COLLINS & ASSOCIATES

ARCHITECTURE

Project:	FLORENCE COUNTY VOTER REGISTRATION & ELECTIONS COMMISSION BUILDING
Addendum No.:	**TWO**
Date:	June 8, 2010

THE FOLLOWING INFORMATION SHALL BE ADDED TO THE CONTRACT DOCUMENTS:

A. Architectural

1. See attached section 00220, Subsurface Exploration (1 page) and the attached Geotechnical Report dated June 7, 2010 as provided by GS2 Engineering & Environmental Consultants, Inc. (33 pages).

2. See attached specification 02360, Soil Treatment for Termite Control (2 pages).

3. See attached specification 07410, Fiber-reinforced Cement Board Roof / Floor Panels (3 pages).

4. Refer to Project Manual and section 01500, Temporary Facilities.
   a. Subparagraph 3.06, item H.
      1). A "shed" for toilet facilities is not required.

5. Refer to Project Manual and specification section 08110, Steel Doors and Frames
   a. Subparagraph 2.1 A
      1). Mesker is approved as a manufacturer of equivalent steel doors and frames.

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6. Refer to Project Manual and specification section 08210, Wood Doors
    a. Subparagraphs 2.2 A.1.a and 2.2 A.2.a
        1). Five Lakes Manufacturing is approved as a manufacturer of equivalent wood doors.

7. Refer to drawing sheet A4.3 and to Wall Section 1.
    a. See attached Supplemental Drawing SD-05 dated 06.07.10.

8. Refer to drawing sheet A4.3 and to Wall Detail A.
    a. See attached Supplemental Drawing SD-06 dated 06.07.10.

9. Refer to drawing sheet A4.3 and to Wall Detail C.
    a. See attached Supplemental Drawing SD-07 dated 06.07.10.

10. Refer to drawing sheet A8.0-1 and to Plan Detail F
    a. See attached Supplemental Drawing SD-08 dated 06.07.10.

11. Refer to drawing sheet A9.1 and to millwork elevation 5 (Millwork at Supply/Copier/Files 1018)
    a. See attached Supplemental Drawing SD-09 dated 06.07.10.

12. Refer to drawing sheet A9.2 and to millwork detail B3, Conference Room Base.
    a. See attached Supplemental Drawing SD-10 dated 06.07.10.

13. Refer to drawing sheet A9.2 and to millwork details B4 and B5.
    a. Delete reference to 20 minute rated hollow metal window frame. Frames at these locations are not required to be rated as noted on Window Schedule and as clarified in Addendum No. 1, Item A.12.

B. Civil

1. Refer to sheet C3, Overall Layout and to sheet A1.0, Architectural Site Plan
   a. See attached "HEAVY-DUTY CONCRETE PAVING DETAIL" as provided by Ervin Engineering (1 page). This detail is for the concrete at dumpster.

2. Refer to sheet C5, Erosion Control Plan and to Standard Notes, item 11 and to sheet C6, Storm Drainage & Paving Details and to General Site Notes.
   a. See attached revision to "GENERAL SITE NOTES" as provided by Ervin Engineering (1 page).

C. Electrical

1. Refer to sheet E2, Electrical Site Plan and sheet E6, Power Riser Diagram and Panel Schedules
   a. The concrete pad for the "Pad-Mounted Transformer" will be furnished and installed by Progress Energy Carolinas, Inc.
2. See attached letter from John Ray Williams and Associates dated June 7, 2010 (1 page).

END OF ADDENDUM No. 2

SECTION 00220 – SUBSURFACE EXPLORATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Information concerning a subsurface investigation by an independent testing laboratory is included in this section.

B. These reports were obtained by the Owner for use in design and are not a part of the contract documents. Test boring records are included for contractor's convenience and information, but are not a warranty of subsurface conditions.

1.2 JOB CONDITIONS

A. The contractor shall visit the site and acquaint himself with all existing conditions. Prior to bidding, bidders may make their own subsurface investigation to satisfy themselves as to the site and subsurface conditions, but such subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Architect.

END OF SECTION 00220

Proposed Florence County Voter Registration and Election Commission Facility

Intersection of South Irby Street and
Third Loop Drive
Florence, South Carolina

GS2 Project Number 10-12393-G
June 7, 2010

Report of Geotechnical Exploration with Pavement Recommendations

Prepared for:

Collins and Associates Architecture, LLC
615 South Coit Street
Florence, South Carolina 29501

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June 7, 2010

Collins And Associates Architecture, LLC
615 South Coit Street
Florence, South Carolina 29501

Attention: **Mr. Kevin J. Almers**

Reference: **Report of Geotechnical Exploration with Pavement Recommendations**
Proposed Florence County Voter Registration and Election Commission Facility
Intersection of South Irby Street and Third Loop Drive
Florence, South Carolina
GS2 Project Number 10-12393-G

Dear Mr. Almers,

This report presents our geotechnical exploration of the proposed Florence County Voter Registration and Election Commission Facility site, in Florence, South Carolina. Information obtained from our geotechnical exploration has been used to evaluate the existing site conditions for the use of developing design parameters for the proposed structure and pavements. This work was performed in general accordance with industry standards and our proposal number GS2 P12755-10, dated April 7, 2010.

Recommendations detailed in this report are specific to the soil conditions in the immediate vicinity of the boring locations for this particular project. This report does not include any environmental assessment of soils, surface water or groundwater, the determination of wetlands, the determination of noise impact, the assessment of air quality, the identification of cultural resources, and the identification of endangered species. These services are beyond the scope of services of a geotechnical exploration.

PROJECT INFORMATION

Proposed Development

Our understanding of the project is based on conversations with Mr. Kevin J. Almers of Collins and Associates and our review of gathered information. From these conversations and information we understand that the proposed development at the site is to include the construction

of a new, roughly 10,000 square foot, one-story in height state government facility with associated paved parking and drives.

We assume that the structure will be constructed utilizing a wood framed wall and roof system, with an exterior brick and glass veneer. Furthermore, we understand that the structure will be supported with a conventional shallow foundation system with a cast-in-place concrete slab-on-grade. Maximum wall and column loads for this type of structure are typically on the order of 2 to 3 kips per linear foot (klf) and 20 to 30 kips, respectively.

Additionally, no finished floor elevations for the proposed development were available at the time of this exploration; therefore, with our knowledge of the area, we assume that there will be possible cuts and fills on the order of 1 to 2 feet necessary to level the development areas.

Furthermore, we have assumed that the site will require both light and heavy-duty paved parking and drives. Anticipated traffic volumes were not available at the time of this investigation. However, our assumptions for each are detailed in the *Pavement Thickness Recommendations* section of this report.

Finally, we have assumed that the design and construction of the proposed structure at the site will be governed under the International Building Code, Edition 2006 (IBC 2006).

SITE SETTING

Site Location

The subject property is roughly 2.65 acres in area. Furthermore, it is understood that the proposed facility site is located northwest quadrant of the intersection of South Irby Street and Third Loop Drive in Florence, South Carolina. The location of the site relative to the nearby streets is shown in the "Site Location Map", Figure 1 in Appendix A.

Site Description

The subject site, at the time of our visit, was noted to be undeveloped and covered with trees and grass. The site was further noted to be bordered by undeveloped property to the north, South Irby Street to the east, Third Loop Drive to the south, and an existing commercial facility to the west. Access to the site was gained from Third Loop Drive.

Site Topography

The topography in the vicinity of the site consists of a series of gently sloping terraces that step downward toward the Atlantic Ocean. More specifically, the site appears to slope to the south toward Third Loop Drive. Furthermore it appears that storm water from the site will

eventually make its way into the surrounding storm sewer system and eventually into Middle Swamp and Alligator Branch Creek. Ground surface elevations across the site appear to range from 112 to 116 feet above mean sea level. General topographic information was obtained from the USGS Florence West topographic quadrangle, Figure 2 in Appendix A. More specific topographic information was obtained from the Proposed Site Plan, provided by Collins and Associates.

SUMMARY OF FIELD EXPLORATION

The subsurface conditions within the ***proposed structure*** were explored with 4 mechanically-augered soil borings, with Standard Penetration Tests (SPT) taken at regular intervals, extended to the termination depths of up to 60 feet below the existing ground surface.

Additionally, the subsurface conditions within the ***proposed pavements*** were explored with 3 hand augered soil borings, with Dynamic Cone Penetrometer tests performed at regular intervals, extended to termination depths of 5 feet below the existing ground surface.

The approximate boring locations are shown on the attached Boring Location Plan, Figure 3 in Appendix A. The borings were located in the field from estimated building corners via the provided layout plan.

SITE SOIL CONDITIONS

Site Geology

The site is located in the Coastal Plain Physiographic Province. The Coastal Plain consists of mainly marine sediments, which were deposited during successive periods of fluctuating sea level and moving shoreline. More specifically, the subject site is located in the middle Coastal Plain region of South Carolina. Surface topography is dominated by a series of nearly level terraces formed by ancient shorelines of the Atlantic Ocean. Terrace sediments are typically 20 to 100 feet in thickness, underlain by older, relatively over-consolidated clays or limestones

Soil Conditions

The subsurface conditions encountered at the boring locations are detailed on the attached “Soil Test Boring Logs” and “Record of Hand Auger Boring”. These logs represent our interpretation of the subsurface conditions at the boring locations based on our visual and textural examination of the recovered soil samples. The horizontal lines in the Soil Description column of the boring logs represent an approximate interface between various soil strata. It is important to understand that

these horizontal lines represent an estimated depth of soil variance where as the actual soil change may be gradual.

Surface materials, in the form of topsoil, ranging from 2 to 6 inches in thickness, were encountered at the ground surface at the boring locations across the site.

Proposed Structure: Beneath the topsoil, the borings performed within the proposed structure (borings B-1 through B-3 and B-7) encountered native Coastal Plain deposits, generally consisting of silty sands (SM) and clayey sands (SC) with intermediate layers of sandy silts (ML) to the termination depths of up to 60 feet below the existing ground surface.

The near-surface (0 to 3 feet) soils encountered in these borings generally consisted of silty sands (SM), which exhibited SPT N-values that ranged between 5 and 6 blows per foot (bpf), indicating loose relative densities. Beneath the near-surface silty sands, the underlying silty sands (SM) and clayey sands (SC), which were encountered to a depth of approximately 13 to 28 feet, exhibited SPT N-values noted to range between 2 and 46 bpf, indicating very loose to dense relative densities. Within and beneath the upper sands, the borings encountered intermediate layers of sandy silts (ML) to a depth of roughly 38 feet, which exhibited SPT N-values noted to range between 14 and 37 bpf, indicating stiff to hard consistencies. Finally, the basement layer of coarse grained silty sands (SM) encountered in Boring B-1, from a depth of 38 feet to the termination depth of 60 feet, exhibited SPT N-values on the order of 100+ bpf, indicating very dense relative densities.

Proposed Pavements: Beneath the surface materials, the soil borings within the vicinity of the proposed pavements (borings B-4 through B-6), generally encountered native Coastal Plain deposits, consisting of clean and clayey sands (SP and SC) to termination depths of 5 feet below the existing ground surface. The near-surface sandy soils (0 to 5 feet) exhibited DCP blow counts noted to range from 8 to 25+ bpi, indicating firm to very firm relative densities.

Groundwater

Free groundwater was encountered in borings B-1 through B-3 and B-7 at depths ranging between 9 to 11 feet below existing ground surface. For safety purposes, the boring holes were backfilled following drilling operations, therefore, twenty-four hour stabilized groundwater readings were not obtained. Groundwater levels are dependent on many factors and can experience seasonal fluctuations and various other fluctuations due to precipitation, construction activities, tidal fluctuations and many other factors.

SEISMIC CONSIDERATIONS

Regional Seismic Conditions

This site is situated in Florence, approximately 90 miles north of Charleston, South Carolina, which is the most prominent area of seismicity along the Atlantic Seaboard. The Charleston earthquake of 1886 was the largest seismic event that has occurred in this region and damage was recorded to be extensive throughout the Charleston area. The epicenter was estimated to be located approximately 15 miles northwest of Charleston between the towns of Summerville and Middleton Place Plantation.

Recent discoveries of relict liquefaction in the Low Country region of South Carolina have expanded knowledge about seismicity in the area. Evidence indicates that at least five episodes of strong prehistoric ground shaking large enough to produce widespread liquefaction have occurred within the Charleston area within the last 7500 years. The Charleston region continues to experience earthquakes of smaller magnitudes yearly.

IBC 2006 Seismic Site Class

Our analysis of the soil seismic conditions was based on the information obtained from our SPT borings, known site and vicinity geological conditions, known regional seismic conditions, and seismic design parameters established in data published in the International Building Code 2006 (IBC 2006), section 1613. Therefore, from the known regional conditions, the SPT N-values measured, and the parameters established in the IBC 2006, we have determined that the site is best defined to have a **Site Class D**.

