

392 FINAL REGULATIONS

programs; allow graduates from accredited programs to bypass the education review process; delete a list of required courses that are likely to be revised over time; allow supervision plan revisions to be submitted after applicants obtain employment; require that qualified mental health practitioner supervisors, who are not licensees of the board, be approved prior to candidates' obtaining the required experience with them; revise endorsement requirements to allow all licensing requirements to be deemed met if the individual has a license in good standing in another state; revise reinstatement requirements to allow an applicant whose license has been lapsed for more than five, as opposed to two, to appear before the board to determine if the terms under which the reinstatement should be made; allow all continuing education to be obtained online or in person, and allow up to 20 hours of CE to be obtained through non-traditional means; and increase the number of supervisees a supervisor may supervise from twelve to fifteen. The updates will also add addiction counselors to certain provisions where they were previously omitted and correct scrivener's errors.

Document No. 5076

DEPARTMENT OF LABOR, LICENSING AND REGULATION
BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS
CHAPTER 49

Statutory Authority: 1976 Code Sections 40-1-70, 40-22-60, and 40-22-130

- 49-100. Definitions.
- 49-101. Board Rules of Order/Procedures and Seal of Board.
- 49-102. Use of Forms/Applications.
- 49-103. Fees.
- 49-104. Examinations – General.
- 49-105. License Expiration, Renewal and Reinstatement – Individuals.
- 49-106. COA Expiration, Renewal and Reinstatement – Firms.
- 49-200. Professional Engineer Licensure Requirements.
- 49-201. Professional Land Surveyor Licensure Requirements.
- 49-202. Classifications and Scopes of Authority: Engineers and Surveyors.
- 49-203. Licensure by Comity.
- 49-205. Firm Registration.
- 49-207. Seals: Individuals and Firms.
- 49-300. Preamble.
- 49-301. Responsibility to the Public.
- 49-302. Competency for Assignments.
- 49-303. Public Statements.
- 49-304. Conflicts of Interest.
- 49-305. Solicitation of Work.
- 49-306. Improper Conduct.
- 49-400. Purpose.
- 49-410. Compliance.
- 49-420. General.
- 49-430. Nomenclature.
- 49-440. Classification of Surveys.
- 49-450. Plats and Platting.
- 49-460. Survey Types and Requirements.
- 49-470. Methods of Marking Property Boundaries.
- 49-480. Land Descriptions.
- 49-490. Instruments and Apparatus.
- 49-600. Purpose.
- 49-601. Definitions.
- 49-602. Requirements.
- 49-603. Units of Credit.

- 49-604. Determination of Credit.
- 49-605. Record Keeping.
- 49-606. Exemptions.
- 49-607. Reinstatements.
- 49-609. Dual License Holders.
- 49-610. Reporting Forms.

Synopsis:

The Board of Registration for Professional Engineers and Land Surveyors proposes to amend various sections of Chapter 49 of the Code of Regulations.

A Notice of Drafting was published in the *State Register* on May 28, 2021.

Instructions:

Replace regulation as shown below. All other items and sections remain unchanged.

Text:

ARTICLE 1
ORGANIZATION, ADMINISTRATION AND PROCEDURE

49-100. Definitions.

A. Definitions found in Section 40-22-20 of the Code of Laws of South Carolina apply to this Chapter.

B. The following definitions are terms used in this Chapter in addition to those included in Section 40-22-20 of the Code of Laws of South Carolina:

- (1) "CEAB" means the Canadian Engineering Accreditation Board.
- (2) "Comity Licensure" means the courteous recognition and extension of license privileges in this State to engineers and surveyors licensed in other states.
- (3) "Dual License Holder" means a person who is licensed as an engineer and a surveyor.
- (4) "Model Law Engineer" refers to a person who meets the following criteria:
 - (a) Graduation from an engineering program accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).
 - (b) Four years of qualifying experience after graduation.
 - (c) Passing of a NCEES Fundamentals of Engineering Examination (FE).
 - (d) Passing of a NCEES Principles and Practice of Engineering Examination (PE).
 - (e) Status in good standing as a registrant in the NCEES Records Program, and
 - (f) A record clear on any license violations or sanctions by an engineering board.
- (5) "NCEES" means the National Council of Examiners for Engineering and Surveying.
- (6) "Washington Accord" refers to an international agreement providing for the mutual recognition of engineering education program accreditation by and between EAC/ABET and engineering education accrediting bodies of other nations holding membership in the Washington Accord.

