitted with stainless steel centralizers at the welding rings. The centralizers shall be placed at 0, 90,180, and 270 degrees around the screen.

C. All centralizers shall be in vertical alignment one above the other at 0 degrees.

3.12 GRAVEL PACK INSTALLATION

A. The gravel pack shall at a minimum, extend below the lowest screen for a distance 2.5 times the largest diameter of the well casing and to the same distance above the highest screen.

B. The gravel pack shall be sterilized with sodium hypochlorite solution as it is placed in the well. For wells deeper than fifty feet, a tremie pipe shall be used.

3.13 WELL DEVELOPMENT

A. The production well shall be developed by surging, compressed air, interrupted over-pumping, or other method approved by SC DHEC and the Engineer. Development shall continue until the well meets all Well Acceptance Criteria specified have been met.

3.14 PUMP TESTING

A. At the completion of the well development the well shall be tested to determine well performance and aquifer properties. The test will consist of a continuous and constant

discharge test for a period not less than 24 hours, followed by a recovery test for an identical period. The 24 hour continuous test shall begin after the well has achieved stability (i.e., the water level in the well has returned to the predevelopment level) after development. The time required for the testing and recovery time shall not be considered as standby time, nor will the time waiting to reach stability be considered as standby time.

B. The temporary discharge pipeline shall be installed at least one day prior to the start of the 24 hour continuous test.

C. A minimum of 5 days prior to the start of testing, the Contractor shall install test data measuring equipment in the well and connect the probes to the data loggers. Prior to the start of testing, the following equipment (at a minimum) shall be installed by the Contractor:
   1. A one-inch nominal diameter pipe, open only at the top and bottom and suitable for water-level measurement with an electric sounder, shall be installed in the production well. The top of the pipe shall be installed at or slightly above ground surface as directed by the Engineer. The bottom of the pipe shall be set three feet above the top of the pump bowl assembly. The inside of the pipe shall be smooth and the pipe shall be sufficiently plumb and straight so that there will be no interference with measurements.
   2. A throttling valve shall be installed in the discharge pipe near the well.
   3. A flow meter shall be installed in the discharge pipe as close to the gate valve as possible without affecting meter accuracy.
   4. An orifice and manometer shall be installed at the end of the discharge pipe. The assembly shall conform to that described in the Water Well Handbook.

D. During all pumping tests, the Contractor shall record discharge rates of the well and record water levels in the well at predetermined times. For this purpose, the Contractor shall operate the pump without interruption, at no more than one percent fluctuation in the designated rate of discharge, during the full period of the continuous discharge pumping test as directed by the Engineer. If a pumping test is started, and then must be stopped due to equipment breakdown, failure of any water level recorder, or inadequate supervision by the Contractor, no extra payment will be made for the time spent pumping before the test had to be stopped, or the time spent waiting for recovery before the test is restarted. If any part of the pumping equipment fails to operate properly or impairs the proper functioning or other elements or instrument involved in the test, the equipment shall be removed and repaired at the expense of the Contractor and no extra payment will be made for the delay. At a minimum, the Contractor shall record the following:
   1. Record static water level before the pumping test begins.
   2. Accurate records of static water level, pumping rate, drawdown level, and recovery level shall be made.
   3. During the test, the elapsed time, pumping rate and drawdown shall be recorded every 15 minutes after the first three hours and at least hourly for the remainder of the test.
   4. At the end of the test run, water level shall be recorded every 15 minutes (for the first three hours, and hourly thereafter) until recovery of the water level to the original static level is reached.
   5. Include time the pumping test was started, name of the person conducting the test and the location of the discharge.
   6. Measure water levels to the nearest 0.1 foot.

E. Aborted Tests: Whenever there is an interruption in pump operation for a period greater than one percent of the elapsed pumping time, there shall be a suspension of the test until

the water level in the pumped well has recovered to the static level. The test must be restarted and run for the full 24 hour period.

F. Location of Discharge: Water shall be discharged so that it will not affect test results and so that no damage by flooding or erosion is caused to the chosen drainage structure or disposal site.

3.15 DISINFECTION

A. Upon completion of well testing operations, the well shall be thoroughly cleaned of all foreign substances, including tools, timbers, ropes, debris of any kind, cement, oil and grease, joint dope, and scum. Casing pipe shall be thoroughly swabbed, using alkalis approved by SC DHEC, as necessary, to remove oil, grease, and/or joint dope.

B. Following cleaning, the well shall be disinfected using a chlorine solution of such volume and strength and so applied that a concentration of at least 50 milligrams per liter shall be obtained in all parts of the well. The chlorine solution shall be prepared and applied in such a manner as will meet AWWA and SC DHEC standards. An appropriate tremie device shall be employed to ensure proper distribution of the disinfectant.

C. After a minimum of 24 hours and before 48 hours has elapsed, the well shall be pumped free of chlorine as indicated by negligible chlorine residual and in preparation for water quality sampling. The Contractor shall be responsible for de-chlorinating the well water prior to discharge. The disposal point for the purged water shall be selected so as to avoid damage to aquatic life or vegetation.

D. The Contractor shall take two consecutive bacteria samples at 24 hour intervals. Results shall also include chlorine residual and total coliform growth using the Membrane Filter Methodology in accordance with SC DHEC's requirements.

E. Should any of the samples prove contaminated, then the process of sterilizing and sampling shall be started and continued again as described until two consecutive 24 hour interval samples of the well water show no contamination.