Earthquake Ground Motion

Earthquake ground motion parameters at the bedrock for this site were obtained from the International Building Code (IBC2006) section 1613. The values for this site are presented in Table 1. Ground motions were obtained utilizing the mapped accelerations, with the design responses for both ground motions represented in the following sections.

Table 1: Probabilistic Ground Motion Values

Spectral Response Acceleration	***Ground Motion Values for Recurrence Period (g)***
	2% in 50 Years (2006)
0.2 sec Sa[1]	0.811
1.0 sec Sa	0.218

Note: 1. Sa is the Spectral Response Acceleration at the noted period.

Based on the information presented in the preceding table, and the IBC2006 section 1613.5.3, the corresponding site coefficients for the site are calculated to be:

Table 2: Seismic Site Coefficients

	2006
F_a	1.176
F_v	1.963

Design Spectral Response

Based on the information presented in the preceding table, and the corresponding site coefficients for the site, we have calculated the Design Spectral Response Acceleration Parameters, according to IBC2006 section 1613.5.4, for this site to be:

Table 3: Design Spectral Response

	2006
S_{DS}	0.64
S_{D1}	0.29

CONCLUSIONS AND RECOMMENDATIONS

The borings performed during this exploration indicate that the existing near surface sandy soils (SP, SM and SC) appear ***suitable***, for support of the proposed structure and pavements as well as for use as structural fill due to their inherent characteristics, while the deeper silty soils (ML), if encountered, appear ***marginally suitable*** for support of the proposed structure as well as for use as structural fill.

It is important to note that fine-grained soils such as those found at this site, if encountered, are typically sensitive to variations in moisture content with a relatively narrow range of workable moisture contents. Therefore, close control of moisture content will be necessary during grading and fill placement operations. In addition, the soils at this site may become difficult to work during periods of wet weather. Grading operations under wet conditions may result in deterioration of otherwise suitable soil conditions, or of previously placed and properly compacted fill. These inherent soil properties make these soils less desirable for support and for use as structural fill, however, if these soils are placed properly suitable support of the structure is achievable.

Due to the loose near-surface soil conditions encountered, it will be necessary to use minor near-surface ground modifications in order to support the proposed structure. In general, the ground modifications at the site should include the in-place densification of the near-surface soils to minimize foundation settlements and to provide a uniform bearing strata for the structure to bear on. The subsequent sections of this report detail our recommendations.

These conclusions, and the subsequent recommendations, are provided in the assumption that the soil conditions at the site do not vary greatly from those encountered in our borings and that our recommendations presented in the following sections of this report are followed.

Suitability of Soils

As previously stated, the near-surface soils at the site have been identified to have an ***SP***, ***SC*** and ***SM*** with deeper layers of ***ML*** USCS soil classification. Most text includes soils with Unified Soil Classifications of SW, SP, SM, SC, SM-SC, ML and CL as suitable for support of structure or for use as structural fill, while soils with classifications of MH, CH, OL and OH are considered unsuitable. Therefore, it is important to note that a large portion of the site contains soils that are considered in the industry to be ***suitable*** (SP, SC and SM) with layers considered to be ***marginally suitable*** (ML). The following sections provide more insight into each soil classification, with emphasis placed on their workability and preferred structural loading.

Soils that have SC (with high Plasticity Indexes) and ML designations are less preferable fill soils that exhibit fair to good structural support characteristics under buildings and pavements, less ease in workability, with little flexibility in achieving compaction at various moisture contents. Consequently, these soils are less preferred for use as roadway subgrade, with a fair to poor rating, due to their instability when exposed to excessive moisture. These soils may be used as roadway subgrade, if adequate moisture control is maintained during placement and if stormwater is not allowed to pond or penetrate these soils, ultimately preventing subgrade degradation due to over-saturation.

Fine-grained soils (SC (with high PIs) and ML) are typically sensitive to variations in moisture content with a relatively narrow range of workable moisture contents. Therefore, close control of moisture content will probably be necessary during grading and fill placement operations, where these soils are involved. In addition, these soils may become difficult to work during periods of wet weather. Grading operations under wet conditions may result in the deterioration of otherwise suitable soil conditions, or of previously placed and properly compacted fill.

Site Preparation

General Clearing and Grubbing: Any vegetation and organic laden soils, as well as any surface materials, should be removed from beneath, and within a 5 foot perimeter, of structurally loaded or fill areas, and wasted off site or in areas to be landscaped prior to placement of structural fills. As previously mentioned, surface materials in the form of topsoil were observed to be roughly 2 to 6 inches in thickness across the site.

Building Pad Subgrade Preparation: Once the general stripping is complete, the exposed cut and proposed fill sections of the building pad, and 5 feet beyond the perimeter, should be densified in-place to depths of at least 3 feet. Our experience of in-place densification dictates that typically only the upper 2 to 3 feet of "dead sands" are able to be affected through conventional methods,

In-place soil densification can be accomplished using a large smooth-drum vibratory roller by making several passes over the area to be densified in a crossing pattern, after the site has been stripped. Densification in-place yields varying results in the field, and is highly dependent upon obtaining a sufficiently large roller, the in-situ moisture content, and the ability to achieve confinement of at least one side, (i.e. along on strip), prior to proceeding to the next. Obtaining confinement is typically an iterative process and requires that multiple passes along well established rolling lanes be performed, the initial passes made with the vibratory setting used and the finishing passes made with a static roller.

Upon achieving an optimal densification in one direction it is recommended that the rolling efforts be repeated in the perpendicular direction, until no noticeable improvements in densification are observed. In-place soil densification is recommended for soils in which below optimum moisture contents are present, and where groundwater is greater that 3 feet below the depth of densification required.

Densification of the on-site soils should continue until an SPT N-value of 8, or an equivalent Dynamic Cone Penetrometer (DCP) value of 11 is achieved, with a target density of 95 percent of the laboratory Standard Proctor maximum dry density (ASTM D698). The densification techniques and activities should be verified as the work progresses. In the event that adequate confinement for the densification is not achieved, we recommend that over excavation and replacement be conducted.

Foundation Subgrades: The proper placement of fill soil will likely provide a suitable footing subgrade beneath the foundations for the planned structure at this site. However, this does not alleviate the contractor from verifying that adequately dense bearing soils are present within the foundation subgrades, as stipulated in the recommendations provided in the *Foundation and Construction Recommendations* section of this report.

Alternate Ground Modification of Foundation Subgrades: If unstable bearing soils are encountered during footing excavation, an alternate ground modification technique that may be used to remedy the bearing

soils includes the over-excavation of the bearing soils directly beneath the footprint of the foundations, and the backfilling the resulting excavation with properly compacted structural fill or washed No. 57 stone, to near original bearing elevations. We recommend that the washed stone, if used, be wrapped with a non-woven filter fabric, where it will be submerged or partially submerged in groundwater.

Pre-Pour and/or Pre-Pave Inspections: After achieving a stabilized subgrade, and prior to the construction of the finished slabs and/or pavements, assuming some time will pass where the grade slab and/or pavement subgrade is exposed, the prepared subgrade will need to be re-inspected and proofrolled in order to detect locally yielding soils.

General Proofroll Recommendations: Proofrolling should be performed with a twenty-ton rubber-tired tandem axle vehicle or similarly loaded vehicle or construction equipment, and should be observed by a qualified geotechnical engineer. For mass graded areas, building pad areas, and paved parking areas, the designated vehicle should make at least four passes over each section of the exposed soils with the last two passes perpendicular to the first two. For paved roadways, the designated vehicle should make at least two passes over each section of the exposed subgrade soils, including the proposed curblines. A final proofroll is recommended to be performed within 24 hours of pavement construction. If inclement weather occurs or if the proofroll fails to yield favorable results within this 24-hour window, then reworking of the subgrade soils may be required to achieve a suitable subgrade.

Any localized areas of yielding, soft/loose and/or saturated soils identified during proofrolling will need to be densified in-place, undercut and the removed soil replaced with properly compacted structural fill, or be modified by the use of mechanical or chemical means. Any modification activities should be monitored and all fill should be placed in general accordance with the recommendations presented in the *Structural Fill* section of this report.

Stormwater and Groundwater Management

As previously stated, groundwater was encountered in borings B-1 through B-3 and B-7 at depths ranging between 9 to 11 feet below the existing ground surface at time of boring. Therefore, it appears that the groundwater is at a sufficient depth as to not affect construction activities at the site. However, if groundwater is encountered during excavation activities, and depending on the proposed grades, the contractor will need to be prepared to dewater any excavations or exposed subgrade soils by ditching or pumping. From our experience with similar projects

and site conditions, the soil types encountered at this site will likely require several days to a week to drain.

Any exposed subgrade soils and recently placed fill soils should be well drained to minimize the accumulation of stormwater runoff. If the exposed subgrade soils are not as anticipated, or become excessively wet, the geotechnical engineer should be consulted.

Structural Fill

On-site Sands: The on-site sandy soils (SP, SC and SM) encountered appear *suitable* for use as structural fill

On-site Silts: As stated previously, the on-site, low-plasticity silty soils (ML), if encountered, are *marginally suitable* for use as structural fill. As mentioned previously, the fine-grained nature of the on-site soils indicates that they are typically sensitive to variations in moisture content, with a relatively narrow range of workable moisture contents. Therefore, close control of moisture content will be necessary during grading and fill placement operations. In addition, the soils at this site may become difficult to work during periods of wet weather. Grading operations under wet conditions may result in the deterioration of otherwise suitable soil conditions, or of previously placed and properly compacted fill.

Furthermore, these inherent soil properties make these soils less desirable for use as structural fill; however, if placed properly, suitable support of structures is achievable, provided subgrade drainage is established and maintained throughout the service life of the structure. Alternate, more suitable, borrow soils should be sought in the event that the on-site silts and clays are deemed, during grading activities by the geotechnical engineer, to be unsuitable for use as structural fill or the support of structure.

General Fill Recommendations: Prior to the placement of fill soils, representative soil samples should be obtained and tested to determine their classification and compaction characteristics. Optimum fill material should be free of debris and any fibrous organic material or organic soils and should have a Plasticity Index (PI) less than 15. We recommend that fibrous organic material found in the fill materials be no more than 5 percent by weight. Compaction characteristics of the fill soils should be determined using the laboratory Standard Proctor density test, ASTM D698, "Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard effort (12,400 ft-lbf/ft^^{3})".

Fill material should be placed in no more than 8-inch thick lifts, loose measurement, and within +1 to -3 percent of the optimum moisture content determined by ASTM D698. Fills placed beneath the area of the structure and pavements, and five to three feet, respectively, beyond their perimeters should be compacted to a minimum of **95** percent of the laboratory Standard Proctor maximum dry density (ASTM D698).

Furthermore, placement of the fill material should be observed and tested by a geotechnical engineer or qualified engineering technician as placement of the fill progresses. For grading beneath structure and pavements, compaction testing should be performed at a minimum frequency of one test per lift per 2000 square feet of fill placed. For utility trench backfill, compaction testing should be performed at a minimum frequency of one test per lift per 200 feet of fill placed within utility trenches, where these trenches are extended beneath structure or pavements. Upon completion of the mass grading and the installation of buried utilities and/or conduits, it will be necessary to retest the compaction of the structural fill placed within all backfilled utility trenches, where they have been buried within a previously tested and approved grade slab or pavements. Failure to re-inspect and retest these trenches beneath grade slabs and pavements may result in varying soil support of the loaded subgrade soils.

Slope Construction Recommendations

Permanent compacted fill and exposed cut slopes, if required, should be inclined no steeper than 2H:1V, for slopes greater than a height of 4 feet. Furthermore, we recommend that any compacted fill slopes be benched and slightly over-built, (in order to minimize the presence of a loose zone of poorly compacted soils near the slope face), and then cut back to firm, well compacted soils prior to the placement of structure or vegetative cover. Cut slopes may require some reworking of the near surface soils in order to achieve a more sound slope surface. Upon construction of a competent slope face, it is critical that the slope face be protected from erosion, through the installation of a geotextile fabric or the application of a vegetative cover.

We caution against the installation of foundation, drop inlets or storm sewer lines within an improper embedment zone of the slope face, where possible over stressing and leakage may create maintenance problems or possible isolated slope failure. In general these structures need to be installed a minimum distance of 1½ times the height of the embankment, as measured from the crest and/or toe of the slope. Furthermore, proper embedment of foundations or buried utilities beneath slope faces should be established prior to construction, with a minimum embedment for foundation recommended to be 5 feet below

the down gradient portion of the slope, while a minimum embedment for buried utilities is recommended to be 3 feet below the down gradient portion of the slope.

Soil Retainage System

We understand that retaining wall structures ***may*** be necessary at the site to support lateral soils forces, and we understand that other soil retainage systems ***may*** be required during excavation and foundation construction activities conducted on-site.

Therefore, we have estimated the earth pressure coefficients for each support condition in a drained situation, for the near-surface soils encountered at the site. The estimated values are dependent on the soil type, and the unit weight of the soil, as determined from laboratory testing, for the type of material actually used, and should be verified upon fill selection.