49-101. Board Rules of Order/Procedures and Seal of Board.

A. Rules of Order/Procedures. All proceedings of the Board shall be governed by provisions set forth in the Administrative Procedures Act.

B. Description of Seal of Board. The seal of the Board shall be circular in form and 1 7/8 inches in diameter. Concentric with the outside of the Seal there shall be a circle 1 1/4 inches in diameter, within which there shall be a replica of the device used on the Seal of the State of South Carolina, and in the annular space between the circle and the outside of the Seal there shall appear the words "State Board of Registration for Professional

394 FINAL REGULATIONS

Engineers and Surveyors.” All official papers, registration certificates, and other formal documents of the Board shall bear the imprint of this Seal.

49-102. Use of Forms/Applications.

A. Forms.

(1) All applications for engineering and surveying licensure and certificate of authorization shall be made on a form provided by the Board, and no applications made otherwise will be accepted.

(2) Applications not completed in accordance with the applicable instructions will be returned to the applicant. Withholding information, misrepresentation, or untrue statements will be cause for denial of application.

B. Documentation.

(1) All information given on an application form must be documented. The applicant is required to provide the names and current mailing addresses of five references having personal knowledge of applicant's character and professional reputation, and of employers or supervisors who can verify applicant's work experience. It is the applicant's responsibility to see that references return the forms promptly to the Board office.

(a) Engineering. At least three of the character references shall be professional engineers.

(b) Land Surveying. At least three of the character references shall be from professional surveyors.

(2) Official transcripts are required showing subjects and grades of all scholastic work which the applicant wishes to claim, degree issued and date of issuance. It is the responsibility of the applicant to see that such a record is sent from the institution directly to the Board office. A failure to provide such transcript directly from the institution, whether foreign or domestic, may be grounds for rejection of the application.

49-103. Fees.

A. The Board may charge fees as shown in South Carolina Code of Regulations Chapter 10-14 and on the South Carolina Board of Registration for Professional Engineers and Surveyors website at <https://llr.sc.gov/eng/fees.aspx>

B. No fee, or any part thereof, paid by any applicant for application, examination, licensure, and/or registration will be refunded once an application has been submitted to the Board for processing. Refunds will not be made.

49-104. Examinations—General.

A. Classifications—Engineering Examinations.

(1) NCEES Fundamentals of Engineering (FE).

(2) NCEES Principles and Practice of Engineering (PE).

(3) NCEES Special Structural Engineering Examinations.

B. Classifications—Surveying Examinations.

(1) NCEES Fundamentals of Surveying (FS).

(2) NCEES Principles and Practice of Surveying (PS).

(3) S.C. State Specific Surveying Examination (State-S).

(4) TIER B Land Surveying (State-TIER B LS).

(5) S.C. Board Rules and Regulations.

(6) Principles and Practice of Photogrammetric Surveying.

(7) Principles and Practice of GIS Surveying.

C. Examination for Record Purposes.

(1) Any engineer registered by this Board may take for record purposes one or more of the listed engineering examinations upon payment of a fee as established by the Board.

(2) Any surveyor registered by this Board may take for record purposes one or more of the listed surveying examinations upon payment of a fee as established by the Board.

(3) Failure to pass an examination will not affect current registration or licensure.

D. Re-Examination.

(1) An applicant who has failed the same topical examination two times shall provide evidence satisfactory to the Board that steps have been taken in preparation for a third examination on the same topical subject.

(2) A new application will be required of any applicant who has failed the same topical examination three times. The applicant must also provide documentation that additional study satisfactory to the Board was taken in preparation for further examination on the same topical subject.

49-105. License Expiration, Renewal and Reinstatement—Individuals.

A. Expiration and Renewal.

(1) The privilege to practice in any category or tier as a registered professional engineer or surveyor in South Carolina expires on June 30, biennially in even numbered years, unless the license is renewed. Every Registered Professional Engineer and Surveyor who elects to continue the practice of his profession shall complete and submit an application for renewal of licensure and pay the appropriate fee by June 30.