F. In the event a test pump is installed after the well has been disinfected, all exterior parts of the test pump coming in contact with the water shall be disinfected with a chlorine solution.

3.16 SAND AND CONTENT TESTING

A. Maximum acceptable sand content is 5 ppm.

B. Sand content shall be determined by averaging the results of 5 samples collected at the following times during the final pumping test:
1. Sample 1 at 15 minutes after start of the test
2. Sample 2 at ¼ of pumping period
3. Sample 3 at ½ of pumping period
4. Sample 4 at ¾ of pumping period
5. Sample 5 at end of the pumping period.

C. The minimum volume of water sample collected for testing for sand content shall be the test rate of flow in gallons per minute multiplied by 0.05, or a minimum of 5 gallons.

D. Sand content shall be determined in the following manner:

1. When a circular orifice meter is used to measure flow rate, the sample shall be discharged from a manometer connection into the sample containers.
2. When other devices are used for measuring flow rate of wells of a lower production rate, a sample may be collected directly from the full and open discharge.
3. The sample shall be allowed to settle not less than 10 minutes before the liquid is decanted.
4. The volume of sand collected in the five sample containers shall be dried, weighed, and expressed to the nearest ppm.

E. Turbidity shall be less than 5 NTU.

3.17 WATER AND SAMPLES AND ANALYSIS

A. Water Samples and Analysis: The Contractor shall be responsible for providing a certified laboratory to perform all water quality sampling and analysis as required per SC DHEC and specifically by R.61-58.2B(14). All samples shall be appropriately identified by the well identification number assigned by the Department (SC DHEC), the date, time, name of the sample collector, Contractor, and Owner. Test results shall be provided to the Engineer and SC DHEC Bureau of Water.

1. Bacteriological Analysis: Prior to sampling, the well shall be pumped until the chlorine residual in non-detectable. Two consecutive samples of water shall be collected at least twenty-four hours apart and be analyzed for total coliform bacteria. The results of both samples must show the absence of total coliform bacteria using membrane filter methodology. The measured chlorine residual and non-coliform growth must also be reported. If the non-coliform growth is greater than eighty colonies per one hundred milliliters, the sample result will be deemed invalid and must be repeated. The SC DHEC, Bureau of Water may request that heterotrophic plate count analyses be conducted on a case-by-case basis where construction, development, or disinfection problems are suspected. There will be no separate payment for heterotrophic plate count analyses if required.
2. Chemical and radiological analysis: Representative clear samples shall be properly collected and preserved and shall be analyzed by a certified laboratory. The sample shall be analyzed for all contaminants as required by SC DHEC and specifically as listed in R.61-58.5 and all other parameters needed to determine the aggressiveness of the water to include, pH, total alkalinity, calcium, hardness, total dissolved solids, temperature, and shall be delivered to the laboratory no more than thirty hours after its collection. The pH and temperature measurements shall be made in the field using certified methodology.

3.18 WATER LEVEL MEASUREMENT

A. The Contractor shall provide a plastic air line not less than 3/8 inch in diameter, with pressure gauge, check valve and connection for air supply, installed permanently in the well.

B. The Contractor shall coordinate the installation of the air line with the installation of the well pump.

3.19 WELL IDENTIFICATION PLATE

A. The Contractor shall provide and install a durable, weatherproof identification plate of rust-proof metal or an approved equal.

B. The Contractor shall attach the plate to the concrete foundation at top of the casing in a readily visible position.

C. The Plate shall be stamped or engraved to show the following information:
1. Drilling Contractor and registration number.
2. Date well completed.
3. Total depth of well.
4. Casing: Depth in feet and inside diameter in inches.
5. Screened intervals.
6. Gravel interval (of gravel-packed wells).
7. Yield or specific capacity expressed in gallons per minute (gpm) and gallons per minute per foot of drawdown (gpm/ft or drawdown).
8. Static water level and date measured.
9. Latitude and Longitude.

3.20 PROTECTION OF WATER QUALITY

A. The Contractor shall take such precautions as are necessary or as may be required to prevent contaminated water, or water having undesirable physical or chemical characteristics from entering, through the opening made by the Contractor in drilling the well, the stratum from which the well is to draw its supply. He shall also take all necessary precautions during the construction period to prevent contaminated water, gasoline, etc., from entering the well either through the opening or by seepage through the ground surface.

B. In the event that the well becomes contaminated or that water having undesirable characteristics does enter the well due to the neglect of the Contractor, he shall, at his own expense, perform such work or supply such casings, seals, sterilizing, agents, or other materials as may be necessary to eliminate the contamination or shut off the undesirable water.

C. Any well which is temporarily removed from service, or which is completed for a period prior to being placed into service, must be capped with a watertight cap and protected from vandalism.

3.21 WELL ABANDONMENT

A. If the Contractor fails to meet the Well Acceptance Criteria stated herein or those of SC DHEC, or should he experience a loss of a tools, cementing well screens or gravel packs, casing, collapse, or for other cause, the Contractor shall abandon the well in accordance with the standards and procedures specified in the SC DHEC's State Primary Drinking Water Regulations including specifically R.61-58.2 (B)(15) and the abandonment must b preformed by a certified Well Driller.

B. Aquifer Sealing Materials: The well to be abandoned shall be filled with neat cement, sand-cement, Bentonite-cement, or concrete. The neat cement, sand-cement, or Bentonite-cement mixtures shall be as specified in SC DHEC's State Primary Drinking Water Regulations including specifically R.61-58.2 (B)(7)(a).