Table 4: Earth Pressure Coefficients

Support Condition	***Pressure Coefficient existing sandy soils***
Active (Wall deflects laterally away from retained soil).	Ka = 0.36
At-rest (Wall is restrained from movement).	Ko = 0.53
Passive (Wall deflects laterally toward retained soil).	Kp = 2.77

A design unit weight of 105.0 pounds per cubic foot, cohesion of 0 psf, and a phi angle of 28 degrees are assumed for the existing sandy soils.

The design of the retainage structures should include an allowance for positive gravity drainage of the retained soils either using permanent toe drains or weep holes.

Additionally, compaction of fills behind retainage structures should be conducted with light, hand-held compactors. Heavy equipment, such as rollers or grading equipment should not be allowed to operate within 10 feet of the retaining wall during construction in order to avoid developing additional excessive lateral earth pressures.

We caution against the installation of structures, drop inlets or storm sewer lines within an improper offset zone of the retaining wall, where possible over stressing and leakage may create maintenance problems or possible wall failure. Proper offsets for construction behind and at the base of retaining walls should be established prior to construction. Minimum offset for the edge of structure or infrastructure should be at least 1 to 1½ times the height of the wall, with distances measured perpendicular and away from the top of the wall, starting at the crest and toe of the wall.

Foundation and Construction Recommendations

Provided that any soft or non-performing near-surface soils have been densified in-place and/or undercut in accordance with the *Site Preparation* section of this report, and that fill has been placed in accordance with the *Structural Fill* section of this report, the conventional shallow spread foundations used to support the planned structure at this site may be proportioned for an allowable bearing pressure of **2,500** pounds per square foot. If the ground modification techniques detailed in this report are not utilized at this site, then the allowable bearing pressure for design of the structure will be on the order of **1,000** to **1,500** psf, with excessive and unpredictable total and differential settlement likely to occur between foundation members of the same structure. The following paragraphs provide additional recommendations, assuming that the ground modifications prescribed in this report are followed.

For the planned structure at the site we recommend that the continuous foundations have a minimum width of **1½** feet, and that the spread foundations have a minimum width of **3** feet, to avoid localized punching failure. Additionally, we recommend that the foundations for the structure bear at a minimum depth of 12 inches below the final ground surface, in order to ensure that the bearing surfaces are below the maximum frost depth.

The actual depth of embedment of the foundations should be dictated by the ability to achieve the foundation and soil forces required to adequately resist up-lift and overturning for the subject structure. Soil forces reacting with embedded shallow foundations may be used to aid in the resistance of both uplift and overturn for this structure. The weight of the soil "wedge" above the footing may be used to aid in the resistance of uplift forces. We recommend that a unit weight of 105 pcf be used to compute the resisting soil weight. This unit weight has been estimated assuming select fill will be used as backfill and that the fill will be compacted to at least 95 percent of the Standard Proctor maximum dry density. The volume of the soil wedge may be calculated by assuming that the resisting soil section extends 45 degrees vertically from the outside top edge of the foundation to the ground surface. Additionally, passive earth pressure of the soils adjacent to the foundations, as well as soil friction at the foundation base and sides, may be used to develop shear to aid in the resistance of uplift and overturn. An ultimate friction coefficient between the foundation concrete and adjacent soil can be assumed to be on the order of 0.40.

The footings should be properly benched and the bearing soils free of loose debris or ponded water. If excavated bearing soils are exposed to the environment for extended periods of time or varying weather

conditions, they may weaken. Foundation concrete should not be placed on bearing soils that have been weakened from the effects of the environment. Therefore, we recommend that the footings be concreted shortly after excavation. If the footing excavation should remain open overnight, or if rain becomes imminent, we recommend that the bearing soils be covered with a 2 to 4 inch mud-mat of 2000 psi concrete.

We strongly recommend that the footing excavations are observed and Dynamic Cone Penetrometer (DCP) values obtained by a qualified geotechnical engineer or engineering technician in order to confirm that the bearing soils are acceptable for the recommended bearing pressure. DCP testing should be conducted at a minimum frequency of 50 linear feet for continuous footings and at every pier footing, to minimum depths of twice the excavated foundation width. Unsuitable bearing soils, if encountered, will likely be required to be over-excavated and the resulting excavation to be backfilled with properly compacted fill, washed No. 57 stone or concrete.

Provided the site preparation and construction recommendations presented in this report are followed, the total estimated settlement for the planned structure will likely be on the order of 1 inch. The differential settlement could be expected to be ½ of the total settlement for the cohesionless and cohesive type soils encountered at the site. It is important to note that these estimates do not account for any seismic induced settlements.

Grade Slabs

We understand that the grade-slab for the structure will be soil supported. We therefore recommend that the slabs be jointed, reinforced and/or doweled in appropriate locations in order to allow differential and rotational movement between parts of the slab without uncontrolled cracking or sharp vertical displacements.

We further recommend that a re-compacted modulus of subgrade reaction of **140** pounds per cubic inch (pci) be used, for the *on-site sandy soils* (SP, SM and SC), for design of slab reinforcement at this site. In addition, an underslab vapor barrier should be included where finished areas will receive floor coverings. Slab design and construction using vapor barriers should be performed using methods detailed in the ACI Manual of Concrete Practice.

Construction activities and exposure to the environment can cause deterioration of the prepared subgrades. Therefore, we recommend that the subgrades be observed and compaction tests performed by a qualified geotechnical engineer or engineering technician in order to confirm suitability of the soil subgrades.

Pavement Thickness Recommendations

If you elect to follow the site preparation recommendations provided in this report, a re-compacted design California Bearing Ratio (CBR) value of approximately **10** should be available from the *on-site sandy soils* (SP, SM and SC) for subgrade support of flexible pavements.

We have assumed both light and heavy-duty paved areas will be required for this project. We define light-duty areas as areas having a heavy concentration of automobiles and no loaded trucks, such as a car parking lot pavement. We define heavy-duty paved areas as areas receiving a heavy concentration of automobiles and loaded trucks such as an access drive or a loading dock area. Since no traffic loading conditions were provided, we have estimated total traffic design loading as 6 cars per day per parking space (understood to be 34 spaces), 3 delivery trucks per day, 1 garbage truck per week and 1 EMS vehicle per year. We calculate a total traffic loading of an equivalent axle loading (EAL) for light and heavy-duty pavements of about 1,490 and 49,450 passes, respectively, of an 18-kip equivalent axle load over a life span of 20 years. These traffic volumes do not account for construction traffic, therefore, proper roadway construction staging techniques should be used, or the pavement thicknesses should be recalculated with respect to this traffic.

Our thickness analyses for flexible pavements were performed in general accordance with the *AASHTO Guide for Design of Pavement Structures, 1993*. Based on the above assumptions, we recommend that the pavement sections over the prepared subgrade adhere to the thicknesses presented in Table 5 below.

Table 5: Pavement Thickness Recommendations

Pavement Type	***Layers***	***Material***	***Thickness (inches)***		
			Light-Duty Stalls	***Light-Duty Drives***	***Heavy Duty Drives***
Flexible	a.	Asphaltic Concrete Surface Course	1-1/2	2	2-1/2
	b.	Asphaltic Concrete Binder Course	---	---	---
	c.	Graded Aggregate Base Course	6	6	8
	d.	Properly Prepared Subgrade	18	18	18

Flexible Pavement Section: The asphalt surface course should conform to the South Carolina Department of Transportation (SCDOT) Standard Specification, Section 403, for Type 1 Hot Laid Asphalt Concrete Surface Course. The binder material should conform to SCDOT Standard Specification, Section 402.

Base Material Section: Additionally, the base course material should be a Graded Aggregate Base Course (GABC) conforming to SCDOT Standard Specification, Section 305. The base course should be compacted to 100 percent of the Modified Proctor (ASTM D-1557) maximum dry density

General Pavement Recommendations: Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations, and environmental factors that will significantly affect the service life must be included in the preparation of the construction drawings and specifications. Normal periodic maintenance will be required.

Additionally, we recommend that the placement of the asphalt and GABC be observed and tested by a geotechnical engineer or qualified engineering technician as placement of the fill progresses. Compaction testing should be performed at a minimum frequency of one test per lift per 200 feet of lane. Furthermore, construction activities and exposure to the environment can cause deterioration of the prepared subgrades, therefore, we recommend that the subgrades be inspected prior to the placement of the asphalt.

BASIS FOR RECOMMENDATIONS

The recommendations presented in this report are based on our understanding of the project information, our interpretation of the data obtained during our recent exploration and our experience with similar soil and project conditions. The Standard Penetration Tests (SPT) and Dynamic Cone Penetration (DCP) values obtained at the boring locations have been used to estimate existing soil conditions at this specific site. Regardless of the thoroughness of this investigation, it is possible that the soil conditions intermediate of the borings vary from the soil conditions encountered at the boring locations. Therefore, it will be necessary for a geotechnical engineer or qualified engineering technician to be present during grading operations in order to evaluate and document that the anticipated design conditions actually exist.

CLOSING

Once again we appreciate the opportunity to provide our services for your geotechnical consulting needs. If there are any questions concerning our recommendations or if additional information becomes available please contact us.

Sincerely,
GS2 ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC.

Shawn J. Etier EIT,
Senior Geotechnical Professional

Bryan Rembert, P.E.
Operations Manager

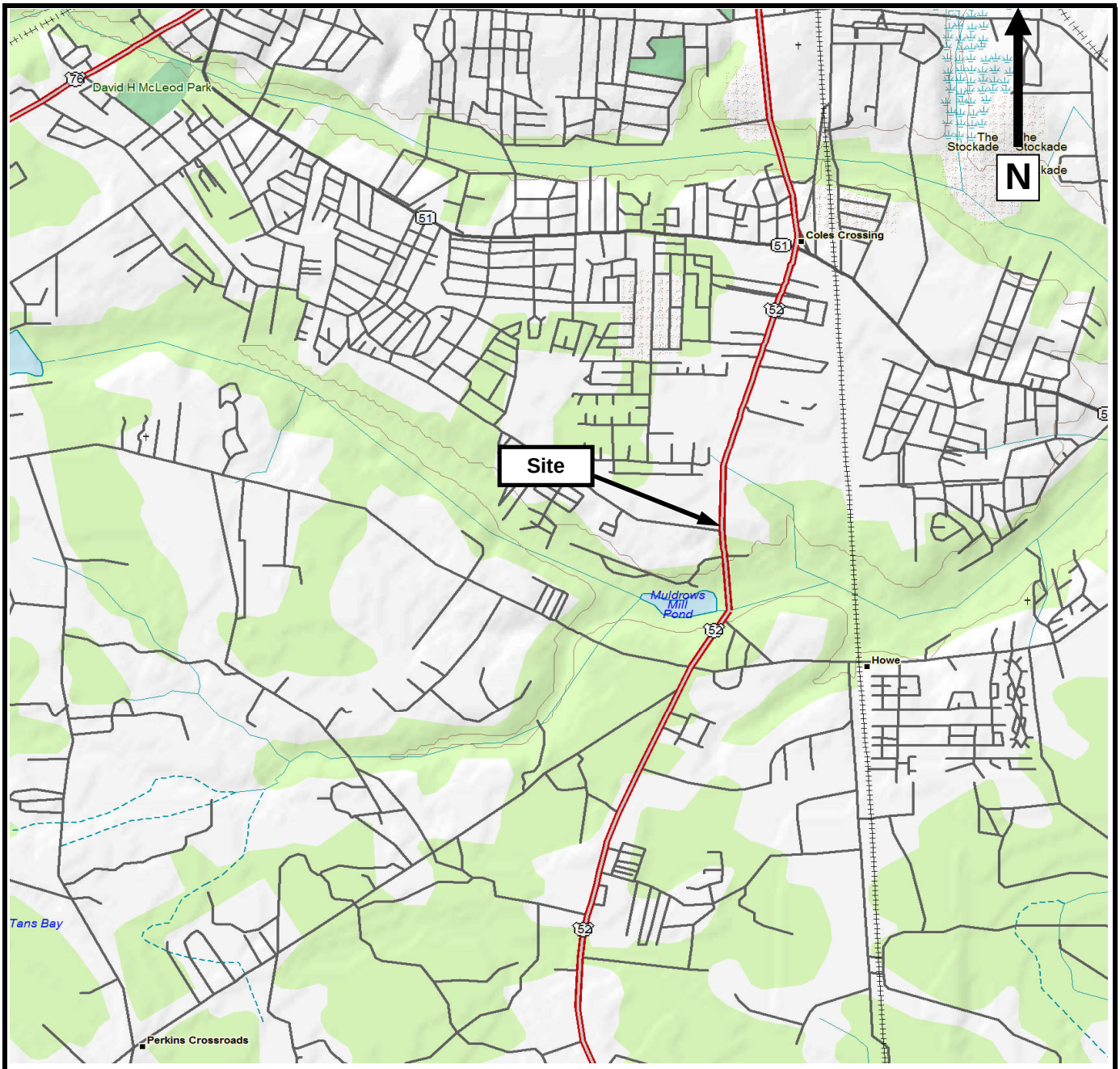
Robert C. Bruorton, P.E.
Chief Geotechnical Engineer, AVP

APPENDIX A

Figure 1. Site Location Map

Figure 2. USGS Topographic Map

Figure 3. Boring Location Plan



Source: Presented by DeLorme, dated 1999.