(2) Renewal notices will be mailed to the licensee's address on record with this Board in May each biennial year; however, it is the licensee's responsibility to renew his or her license prior to the official expiration date of June 30.

(3) A licensee whose license has been lapsed for three months or less and who can truthfully certify that he or she has not been engaged in the practice of engineering or surveying in South Carolina during the period the certificate was not in a current status, barring any other irregularities, shall be renewed and retain the original license number upon payment of the renewal fees and penalties.

B. Reinstatement.

(1) A licensee whose license has lapsed more than three months may be required to take and pass examinations as required by the Board.

(2) Those persons who cannot certify that they have refrained from practicing their profession in this State during the period in which their license lapsed may be required to show cause to the Board why their license should not be disciplined.

(3) Any person reinstating an expired license will be required to meet the continuing professional competency requirements. If the total number of PDH units required to become current exceeds 30, then 30 shall be the maximum number of PDH units required.

49-106. COA Expiration, Renewal and Reinstatement—Firms.

A. Expiration and Renewal.

(1) Certificates of Authorization must be renewed biennially to remain in effect. Unless renewed a Certificate of Authorization shall expire biennially on March 31 of odd numbered years. A firm whose certificate has expired may not offer or engage in engineering or surveying services until the Certificate of Authorization has been renewed or until a new certificate has been issued.

(2) Renewal notices will be mailed to the firm's address on record with this Board in January each biennial year; however, it is the firm's responsibility to renew its license prior to the official expiration date of March 31.

(3) The completed renewal form signed and sworn to by the applicant must be filed with the Board office on or before March 31 of each odd numbered year.

(4) A Certificate of Authorization will become invalid upon a failure to renew by April 1 of the biennial renewal year. The Certificate may be renewed by the Board at any time during the following three months on payment of the biennial renewal fee plus late penalty. The penalties are computed in the same manner as prescribed for individual licensees who fail to renew.

B. Reinstatement.

In the case of failure to renew within three months from the date of expiration, the Certificate of Authorization will be reinstated only upon submittal of a reinstatement application, accompanied by the application fee, and approval by the Board.

C. Resident Professional Requirement.

(1) A Certificate of Authorization (COA) is automatically suspended when the firm fails to comply with the resident professional requirement as provided for in Section 40-22-250 of the Practice Act.

ARTICLE 2 GENERAL PROVISIONS

396 FINAL REGULATIONS

49-200. Professional Engineer Licensure Requirements.

A. Education Requirements.

(1) The Board will recognize the degrees of Master of Engineering or Master of Science in Engineering in a program accredited by EAC/ABET at either the baccalaureate or master's level as fulfilling the education requirements in satisfaction of the qualifications detailed in Section 40-22-220.

(2) The Board will recognize degrees from an engineering program evaluated as accredited by a foreign accreditation board or other authority recognized by ABET as having accreditation criteria substantially equivalent as that established by EAC/ABET. Engineering degree programs in this category include the following:

(a) Four-year engineering degree accredited by the Canadian Engineering Accreditation Board (CEAB).

(b) Four-year engineering degree from an accredited program in other countries listed in the ABET published "Washington Accord" document.

(c) Courses taken for credit and appearing on official college or university transcripts must be evaluated by a Board approved Education Consultant or NCEES Credentials Evaluations. The purpose of such evaluations shall be to determine whether or not the curriculum presented by the applicant complies substantially with accreditation criteria of EAC/ABET. Programs determined by the Board, based upon the evaluations, to be substantially equivalent to those accredited by EAC/ABET will be considered as fulfilling the education requirements.

(3) In addition to transcripts submitted for evaluation by the Education Consultant or NCEES, an applicant shall have the academic institution furnish the Board such supporting documentation as necessary for a proper and sufficient evaluation.

B. Experience Requirements.

(1) General.

(a) An applicant must have completed the qualifying experience required by the Board by the application deadline. Experience cannot be anticipated. Experience gained prior to completion of the qualifying degree requirements will not be accepted as qualifying experience.

(b) Qualifying experience must be progressive and of an increasing standard of quality and responsibility after graduation. Where guidelines for qualifying experience are published by NCEES, such guidelines may be used by the Board to evaluate experience of the applicant.

(2) Engineering Experience.