C. Placement of Sealing Material: Sealing materials used in abandonment operations shall be placed in such a way as to avoid segregation or dilution of the sealing materials. Dumping sealing material fro the top shall not be permitted. Special consideration shall be given to the following:

1. A borehole or well which is to be abandoned due to contamination shall be considered a special case, and the method of filling and sealing such wells shall be subject to individual review and prior written approval by SC DHEC, Bureau of Water.
2. In the sealing of a double or multiple cased well, the certified well driller shall submit, for prior approval, a drawing thereof with a description of the proposed procedure and materials to be used to completely and permanently seal both the well and any column of filter pack that extends to the ground surface.
3. Bridging for Deep Wells: Very deep wells that do not require complete filling for sanitary protection may be backfilled with clean sand or gravel to the depth appropriate for the bottom of the plug of sealing materials. Where open casing (types II or III wells) are to remain below the sealed depth, a temporary bridge or plug made of inorganic materials (e.g., metal, cement) or manufactured devices specifically designed for this purpose in well construction and made of plastic or other elastic materials (e.g., neoprene, rubber) may be used to support the column of sealing materials until they cure and bond to the casing or borehole. The column of sealing materials is installed above the temporary bridge.

D. In Type II or III wells, the sealing materials shall extend down to at least fifty feet below ground surface, except that the uppermost five feet of the borehole may be filled with soil suitable for the intended land use. Casing may be removed, if desired, and the borehole abandoned by grouting.
   1. In abandoning all new wells (test wells, wells of insufficient yield, unacceptable water quality, etc.) the casing must be properly installed with the appropriate grouted material or else removed and the borehole abandoned by grouting.
   2. Contaminated Wells: Wells tapping multiple aquifers of different hydrostatic heads or wells tapping multiple zones of significantly different water quality must be abandoned in a manner such that contaminated or lower quality water does not migrate through the abandoned well or borehole and such that ongoing large vertical transfers of water between aquifers, of any quality, do not occur. The methods proposed for sealing such wells shall be reviewed and will require prior written approval by SC DHEC's Bureau of Water, Completely filling an uncased borehole with sealing materials shall be acceptable without prior approval.
   3. In sealing a double wall or multiple cased well, the certified well driller shall submit a drawing with a description of the proposed procedure.

E. Well Abandonment Records: Before the equipment is removed from the site, the exact location of the abandoned well or borehole shall be accurately surveyed and a record made to the location with respect to several fixed reference points. All information relative to the abandonment procedures, the location, depth, and diameter of the well or borehole shall be supplied in writing to the owner and the SC DHEC's Bureau of Water.

F. The Contractor shall receive no payment for time and material for well abandonment and shall receive no compensation for the abandoned well.

G. The Contractor shall replace the abandoned well at the price(s) set forth in the Bid. The new location shall be selected by the Engineer.

H. The Contractor shall compensate the Engineer for the additional costs of relocation and inspections associated with the abandoned well. It is understood and agreed that aside from any other liquidated or other damage per day for such delay from such time until the same is completed and accepted as herein provided, all costs of Engineering and inspection

incurred b the Engineer will be charged to the Contractor hereunder and deducted from any estimate or payment otherwise due and payable from time to time. The cost(s) of Engineering and inspections which may be charged to the Contractor under this article shall be equal to or equivalent to the Engineer's charge(s) (or the Engineer's standard rates) to the Owner under the terms of the Engineer's agreement with the Owner.

3.22 SITE CLEAN-UP

A. Immediately upon completion of a well, the Contractor shall remove all of his equipment, materials, and supplies from the site of the Work, remove all surplus materials and debris, fill in all holes or excavations with excavated materials free from debris and organic matter, and grade the site to elevations of the surface levels which existed before Work started. Not more than two weeks will be allowed for this Work and the Contractor shall complete all clean-up within that time. Failure to comply with these requirements shall be the authority of other contractors or workers directed by the Owner to enter upon the site and complete the clean up, grading, etc. The cost of this Work shall be deducted from any money due or to become due the Contractor for construction of the well.