Prepared By-Date: SE-6/07/10
Checked By-Date: CB-6/07/10

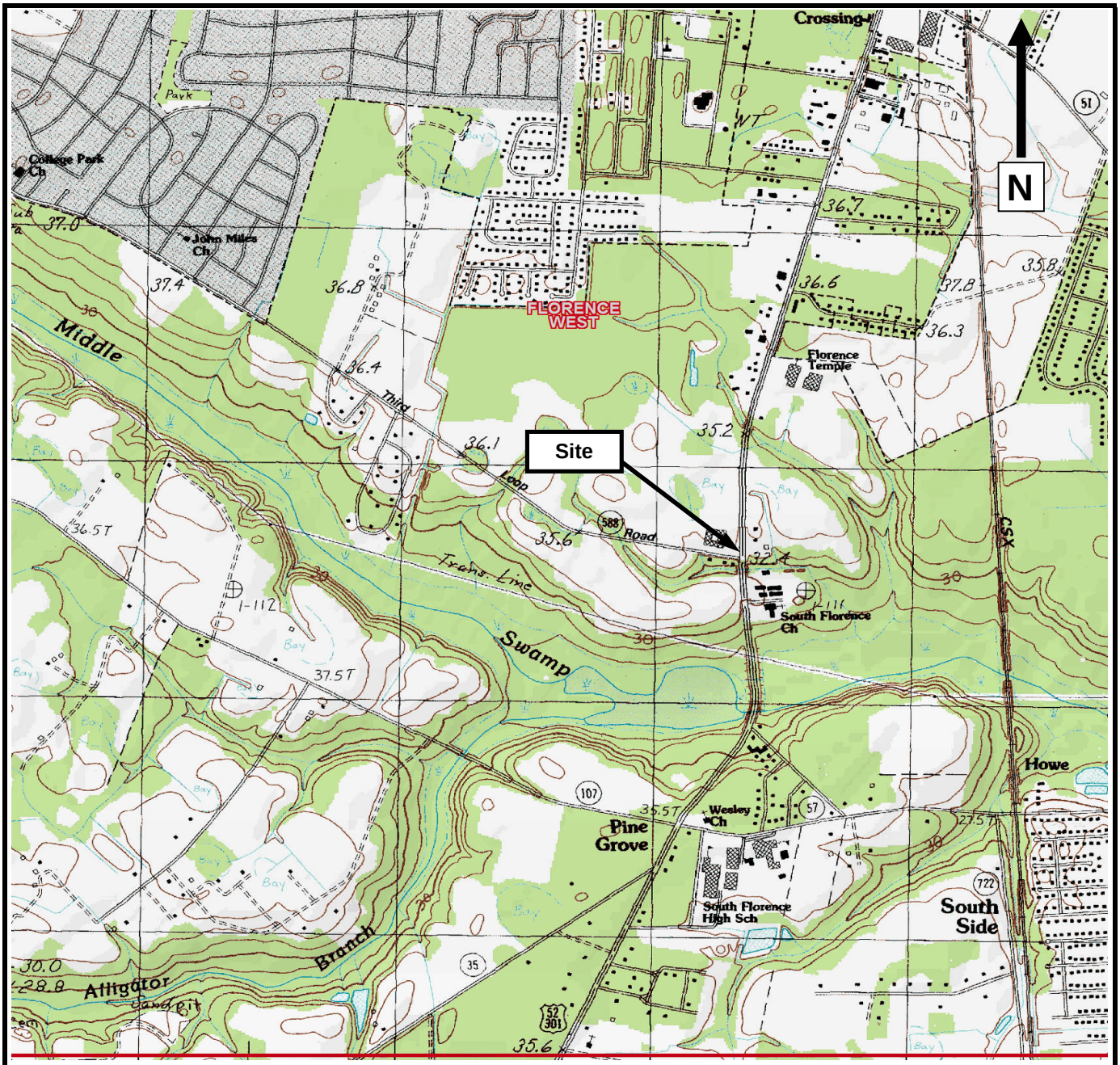
GS2
ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC.

Site Location Map
Proposed Florence County Voter Registration
and Election Comission Facility
Florence, South Carolina
GS2 Project Number 10-12393-G

Collins and Associates Architecture
615 South Coit Street
Florence, South Carolina 29501

Scale
1" = 2300'

Figure 1



Source: Florence West, USGS Topographic Quadrangle, dated 1999.

Prepared By-Date: SE-6/07/10
Checked By-Date: CB-6/07/10

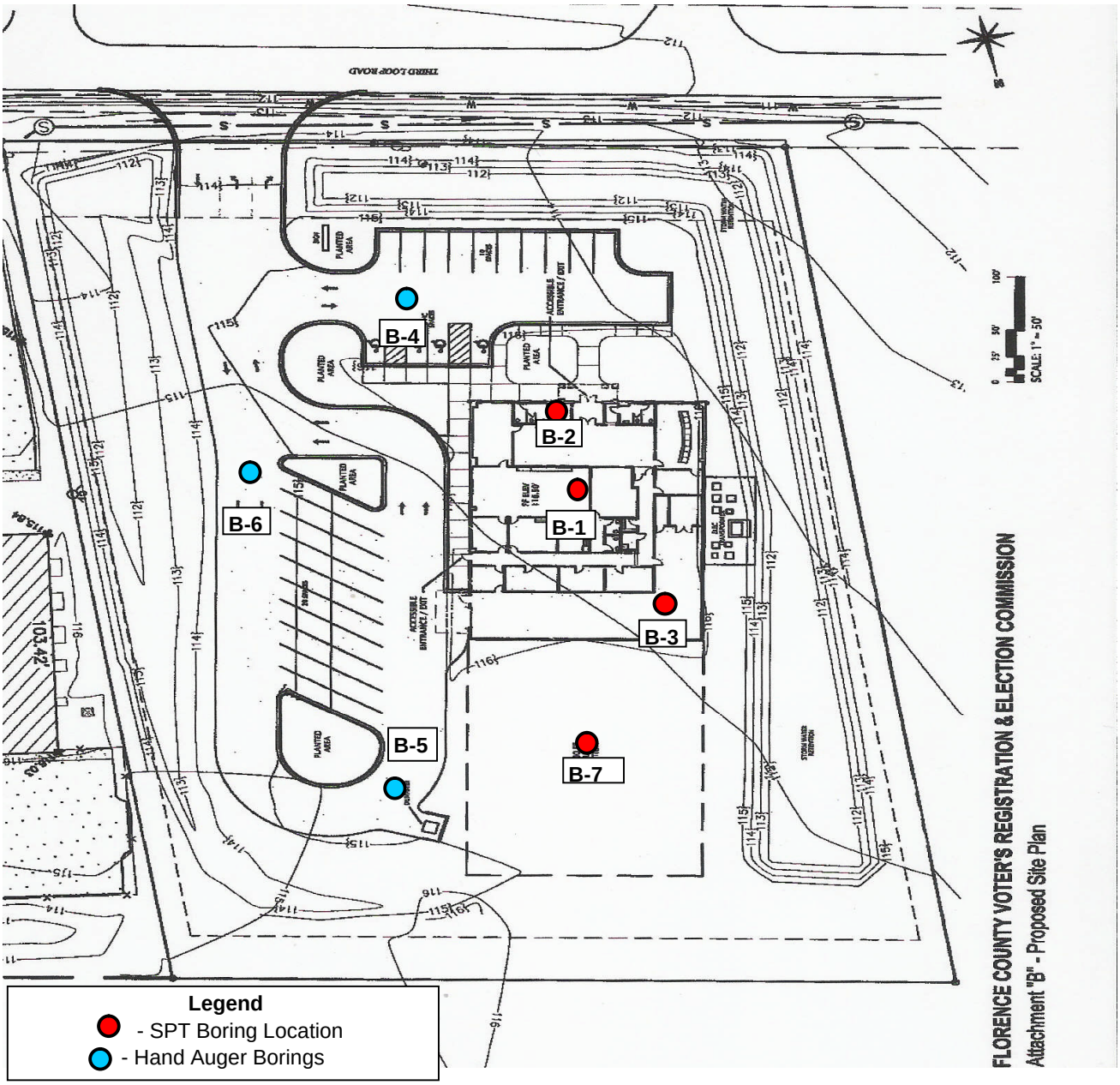
GS2
ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC.

USGS Topographic Map
Proposed Florence County Voter Registration
and Election Comission Facility
Florence, South Carolina
GS2 Project Number 10-12393-G

Collins and Associates Architecture
615 South Coit Street
Florence, South Carolina 29501

Scale
1" = 2000'

Figure 2



Source: Drawing provided by Mr. Kevin J. Almers.

Prepared By-Date: SE-6/07/10
Checked By-Date: CB-6/07/10

Boring Location Plan
Proposed Florence County Voter Registration
and Election Comission Facility
Florence, South Carolina
GS2 Project Number 10-12393-G

Collins and Associates Architecture,LLC
615 South Coit Street
Florence, South Carolina 29502

Scale
AS SHOWN

Figure 3

APPENDIX B

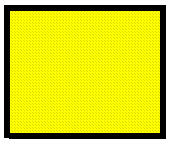
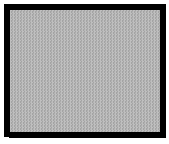
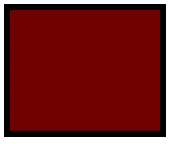
Soil Test Boring Log Key

Soil Test Boring Logs

Record of Hand Auger Boring

SOIL TEST BORING LOG KEY

The color/pattern soil description detailed below appears in the remarks section of the SOIL TEST BORING LOGS in the Appendix of this report.

COLOR/PATTERN	PRIMARY SOIL TYPE	DESCRIPTION
	**SURFACE MATERIALS**	Surface Materials include: topsoil, gravel, asphalt GAB, concrete, etc. Topsoils typically combine a mixture of soils and organic materials. Topsoils are typically recognized through texture and odor.
	**SANDS**	Sands are considered to be a granular soil type with no cohesive properties. Grain sizes are categorized as fine (falls between 0.075 and 0.420 mm. in diameter), medium (falls between 0.420 and 2 mm. in diameter) or coarse (falls between 2 and 4.75 mm. in diameter).
	**SILTS**	Silt grain sizes typically fall between 0.002 and 0.075 mm. in diameter. The Atterberg's limits for silts typically plot below the A-Line on a Plasticity Chart. Silts are typically distinguished as having a Low Plasticity (P.I. is between 0 and 22) or as having a High Plasticity (P.I. is between 22 and 59). Silts exhibit some cohesive properties.
	**CLAYS**	Clay grain sizes typically are smaller 0.002 mm. in diameter. The Atterberg's limits for clays typically plot on or above the A-Line on a Plasticity Chart. Clays are typically distinguished as having a Low Plasticity (P.I. is between 0 and 22) or as having a High Plasticity (P.I. is between 22 and 59). Clays exhibit strong cohesive properties.

Note: The above detailed colors/patterns are indicative of the predominant soil type observed in the indicated soil strata at the Boring locations for the subject site. Secondary soil types are touched upon in the Soil Description column of the BORING LOGS. All soil descriptions are based on visual and textural properties observed in the recovered soils. No laboratory tests were performed on the soils described in this report, unless noted within the remarks column of the logs.

SOIL TEST BORING LOG

Project Name: **Proposed Florence County Voter Registration and Election Commision Facility**

Boring Number: **B-1**

Project Number: **10-12393-G**

Date of Test: **May 27, 2010**

Depth (feet)	Soil Description	Sample Interval	Blow Counts*	Remarks
	SURFACE MATERIALS: 3" of TOPSOIL			
1	COASTAL PLAIN: Loose Tan Silty SAND . (SM)			
2		0 to 1-1/2'	5	**MOIST**
3				
4	Dense Brown Clayey SAND. (SC)			
5		3-1/2' to 5'	41	**MOIST**
6	Firm Orangish Grey Clayey SAND. (SC)			
7				
8		6' to 7-1/2'	20	**MOIST**
9	Dense Light Grey Clayey SAND. (SC)			**GW at TOB**
10		8-1/2' to 10'	46	**WET**
11				
12				
13				
14	Stiff Grey Sandy SILT. (ML)			
15		13-1/2' to 15'	14	**WET**
16				
17				
18				
19	Very Firm Tan Silty SAND. (SM)			
20		18-1/2' to 20'	28	**WET**
21	Firm Dark Grey Silty SAND w/ Shell Fragments. (SM)			
22				
23				
24				
25		23-1/2' to 25'	20	**WET**

Depth of Boring (ft): 60 Feet

Location of Boring: See Boring Location Plan

Depth of Groundwater T.O.B. (feet): 9 Feet

Method of drilling: Rotary Drill w/ Mud

Depth of Groundwater 24 hrs. (feet): Not Available

Performed By: GS2 Engineering

* The Blow Counts given above are recorded for a 140 pound hammer (falling 30 inches/blow) to drive a 2 inch O.D., 1.375 inch I.D. split-barrel sampler 12 inches, after an initial 6 inch seating increment.