(a) The applicant should have meaningful design experience under the supervision of a registered professional engineer in designing components or processes that meet a public need. This experience should include but is not limited to exposure to the formation of design problem statements and specifications, consideration of alternative solutions, feasibility considerations, analytical calculations and detailed systems descriptions. If the experience was not gained under the direct supervision of a registered professional engineer, then the indirect supervision should be explained with clarification of the degree of supervision received.

(b) Successful completion of a Master's degree in a Board approved engineering curriculum may be accepted for up to one year of equivalent engineering experience credit. The completion of a PhD in a Board approved engineering curriculum may be accepted for up to two years of equivalent experience credit. However, in no case will more than two years of equivalent engineering experience credit be given for post baccalaureate education. No applicant will be allowed credit of more than 1 year of experience for both work and education during any consecutive 12-month period.

(c) For teaching experience to be considered by the Board, the engineer applicant must have taught design courses acceptable by the Board in an engineering curriculum accredited by ABET.

(d) Military experience must have been spent in engineering and of a character substantially equivalent to that required in the civilian sector for like work.

(e) For sales experience to be considered by the Board, the engineer applicant must demonstrate conclusively that engineering principles and engineering knowledge were actually employed. The mere selection of data or equipment from a company catalogue or a similar publication will not be considered qualifying engineering experience.

(f) Experience in construction supervision must show proficiency in engineering computational and problem-solving skills in assuring compliance with specifications and designs.

(g) The Board will not accept the mere execution as a contractor of work designed by a registered professional engineer, or the supervision of the construction documents, or similar non-engineering tasks as qualifying engineering experience.

(h) Industrial experience should be directed toward the identification and solution of practice problems in the applicant's area of engineering specialization. This experience should include engineering analysis of existing physical systems and the design of new ones.

(i) Work as laboratory or field technicians where such work is merely the conduct of routine explorations or data acquisition activities shall not be considered as qualifying. In order to be qualifying, the experience should show a demonstrated and satisfactory use of basic engineering computational and problem-solving skills.

C. Examination Requirements.

(1) Engineer-in-Training (EIT).

(a) An applicant applying for certification as an engineer-in-training must take and pass one of the written examinations on the Fundamentals of Engineering (FE), prepared and graded by the NCEES.

(b) The Board may, at its discretion, exempt an applicant from taking the FE examination. These exemptions include the following:

1. An applicant who has earned a doctorate degree in engineering in which the undergraduate degree in the same field of study is accredited by EAC/ABET, and is otherwise qualified under the provisions of the South Carolina Code of Laws at the time the application is received.

2. An applicant with more than fifteen years of acceptable experience after the date of the accredited degree and is otherwise qualified under the provisions of Section 40-22-220 of the Practice Act, at the time the application is received.

3. An applicant who has been licensed in another jurisdiction for not fewer than 12 years and is otherwise qualified under the provisions of Section 40-22-220 of the Practice Act, at the time the application is received.

(2) Professional Engineer (PE).

(a) An applicant may sit for the Principles and Practice of Engineering (PE) examination prior to obtaining the mandatory four years of experience provided that:

1. The applicant has obtained an EAC/ABET undergraduate engineering degree; and
2. The applicant has successfully passed the FE examination.

(b) Upon successfully passing the PE examination and completing the qualifying four years of engineering experience, the applicant may apply for licensure with the Board.

49-201. Professional Land Surveyor Licensure Requirements.

A. Qualifying Experience and Documentation.

(1) Experience must be obtained under the supervision of a registered professional surveyor and must be of a character satisfactory to the Board.

(2) Qualifying experience approved by the Board is experience beyond elementary surveying duties such as rodman and other unskilled tasks. In order for work to be considered as qualifying experience, an advanced level of responsibility must have been placed on the applicant. Responsibility should involve mature judgment and expertise gained in such job assignments as instrument man, assistant crew chief or crew chief. Work claimed as qualifying experience should demonstrate a sound working knowledge of surveying with respect to research (records and field), instrumentation, note-keeping and data management, calculations and mapping.

(3) An experience record in boundary and route surveying, topographical surveying, construction surveying, control/geodetic surveying, and rights-of-way surveying is beneficial to the applicant in the Board's evaluation of the application. Recognizing that boundary surveys are the types of surveys which more critically affect the public welfare, experience in boundary surveys should constitute a significant portion of the applicant's experience record and will be given more weight by the Board in considering an applicant's qualifications for licensure.