3.23 PERFORMANCE TESTING

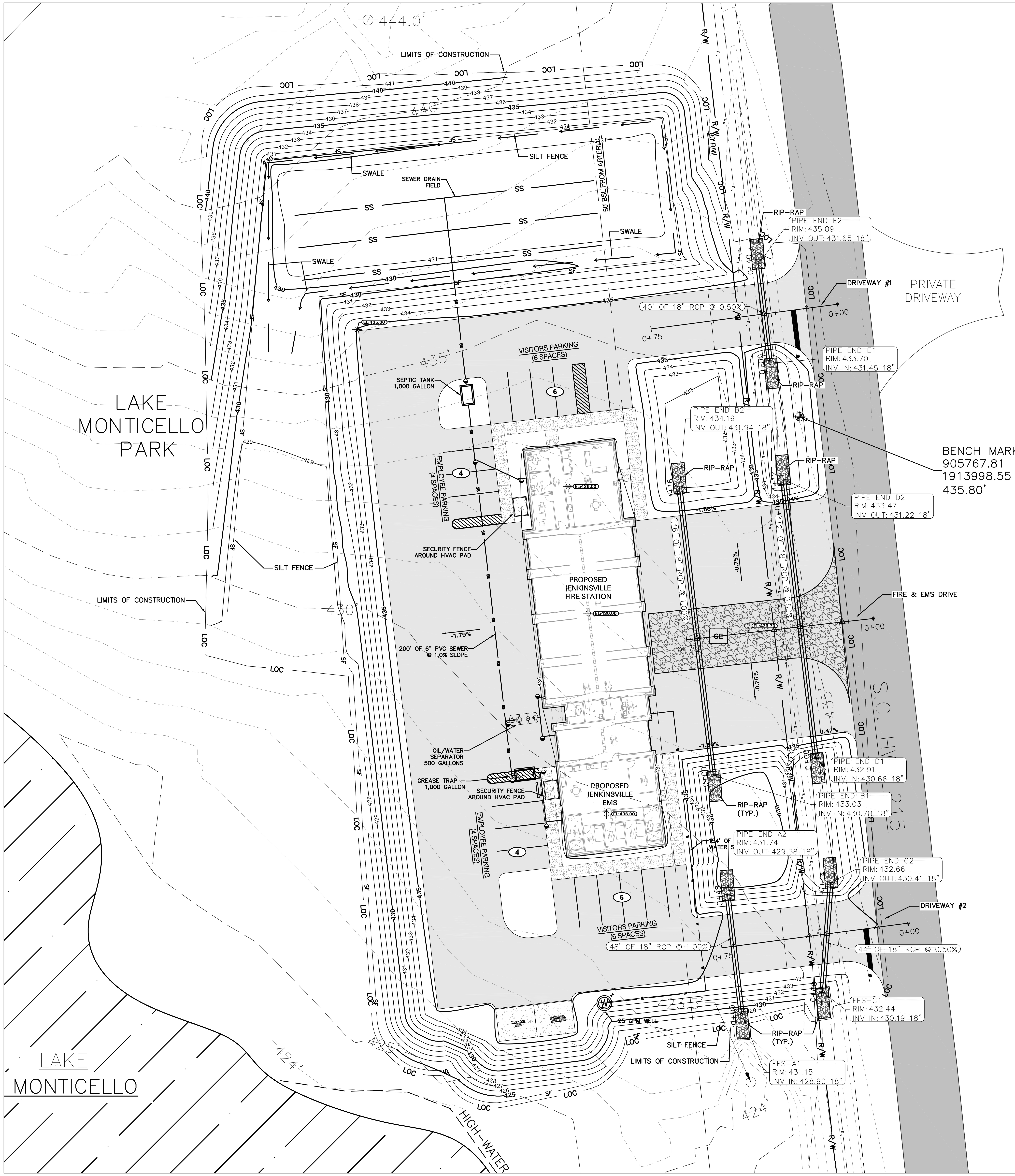
A. Notify Engineer and SC DHEC a minimum of 3 days prior to flow rate testing.

B. Test flow rate and certify.

C. Water Quality: Water Quality shall as a minimum be the more restrictive of SC DHEC's requirements or as noted herein.

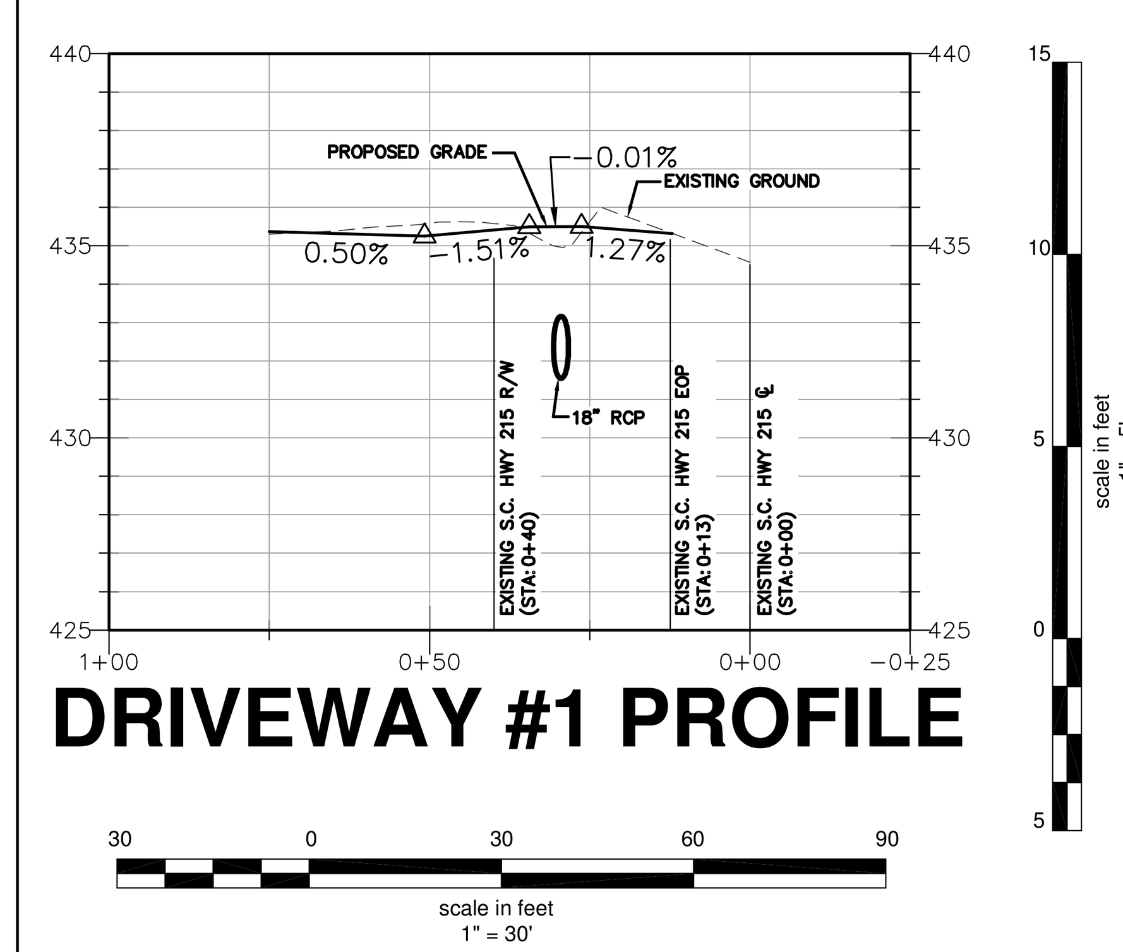
D. Sand Content: Sand Content shall as a minimum be the more restrictive of SC DHEC's requirements or as noted herein.