SOIL TEST BORING LOG

Project Name: Proposed Florence County Voter Registration and Election Commision Facility
Project Number: 10-12393-G
Boring Number: B-1- CON'T
Date of Test: May 27, 2010

Depth (feet)	Soil Description	Sample Interval	Blow Counts*	Remarks
	…continued			
26	Firm Dark Grey Silty SAND w/ Shell Fragments. (SM)			
27				
28				
29	Very Stiff to Hard Sandy SILT. (ML)			
30		28-1/2' to 30'	17	**WET**
31				
32				
33				
34				
35		33-1/2' to 35'	37	**WET**
36				
37				
38				
39	Very Dense Dark Grey Silty SAND. (SM)			
40		38-1/2' to 40'	50/5"	**WET**
41				
42				
43				
44				
45		43-1/2' to 45'	50/5"	**WET**
46				
47				
48				
49				
50		48-1/2' to 50'	50/5"	**WET**

Depth of Boring (ft): 60 Feet
Location of Boring: See Boring Location Plan

Depth of Groundwater T.O.B. (feet): 9 Feet
Method of drilling: Rotary Drill w/ Mud

Depth of Groundwater 24 hrs. (feet): Not Available
Performed By: GS2 Engineering

* The Blow Counts given above are recorded for a 140 pound hammer (falling 30 inches/blow) to drive a 2 inch O.D., 1.375 inch I.D. split-barrel sampler 12 inches, after an initial 6 inch seating increment.

SOIL TEST BORING LOG

Project Name: **Proposed Florence County Voter Registration and Election Commision Facility**

Boring Number: **B-1- CON'T**

Project Number: **10-12393-G**

Date of Test: **May 27, 2010**

Depth (feet)	Soil Description	Sample Interval	Blow Counts*	Remarks
	…continued			
51	Very Dense Dark Grey Silty SAND. (SM)			
52				
53				
54				
55		53-1/2' to 55'	50/5"	**WET**
56				
57				
58				
59				
60		58-1/2' to 60'	50/5"	**WET**

Boring Terminated at 60 feet.

Depth of Boring (ft): 60 Feet

Location of Boring: See Boring Location Plan

Depth of Groundwater T.O.B. (feet): 9 Feet

Method of drilling: Rotary Drill w/ Mud

Depth of Groundwater 24 hrs. (feet): Not Available

Performed By: GS2 Engineering

* The Blow Counts given above are recorded for a 140 pound hammer (falling 30 inches/blow) to drive a 2 inch O.D., 1.375 inch I.D. split-barrel sampler 12 inches, after an initial 6 inch seating increment.

SOIL TEST BORING LOG

Project Name: **Proposed Florence County Voter Registration and Election Commision Facility**

Boring Number: **B-2**

Project Number: **10-12393-G**

Date of Test: **May 27, 2010**

Depth (feet)	Soil Description	Sample Interval	Blow Counts*	Remarks
	SURFACE MATERIALS: 2" of TOPSOIL			
1	COASTAL PLAIN: Loose Greyish Tan Silty SAND. (SM)			
2		0 to 1-1/2'	5	**MOIST**
3				
4	Firm Tan Clayey SAND. (SC)			
5		3-1/2' to 5'	13	**MOIST**
6				
7	Very Firm Light Grey Clayey SAND. (SC)			
8		6' to 7-1/2'	25	**MOIST**
9				
10		8-1/2' to 10'	29	**MOIST**
11				**GW at TOB**
12				
13				
14	Stiff Light Grey Sandy SILT. (ML)			
15		13-1/2' to 15'	14	**WET**
16				
17				
18				
19	Loose Greyish Brown Clayey SAND. (SC)			
20		18-1/2' to 20'	7	**WET**

Boring terminated at 20 feet.

Depth of Boring (ft): 20 Feet

Location of Boring: See Boring Location Plan

Depth of Groundwater T.O.B. (feet): 11 Feet

Method of drilling: Hollow Stem Auger

Depth of Groundwater 24 hrs. (feet): Not Available

Performed By: GS2 Engineering

* The Blow Counts given above are recorded for a 140 pound hammer (falling 30 inches/blow) to drive a 2 inch O.D., 1.375 inch I.D. split-barrel sampler 12 inches, after an initial 6 inch seating increment.

SOIL TEST BORING LOG

Project Name: Proposed Florence County Voter Registration and Election Commision Facility

Project Number: 10-12393-G

Boring Number: B-3

Date of Test: May 27, 2010

Depth (feet)	Soil Description	Sample Interval	Blow Counts*	Remarks
	SURFACE MATERIALS: 3" of TOPSOIL			
1	COASTAL PLAIN: Loose Greyish Tan Silty SAND . (SM)	0 to 1-1/2'	5	MOIST
2				
3				
4	Firm Tan Clayey SAND. (SC)	3-1/2' to 5'	14	MOIST
5				
6				
7	Very Firm Light Tan Clayey SAND. (SC)	6' to 7-1/2'	28	MOIST
8				
9	Dense Light Grey Clayey SAND. (SC)	8-1/2' to 10'	40	MOIST
10				
11				GW at TOB
12				
13				
14	Loose Reddish Brown Clayey SAND. (SC)	13-1/2' to 15'	9	WET
15				
16				
17				
18				
19	Very Loose to Loose Grey Silty SAND w/ Shell Fragments. (SM)	18-1/2' to 20'	2	WET
20				
21				
22				
23	---trace organics	23-1/2' to 25'	10	WET
24				
25	**Boring terminated at 25 feet.**			

Depth of Boring (ft): 25 Feet

Depth of Groundwater T.O.B. (feet): 11 Feet

Depth of Groundwater 24 hrs. (feet): Not Available

Location of Boring: See Boring Location Plan

Method of drilling: Hollow Stem Auger

Performed By: GS2 Engineering

* The Blow Counts given above are recorded for a 140 pound hammer (falling 30 inches/blow) to drive a 2 inch O.D., 1.375 inch I.D. split-barrel sampler 12 inches, after an initial 6 inch seating increment.

Record Of Hand Auger Boring

Project Name: Prop Florence County Voter Registration and Election Commission Facility
Boring No.: B-4
Project Number: 10-12393-G
Date: 5/25/2010

Depth From	Depth To	Soil Description	Depth of Test	DCP* Blow Counts 1st	2nd	3rd	Average** DCP (bpi)
0	6"	TOPSOIL	0'	3	7	6	7
6"		Firm Tan Poorly Graded SAND. (SP)					
			1'	6	11	13	12
	1-1/2'						
1-1/2'		Firm Brown Clayey SAND. (SC)	2'	4	8	12	10
			3'	4	12	12	12
	3-1/2'						
3-1/2'		Very Firm Orangish Brown Clayey SAND. (SC)	4'	13	25+	25+	25+
	5'		5'	11	17	20	19
		Boring Terminated at 5 feet.					
			6'				
			7'				
			8'				
			9'				
			10'				

Method of drilling: Hand Auger
Performed By: B. Hamilton
Depth of Groundwater T.O.B.: Not Encountered
Boring Location: See Boring Location Plan
Depth of Groundwater 24 hrs.: Not Available

Notes: 1. Please see attached report.

* DCP (or Dynamic Cone Penetrometer) tests were taken in general accordance with ASTM #T-399.
** The average DCP blow per increment (bpi) is arrived at by averaging the 2nd and 3rd blows.

Signature: _____
Shawn J. Etier, E.I.T
Senior Geotechncial Professional

Record Of Hand Auger Boring

Project Name: **Prop Florence County Voter Registration and Election Commission Facility** **Boring No.:** **B-5**

Project Number: **10-12393-G** **Date:** **5/25/2010**

Depth From	Depth To	Soil Description	Depth of Test	DCP* Blow Counts 1st	2nd	3rd	Average** DCP (bpi)
0	6"	TOPSOIL	0'	2	3	3	3
6"		Firm to Very Firm Brown Clayey					
		SAND. (SC)	1'	3	8	11	10
1-1/2'			2'	14	19	21	20
	3'		3'	6	11	15	13
3'		Very Firm Orangish Brown and Grey					
		Clayey SAND. (SC)	4'	14	25+	25+	25+
	5'		5'	17	25+	25+	25+
		Boring Terminated at 5 feet.					
			6'				
			7'				
			8'				
			9'				
			10'				

Method of drilling: Hand Auger Performed By: B. Hamilton

Depth of Groundwater T.O.B.: Not Encountered Boring Location: See Boring Location Plan

Depth of Groundwater 24 hrs.: Not Available

Notes: 1. Please see attached report.

* DCP (or Dynamic Cone Penetrometer) tests were taken in general accordance with ASTM #T-399.

** The average DCP blow per increment (bpi) is arrived at by averaging the 2nd and 3rd blows.

Signature: _____

Shawn J. Etier, E.I.T

Senior Geotechncial Professional

Record Of Hand Auger Boring

Project Name: **Prop Florence County Voter Registration and Election Commission Facility** **Boring No.:** **B-6**

Project Number: **10-12393-G** **Date:** **5/25/2010**

Depth From	Depth To	Soil Description	Depth of Test	DCP* Blow Counts 1st	2nd	3rd	Average** DCP (bpi)
0	6"	TOPSOIL	0'	8	9	11	10
6"		Firm Brown Clayey SAND. (SC)					
	1'		1'	6	7	8	8
1'		Firm to Very Firm Brown Clayey					
		SAND. (SC)	2'	7	11	11	11
			3'	4	13	21	17
	4'		4'	25+	25+	25+	25+
4'		Very Firm Orangish Brown Clayey					
	5'	SAND (SC)	5'	25+	25+	25+	25+
		Boring Terminated at 5 feet.					
			6'				
			7'				
			8'				
			9'				
			10'				

Method of drilling: Hand Auger Performed By: B. Hamilton

Depth of Groundwater T.O.B.: Not Encountered Boring Location: See Boring Location Plan

Depth of Groundwater 24 hrs.: Not Available

Notes: 1. Please see attached report.

* DCP (or Dynamic Cone Penetrometer) tests were taken in general accordance with ASTM #T-399.

** The average DCP blow per increment (bpi) is arrived at by averaging the 2nd and 3rd blows.

Signature: _____

Shawn J. Etier, E.I.T

Senior Geotechncial Professional

SOIL TEST BORING LOG

Project Name: **Proposed Florence County Voter Registration and Election Commision Facility**

Boring Number: **B-7**

Project Number: **10-12393-G**

Date of Test: **May 27, 2010**

Depth (feet)	Soil Description	Sample Interval	Blow Counts*	Remarks
	SURFACE MATERIALS: 3" of TOPSOIL			
1	COASTAL PLAIN: Loose Tan Silty SAND. (SM)			
2		0 to 1-1/2'	6	**MOIST**
3				
4	Loose Reddish Brown Clayey SAND. (SC)			
5		3-1/2' to 5'	10	**MOIST**
6				
7	Firm to Very Firm Light Grey Clayey SAND. (SC)			
8		6' to 7-1/2'	20	**MOIST**
9				
10		8-1/2' to 10'	23	**MOIST**
11				**GW at TOB**
12				
13				
14	Dense Reddish Tan Silty SAND. (SM)			
15		13-1/2' to 15'	40	**WET**
16				
17				
18				
19	Loose Reddish Tan Silty SAND. (SM)			
20		18-1/2' to 20'	5	**WET**

Boring terminated at 20 feet.

Depth of Boring (ft): 20 Feet

Location of Boring: See Boring Location Plan

Depth of Groundwater T.O.B. (feet): 11 Feet

Method of drilling: Hollow Stem Auger

Depth of Groundwater 24 hrs. (feet): Not Available

Performed By: GS2 Engineering

* The Blow Counts given above are recorded for a 140 pound hammer (falling 30 inches/blow) to drive a 2 inch O.D., 1.375 inch I.D. split-barrel sampler 12 inches, after an initial 6 inch seating increment.

SECTION 02360 – SOIL TREATMENT FOR TERMITE CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Application of toxicant chemicals to all soil and earth-type material which will be covered by and lie immediately adjacent to building or additions so as to provide a lethal barrier to subterranean termites.

1.02 QUALITY ASSURANCE

A. All work shall be accomplished by a bonded contractor whose principal business is pest control and anti-termite soil treatment, and who can show evidence of at least five years of successful operation in his field.

B. Evidence of such qualifications shall be submitted for approval to the Architect prior to beginning any of the work.

C. The applicator shall be licensed and bonded in the state where the project is located.

1.03 WARRANTY

A. Upon completion and prior to acceptance of the building by the Owner, the soil treatment applicator shall issued in an acceptable form, a written warranty to the Owner, co-signed by the General Contractor stating the following provisions.

1. That the chemicals having the required concentration and rate of application have been applied.
2. The effectiveness of the soil treated will provide against infestation for a period of not less than 5 years. This warranty period shall be covered by a repair bond in the amount of $100,000 for each occurrence. The owner shall have an option to renew security bond for the life of the building.
3. Applicator shall make yearly inspections of the project and give a copy of his report to the Owner. Upon notice by the Owner of termite infestation, during this guarantee period, the Contractor shall provide promptly such treatment as may be necessary for the elimination and control of original new condition at contractor’s expense.

PART 2 - PRODUCTS

2.01 MATERIALS

A. To the extent approved by governmental agencies having jurisdiction, use the following: Dursban TC applied as per label instructions.

B. Above termicide to be applied by a South Carolina certified applicator.

PART 3 - EXECUTION

3.01 GENERAL

A. At the time soil treatment is to be applied, soil to be treated shall be in friable condition with a sufficiently low moisture content to allow uniform distribution of the soil treatment agent throughout the soil. Application shall be as a coarse spray and so as to provide uniform distribution of chemical on soil surfaces. All soil surfaces which are distributed after treatment and

before placement of slabs and other covering structures, shall be retreated as originally specified. Application of chemicals shall not be made until all preparation for placing of slabs and other pertinent structures have been completed. Chemicals shall be applied at least 12 hours prior to placing of concrete and other structures which will be in contact with treated materials. Where concrete slabs and other structures are to be placed over vapor barrier or waterproof membrane, toxicant shall be applied immediately prior to placement of vapor barrier or waterproof membrane. Treatment of soil on exterior sides of foundation walls, grade beams and similar structures shall be coordinated with final grading and planting operations so as to avoid disturbance of chemical barriers by such operations.

B. Manufactures warnings and precautions shall be observed in handling and use of soil toxicants. Care shall be taken that these chemicals do not endanger animals. All formulating, mixing and application work shall be done under direct supervision of a supervisor trained in pest control work.

C. Rates and methods of application shall be in strict accordance with the insecticide manufacturer's printed instructions or these specifications.

3.02 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until satisfactory conditions are corrected.

3.03 SLABS ON GRADE APPLICATION

A. Apply toxicant at the rate of two gallons of toxicant per five lin. ft. at critical locations such as where utilities pass through exterior walls and through floor slabs.

B. Extend treatment not less than 48" form wall into trench.

3.04 WALLS APPLICATION

A. Apply toxicant at the rate of two gallons of toxicant per five lin. Ft. along both sides of all foundations, walls, cross walls, and grade beams, after all nearby excavation has been completed.

B. Apply toxicant at the rate of one gallon of toxicant per five lin. Ft. to voids in masonry walls.

3.05 MISCELLANEOUS APPLICATION

A. Apply toxicant at the rate of two gallons of toxicant per five lin. ft. to voids at the following areas:

1. Immediately below the expansion joints, control joints, and all areas where slab will be penetrated by construction features.
2. Where exterior facings or veneers extend below grade level along the exterior side of all foundation walls.
3. Where unit masonry foundation construction is needed.

END OF SECTION 02360

SECTION 07410 – FIBER-REINFORCED CEMENT BOARD ROOF / FLOOR PANELS

PART 1 – GENERAL

1.1 WORK INCLUDED:

A. Furnish and install all fiber reinforced cement board roof or floor panels as shown on the drawings or as herein specified.

B. Coordinate this Section with interfacing and adjoining work for proper sequencing of installation.

1.2 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

B. Work in other sections:

1. Division 5 Metals
2. Section 09650 Resilient Flooring

1.3 SUBMITTALS:

A. Submit two 4-inch x 6-inch pieces of panel in thickness selected.

B. Submit two copies of specifications, installation instructions and general recommendations of the manufacturer.

1.4 QUALITY ASSURANCE:

A. All cement board roof panels shall comply with ASTM G1186-91 Norm, standard specification for flat non-asbestos fiber-cement sheets, Grade 1; and shall be installed according to the manufacturer's most current printed instructions.

1.5 FIRE RESISTANCE PROPERTIES:

A. Cement board roof or floor panels shall be noncombustible according to ASTM E136. Panels shall be rated zero flame spread and zero smoke development per ASTM E84.

1.6 DELIVERY AND STORAGE:

A. Panels are normally delivered to site in factory crates that are bound with plastic sheet protection, wooden edge protection and wooden dunnage to facilitate forklift handling. When transporting loose panels by truck, they must be laid flat and fully protected from weather with waterproof covering. When hand carrying single panels, they must be carried on edge with the short side held vertically.

B. Deliver, store and handle materials to prevent breakage, warping or damage by water.

C. Acclimatize materials by storing on site not less than three days before installation.

D. Materials to be stored indoors on leveled dunnage not exceeding 32-inches on centers. If temporarily stored outdoors, boards must be elevated above ground, and protected from the weather with waterproof covering.

E. Panels to be stored flat and not on edges.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Available manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. VERSAROC (by US Architectural Products, Inc.)
2. PLYCEM
3. Or approved substitution.

B. Nomenclature used in this section shall be based on products and terminology of PLYCEM.

2.2 ROOF AND FLOOR PANELS:

A. Panels to be of metric thickness: 20mm (3/4") minimum for floor applications, 17mm (5/8") minimum for roof applications or 22mm (7/8"), 25mm (1"), or 30mm (1-3/16") thickness, in 4' x 8' or 4' x 10' sizes as shown on drawings. Cement board panels shall be factory silicone impregnated. Select proper panel thickness for the design load, deflection limit and framing spacing from the manufacturer's loading tables.

B. Panels shall have the following minimum mechanical properties (in dry condition):

1. Modulus of Elasticity perpendicular to fibers (per ASTM C120) 775,000 psi.
2. Modulus of Rupture perpendicular to fiber (per ASTM C120) 1,820 psi.
3. Shear Strength (per ASTM D732) 1,180 psi.
4. Tensile Strength perpendicular to fibers (per ASTM D209) 690 psi.
5. Compressive Strength perpendicular to surface (per ASTM C170) 3,860 psi.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Tools: Use standard carpentry tools to cut and install panels.

B. Installation:

1. Use minimum 17mm (5/8") thickness panel for roofs; 20mm (3/4") minimum thickness panel for floors, stagger panel joints in long direction. Panels less than 17mm thickness must be installed over structural metal deck. Install T-Splines at long dimension of panel joints.
2. A framing member must always occur at short side of panel. Maintain a 1/8" space between all panel joints.
    a. Where openings are cut in panels, framing or blocking must support all edges of the panel around opening.
3. Install panels with long dimension across framing members.
4. Comply with applicable building codes for wind, seismic and other load requirements.
5. Do not nail or screw any collateral building materials to panels without a secure backing surface beneath the panel. Floor connections, when not over metal decking or framing members, must be made by toggle bolting.

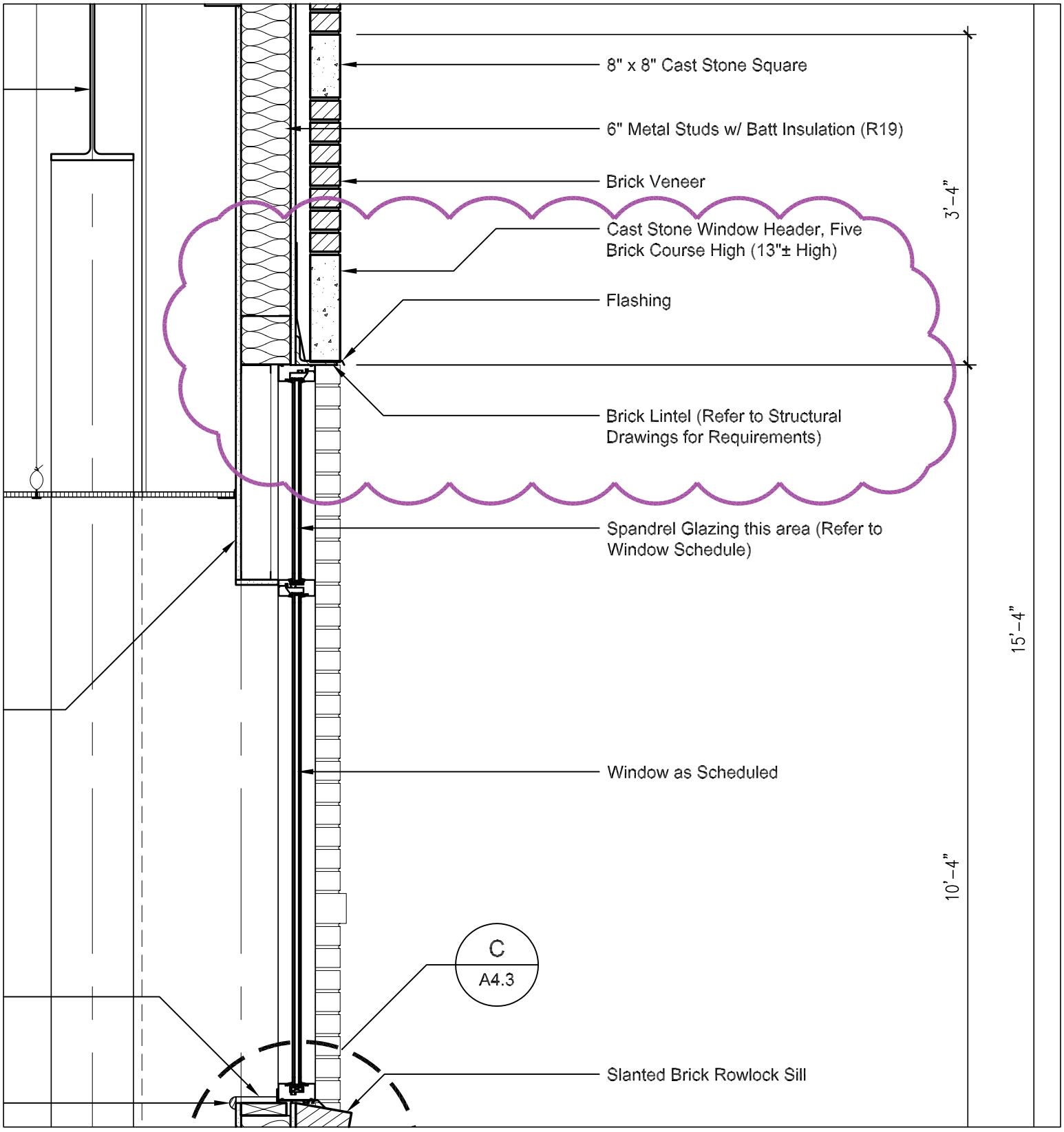
6. All floor panels are to receive a wear surfacing finish. Cement board floor panels are to be installed as a sub-floor, not as a finished wear floor surface. Resilient flooring joints shall not coincide with cement board panel joints. Use trowel applied, acrylic based floor-leveling compound for correcting minor unevenness of the cement board floor joints prior to the application of the finish flooring materials. Ceramic tile should be installed using a 100% acrylic based adhesive.
7. Deflection of panels must be limited to 1/240 under maximum live load designed.
8. Never install panels while wet or damp. During on-site installations that are open to weather, panels must be kept dry until project is closed to the weather.

3.2 FASTENING:

A. Screw fasteners to be 12" o.c. maximum spacing on short side only at framing. Fasten long side of panel at framing locations. Use #8 diameter minimum with self-drilling point, self countersinking head and corrosion resistant coating. Do not use black phosphate screws.

B. Maintain centerline of fasteners a minimum of ¾" from all edges of panels. Maintain minimum 2" distance from all corners and avoid 45-degree fastener placement in corners. Do not overdrive screw heads. Seat screw heads flush with board surface.