END OF SECTION

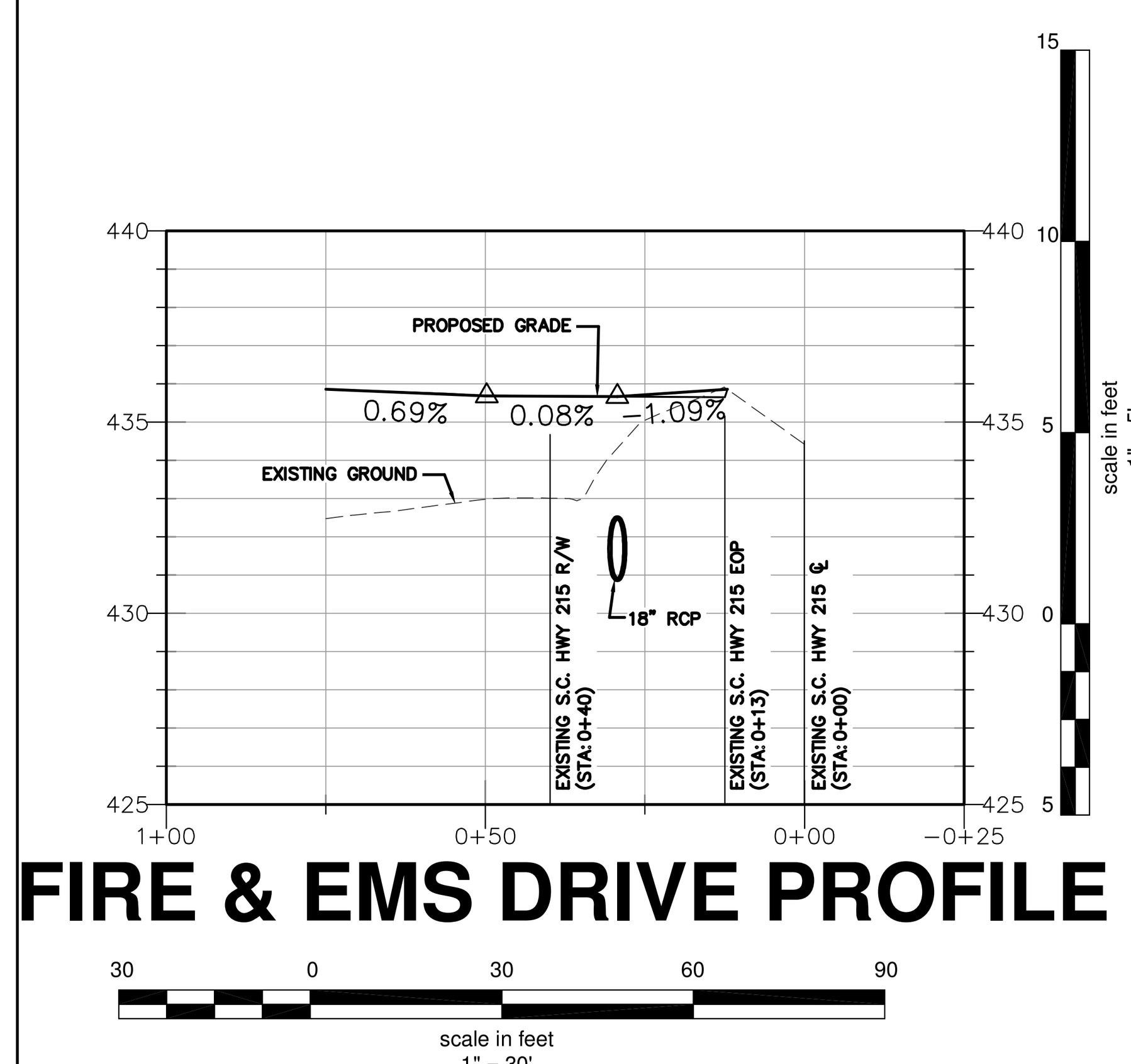


CONSTRUCTION SEQUENCE

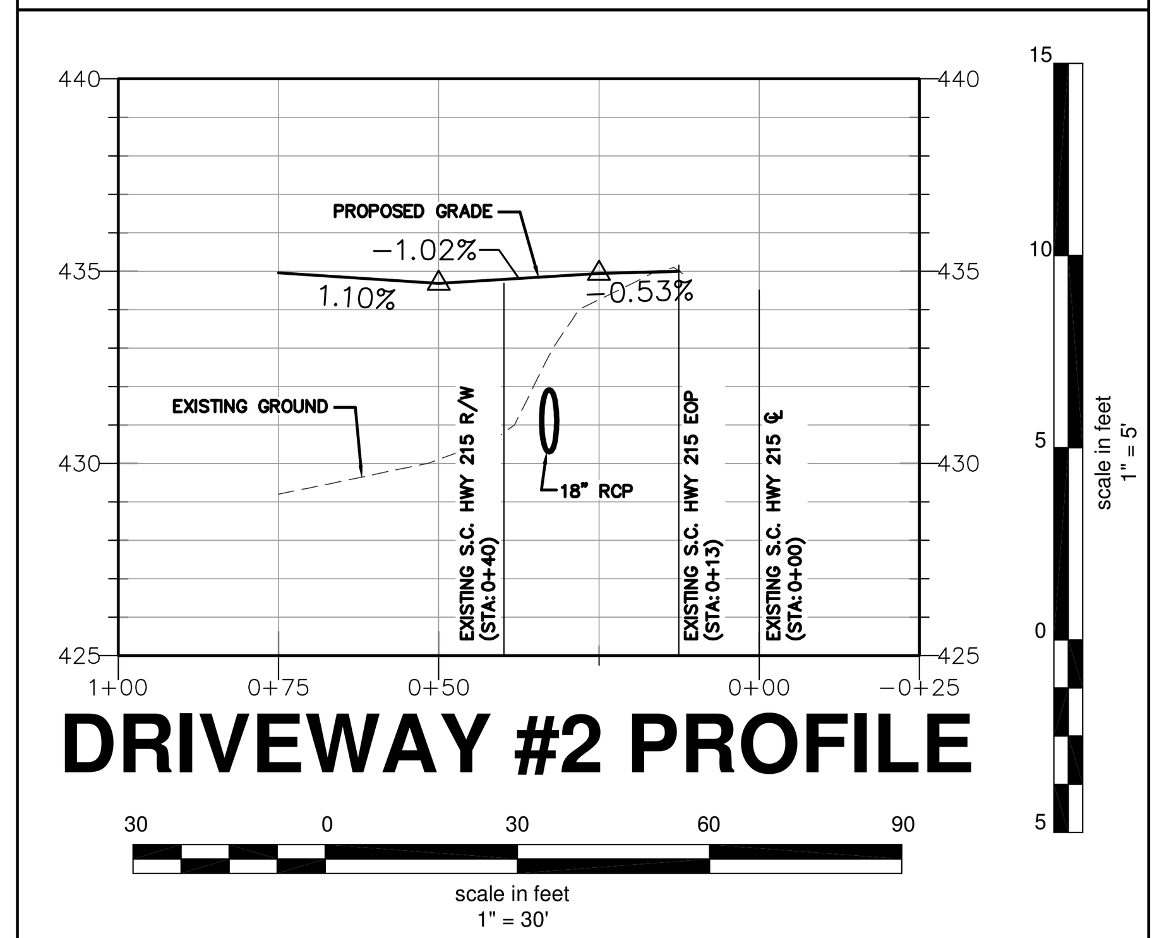
1. CONTACT SEDIMENT AND EROSION CONTROL INSPECTOR AT (803) 684-8571 TO SET UP A PRELIMINARY CONSTRUCTION MEETING 48 HOURS PRIOR TO ANY LAND DISTURBANCE.
2. INSTALL SEDIMENT CONTROL STRUCTURES (i.e., SILT FENCE, DIVERSIONS, SEDIMENT DAMS).
3. CALL THE INSPECTOR FOR AN INSPECTION OF SEDIMENT AND EROSION CONTROL MEASURES ONCE THEY ARE INSTALLED
4. INITIATE CLEARING AND GRUBBING.
5. CONSTRUCT DETENTION POND.
6. CONSTRUCT UTILITIES AND DRAINAGE STRUCTURES.
7. INSTALL EROSION CONTROL DEVICES (i.e. INLET PROTECTION).
8. GRADE SITE
9. CONSTRUCT BUILDING AND PARKING LOT.
10. STABILIZE DISTURBED AREAS.
11. REMOVE EROSION CONTROL DEVICES.



DRIVEWAY #1 PROFILE



FIRE & EMS DRIVE PROFILE



DRIVEWAY #2 PROFILE

LEGEND

Symbol	Description
80	EXISTING MAJOR CONTOUR
81	EXISTING MINOR CONTOUR
151	PROPOSED MINOR CONTOUR
150	PROPOSED MAJOR CONTOUR
EL: 151.00	PROPOSED SPOT ELEVATION (ALL ELEVATION ARE TO TOP OF PAVEMENT, TOP OF SIDEWALKS AND CURB & GUTTER ARE 6" HIGHER UNLESS OTHERWISE NOTED)
	PROPOSED CATCH BASIN
	PROPOSED DROP INLET
	PROPOSED FLARED END SECTION
LOC	LIMITS OF CONSTRUCTION
SF	SILT FENCE
	TEMPORARY CONSTRUCTION ENTRANCE (SEE DETAIL)
	INLET PROTECTION
	RIPRAP

STORMWATER NOTES

a) IF NECESSARY, SLOPES, WHICH EXCEED (8) VERTICAL FEET SHOULD BE STABILIZED WITH SYNTHETIC OR VEGETATIVE MATS, IN ADDITION TO HYDROSEEDING. IT MAY BE NECESSARY TO INSTALL TEMPORARY SLOPE DRAINS DURING CONSTRUCTION. TEMPORARY BERMS MAY BE NEEDED UNTIL THE SLOPE IS BROUGHT TO GRADE AND STABILIZED.

b) STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICAL IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW:

c) WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS. STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.

d) WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH DISTURBING ACTIVITIES WILL BE RESUMED WITHIN FOURTEEN (14) DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.

e) ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED EVERY SEVEN (7) DAYS. IF SITE INSPECTIONS IDENTIFY BMPs THAT ARE DAMAGED OR ARE NOT OPERATINGEFFECTIVELY, MAINTENANCE MUST BE PERFORMED AS SOON AS PRACTICAL OR AS REASONABLY POSSIBLE AND BEFORE THE NEXT STORM EVENT WHENEVER PRACTICABLE.

f) PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED, AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE ANY SEDIMENTS BEFORE BEING PUMPED BACK INTO ANY WATERS OF THE STATE (WoS).

g) ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.

h) THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO PAVED ROADWAY(S) FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT, AS MAY BE REQUIRED.

i) RESIDENTIAL SUBDIVISIONS REQUIRE EROSION CONTROL FEATURES FOR INFRASTRUCTURE AS WELL AS FOR INDIVIDUAL LOT CONSTRUCTION. INDIVIDUAL PROPERTY OWNERS SHALL FOLLOW THESE PLANS DURING CONSTRUCTION OR OBTAIN APPROVAL OF AN INDIVIDUAL PLAN IN ACCORDANCE WITH S.C. REG 72-300 et seq. AND SCR100000.

j) TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT-LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.

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scale in feet
1" = 20'

GENESIS CONSULTING GROUP

Kenneth B. Simmons Associates, LLC
landscape architecture & planning
2711 Middleburg Drive, Suite 210
Columbia, South Carolina 29204
(803) 254-3791 FAX (803) 254-3790

JOHN BOWMAN ARCHITECT, P.A., INC.

SHEET TITLE

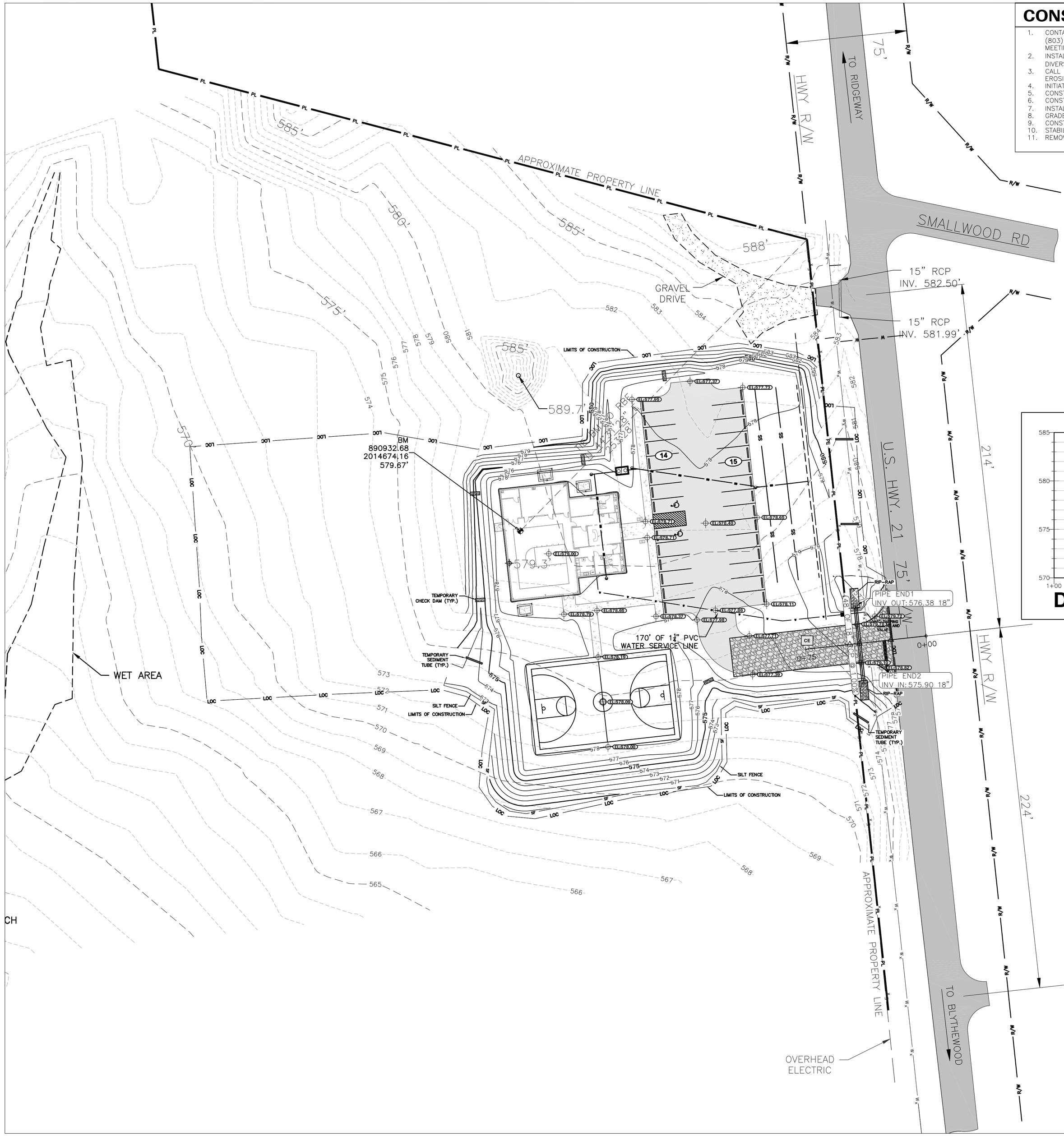
GRADING PLAN

PROJECT

JENKINSVILLE FIRE AND EMS
Fairfield County Recreation
(KBSA# - 2081A1-7,B,B1-2 JAN. 2015)

DATE	06-01-2015
PROJ. NO.	2081A1
DRAWN	CWS
CHECKED	DKB
PRINTED	
REVISIONS	

SHEET NO.
13C300
OF XX



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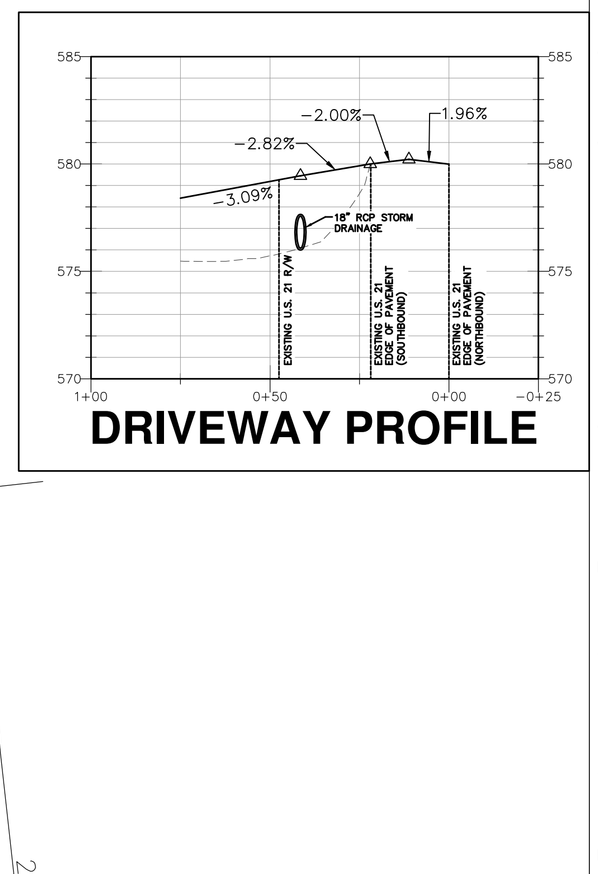
- PROPOSED CATCH BASIN
- PROPOSED DROP INLET
- PROPOSED FLARED END SECTION
- LOC — LIMITS OF CONSTRUCTION
- SF — SILT FENCE
- TEMPORARY CONSTRUCTION ENTRANCE (SEE DETAIL)
- INLET PROTECTION
- RIPRAP



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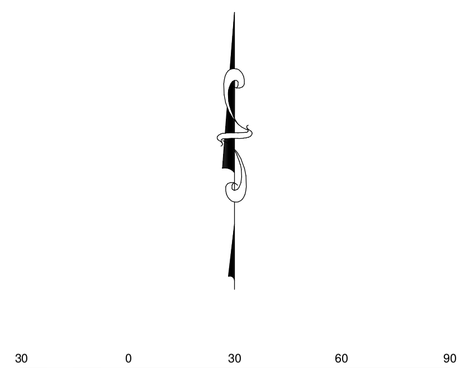

SOUTH CAROLINA — GENESIS CONSULTING GROUP NO. 3313 — CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 28282 — BRANDON K. DAVIS — 06-01-15

GENESIS CONSULTING GROUP

KBS
Kenneth B. Simmons Associates, LLC
landscape architecture & planning
2711 Middleburg Drive, Suite 210
Columbia, South Carolina 29204
(803) 254-3790 FAX (803) 254-3790

JOHN BOWMAN ARCHITECT, P.A., INC.
2711 Middleburg Drive, Suite 207
Columbia, SC 29204
Phone: (803) 252-2266
Fax: (803) 252-7788
www.jbowmanarchitect.com

SHEET TITLE
GRADING PLAN

PROJECT
DISTRICT #1- SMALLWOOD
Fairfield County Recreation
(KBSA# - 2081A1-7,B,B1-2 JAN. 2015)

DATE	06-01-2015
PROJ. NO.	2081A1
DRAWN	CWS
CHECKED	DKB
PRINTED	
REVISIONS	

SHEET NO.
1C300
OF XX

APAVEP

State of South Carolina
REGISTERED LANDSCAPE ARCHITECT
No. 4
KENNETH B. SIMMONS, JR.

State of South Carolina
CERTIFICATE OF AUTHORIZATION
No. 164C
KENNETH B. SIMMONS ASSOC., LLC

GENESIS CONSULTING GROUP

KBS
Kenneth B. Simmons Associates, LLC
landscape architecture & planning
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Columbia, South Carolina 29204
(803) 254-3791 FAX (803) 254-3790

JOHN BOWMAN ARCHITECT P.A., INC.
2422 Devine Street - Suite C
Columbia, SC 29205
Phone: (803) 252-2144
Fax: (803) 252-2766
www.JohnBowmanArchitect.com

SHEET TITLE
SITE WORK DETAILS

PROJECT
DISTRICT #1-7
Fairfield County Recreation
(KBSA# - 2081A1-7,B,B1-2 JAN. 2015)

DATE	07-1-2015
PROJ. NO.	2081A1-7,B, B1-2
DRAWN	AMC
CHECKED	KBS
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REVISIONS	

SHEET NO.

ADDENDUM #1
LA-SK1

OF XX