END OF SECTION 07410



COLLINS & ASSOCIATES
ARCHITECTURE

Florence Co. Voter's Registration
& Election Commission

Proj. # 1095

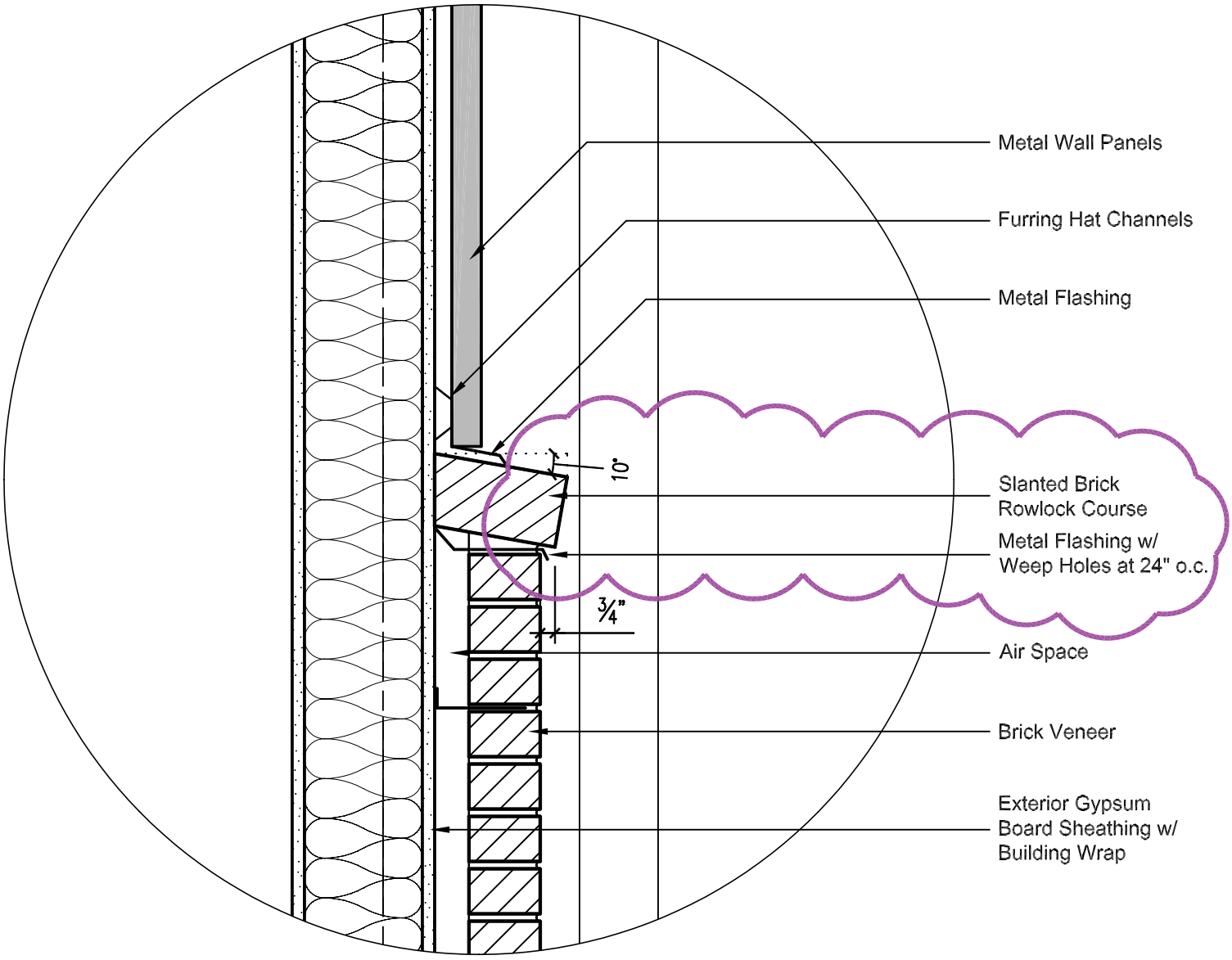
Supplemental Drawing | SD-05

REVISION TO WALL SECTION 1/A4.3

(Reference Drawing: A4.3)

Scale: 3/4" = 1'-0"

DATE: 06.07.10



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ARCHITECTURE

Florence Co. Voter's Registration
& Election Commission

Proj. # 1095

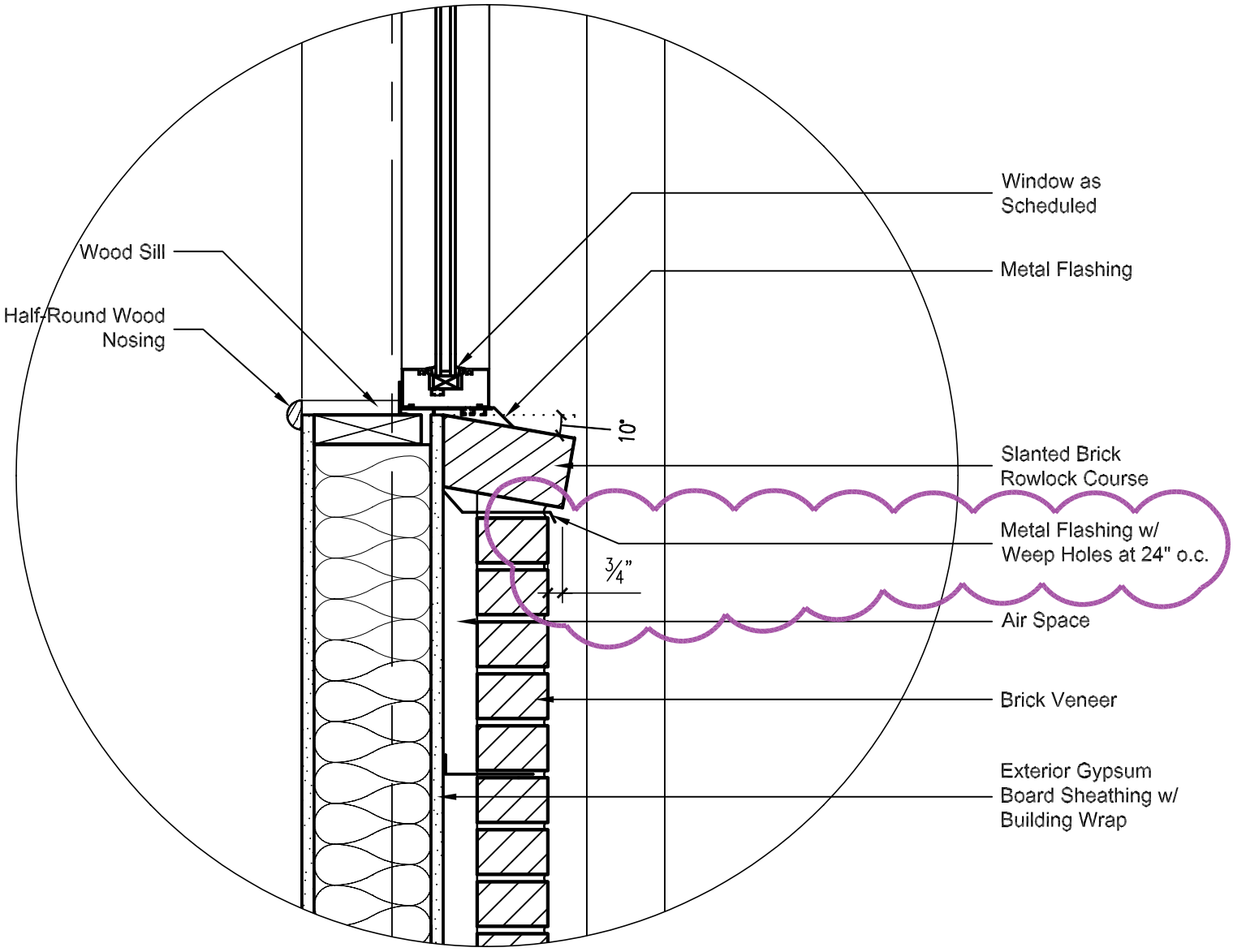
Supplemental Drawing | SD-06

REVISED WALL DETAIL A/4.3

(Reference Drawing: A4.3)

Scale: 1-1/2" = 1'-0"

DATE: 06.07.10



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Florence Co. Voter's Registration & Election Commission

Proj. # 1095

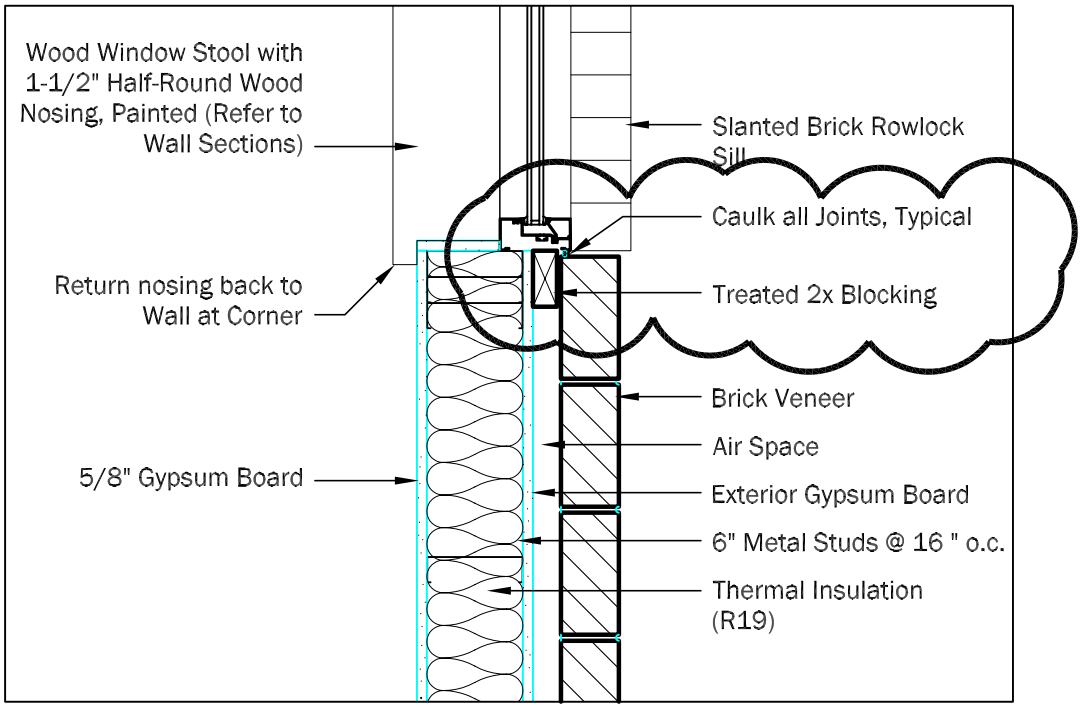
Supplemental Drawing | SD-07

REVISED WALL DETAIL C/A4.3

(Reference Drawing: A4.3)

Scale: 1-1/2" = 1'-0"

DATE: 06.07.10



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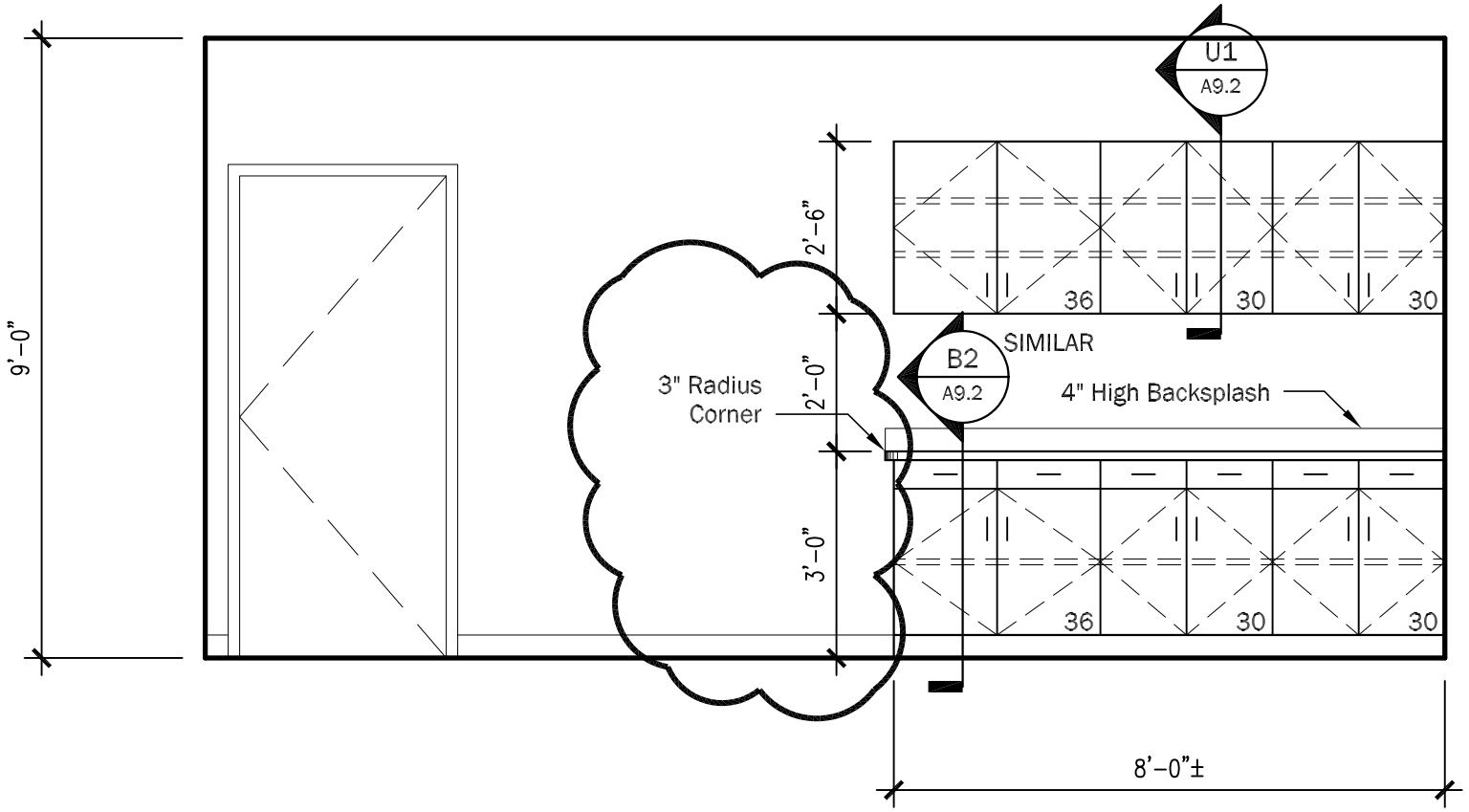
Supplemental Drawing | SD-08

REVISION TO PLAN DETAIL F/A8.0-1

(Reference Drawing: A8.0-1)

Scale: 1" = 1'-0"

DATE: 06.07.10



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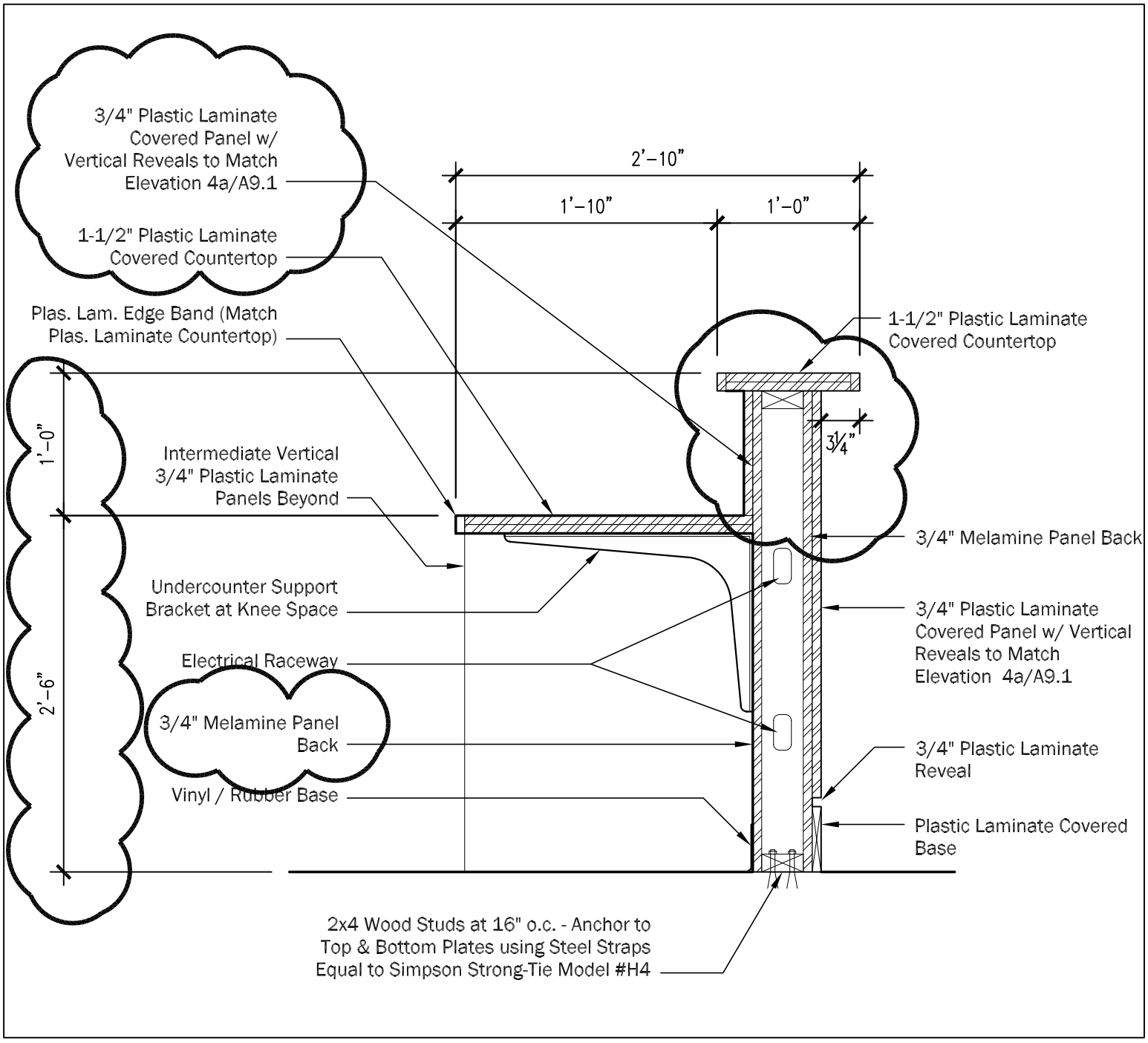
Supplemental Drawing | SD-09

REVISION TO 5/A9.1 - MILLWORK @ SUPPLY/COPIER/FILES 1018

(Reference Drawing: A9.1)

Scale: 3/8" = 1'-0"

DATE: 06.07.10



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Proj. # 1095

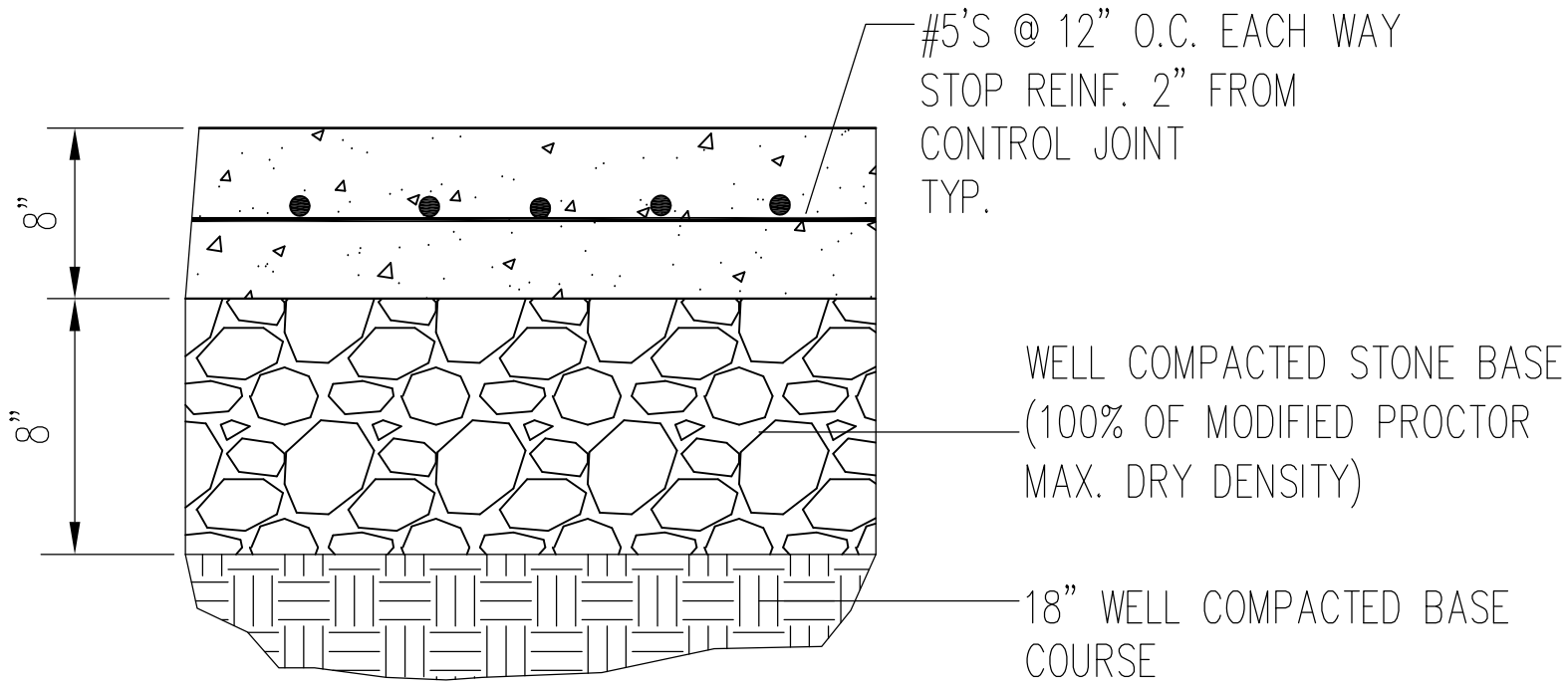
Supplemental Drawing | SD-10

REVISIONS TO MILLWORK B3/A9.2 - CONF. ROOM BASE

(Reference Drawing: A9.2)

Scale: 1" = 1'-0"

DATE: 06.07.10



TO BE USED AT DUMPSTERS

HEAVY- DUTY CONCRETE PAVING DETAIL

N.T.S.

GENERAL SITE NOTES

1. CONTRACTOR VERIFY PROPERTY CORNERS AND TOPO BEFORE ANY CONSTRUCTION IS BEGUN.
2. CONTRACTOR TO NOTIFY THE ENGINEER FOR A REVIEW SHOULD ANY DISCREPANCIES BE DISCOVERED AT THE SITE OR ON THE DRAWINGS.
3. EARTHWORK SHALL BE TO THE LINES AND GRADES SHOWN. PROOF ROLLING AND COMPACTION TESTING SHALL BE ACCOMPLISHED IN THE FIELD TO TEST ALL AREAS. THE OWNER SHALL RETAIN THE SERVICES OF A TESTING COMPANY FOR THIS WORK.
4. THE GRADING CONTRACTOR SHALL CONFORM TO ELEVATIONS AND AND DIMENSIONS SHOWN ON THE PLANS WITHIN A CLEARANCE OF PLUS OR MINUS 0.10 FEET.
5. ALL REINFORCED CONCRETE PIPE (RCP) SHALL BE CLASS III, UNLESS NOTED ON THE DRAWINGS AND SHALL CONFORM TO THE STATE SPECIFICATIONS. JOINTS SHALL BE TONGUE AND GROOVE WITH MASTIC JOINT MATERIAL.
6. ALL WATER LINES SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS. ALL PIPES, VALVES AND FITTINGS SHALL COMPLY WITH AWWA STANDARDS, ALL LOCAL CODES AND ORDINANCES. PIPE BEDDING AND BACKFILL SHALL BE CAREFULLY CONTROLLED. WATER LINES SHALL BE PRESSURE TESTED AND DISINFECTED AS REQUIRED.
7. ALL UTILITY TRENCHES SHALL BE THOROUGHLY COMPACTED TO PREVENT SETTLEMENT AND DAMAGE TO FUTURE PAVEMENT AND STRUCTURES.

1

8. ALL PAVING SHALL BE AS SHOWN ON PLANS.
9. THE GRADING CONTRACTOR SHALL INCLUDE THE COST OF ALL CUT AND FILL NECESSARY TO BALANCE THE EARTHWORK ON THE SITE. THE GRADING CONTRACTOR SHALL INCLUDE THE COST OF WETTING/DRYING OF SOILS NECESSARY TO OBTAIN COMPACTION PER SPECIFICATIONS.
10. THE SEQUENCE OF WORK SHALL CONFORM TO THE EROSION CONTROL NARRATIVE.
11. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REP. WHEN INSTRUCTIONS FROM REGULATORY AGENCIES ARE RECEIVED AND COMPLY WITH INSTRUCTIONS AS DIRECTED BY THE OWNER'S REP.
12. THE CONTRACTOR SHALL CAREFULLY STUDY AND COMPARE THE CONSTRUCTION DOCUMENTS AND SHALL AT ONCE REPORT ANY INCONSISTENCIES OR OMISSIONS DISCOVERED. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS TO VERIFY THAT ALL LOCATIONS ARE CORRECT PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL NOT PERFORM ANY WORK ON ANY UTILITIES OR IN
13. PUBLIC RIGHT-OF-WAY UNTIL HE HAS OBTAINED COPIES OF ALL NECESSARY ENCROACHMENT AND CONSTRUCTION PERMITS.

John Ray Williams and Associates
Consulting Electrical Engineers
3918 Rosewood Drive
Columbia, South Carolina 29205

Telephone 803.782.5411 Fax 803.782.5551

SOUTH CAROLINA GEORGIA

June 7, 2010

Mr. Kevin Almers
Collins and Associates
P.O. Box 3009
Florence, South Carolina 29502

Re: Voter Registration Building
Florence, SC

Dear Kevin,

Please issue the following information in your next addendum:

1-Refer to sheet E4 and to the Power Plan. Omit circuit to Outdoor Unit "HP9". Change conductors to Outdoor Unit "HP7" to #6.
2-Refer to sheet E6 and to the schedule for Panel "M". Change circuits M5 & M6 to three phase circuits. Change circuit M9 to 45/3. Refer to the schedule for Panel "C". Change circuit C5 to 60/2. Refer to the schedule for Panel "D". Change circuit D2 to 40/3.
3-Refer to the Mechanical Plan M1. Provide 120v power and a duct smoke detector at all "FSD" Fire/Smoke Dampers – Total of 21 units.

Yours truly,

John Ray Williams, PE