(4) An applicant must submit copies of three different maps and plats of land surveys on which he has worked. The documents must be signed by the professional land surveyor who supervised the work and contain a statement describing that part of the work done by the applicant. Submitted plats and maps must meet the

398 FINAL REGULATIONS

requirements of the Standards of Practice Manual for Surveying in South Carolina, Chapter 49, Article 4, of the Code of Regulations, in effect at the time of licensure.

(5) An applicant must submit five references as to the applicant's character and quality of work, three or more must be registered land surveyors having personal knowledge of the applicant's qualifications.

B. Examination Requirements—Land Boundary Surveyor.

(1) An applicant applying for certification as land surveyor-in-training must take and pass a written examination on the Fundamentals of Surveying (FS), prepared and graded by the NCEES.

(2) An applicant applying for licensure as a TIER A land boundary surveyor must have taken and passed the FS written examination and must take and pass the Principles and Practice of Surveying (PS), prepared and graded by the NCEES, and a South Carolina State Specific Surveying examination.

(3) A person licensed as a professional land boundary surveyor may practice as a professional photogrammetric surveyor only by meeting the requirements as described in the section R.49-201D of this Chapter, and may practice as a professional GIS surveyor only by meeting the requirements as described in the section R.49-201E of this Chapter.

C. TIER A Professional Photogrammetric Surveyor.

(1) After June 30, 2004, any person applying for licensure as a photogrammetric surveyor must meet the following requirements:

(a) Education Requirement—Photogrammetric Surveyor.

1. Education must be evaluated by an Education Consultant and approved by the Board before an application can be considered for further processing.

2. In addition to one of the following degrees, an applicant must submit proof of satisfactorily completing not fewer than 12 semester hours, or the equivalent in quarter hours, of course work specific to the discipline of photogrammetric surveying, satisfactory to the Board:

a. Four-year engineering or bachelor of science degree in a related field from a program accredited by the Related Accreditation Commission (RAC) or the Accreditation Board for Engineering and Technology (ABET).

b. Four-year civil engineering technology degree from a program accredited by the Technology Accreditation Commission (TAC) of ABET.

c. Four-year related baccalaureate degree, or equivalent degree, approved by the Board.

(b) Experience Requirement—Photogrammetric Surveyor.

1. Photogrammetric Surveyor-in-Training.

a. An applicant applying for certification as a photogrammetric surveyor-in-training who meets the four-year education requirements must have one year of progressive practical experience.

2. Photogrammetric Surveyor.

a. An applicant applying for licensure as a photogrammetric surveyor who meets the four-year education requirements must have four years of progressive practical experience.

3. Qualifying Experience and Documentation.

a. Experience must be obtained under supervision of a licensed photogrammetric surveyor or a recognized professional in the field of photogrammetry and must be of a character satisfactory to the Board.

b. Qualifying experience approved by the Board is experience beyond elementary level activities. In order for work to be considered as qualifying experience, an advanced level of responsibility must have been placed on the applicant. Work claimed as qualifying experience should demonstrate a sound working knowledge of photogrammetry.

c. At least two years of the required experience must have been at the professional level in responsible charge of photogrammetric mapping projects meeting ASPRS Accuracy Standards.

d. The applicant must submit proof of employment in responsible charge of at least one project as a photogrammetrist. Maps and documents satisfactory to the Board detailing methods, procedures, amount of applicant's personal involvement must be submitted to document this project. These maps and documents must be signed by the professional who supervised the work and contain a statement describing the part or the work performed by the applicant. The applicant must submit the name, address and telephone number of references to verify this information.

e. An applicant must submit five references as to the applicant's character and quality of work, three or more must be licensed surveyors or practicing professionals in the field of photogrammetry, having personal knowledge of the applicant's photogrammetric surveying experience.

(c) Examination Requirements—Photogrammetric Surveyor.

1. An applicant applying for certification as a photogrammetric surveyor-in-training must take and pass a written examination on the Fundamentals of Surveying (FS), prepared and graded by the NCEES.

2. An applicant applying for licensure as a photogrammetric surveyor must have taken and passed the FS examination and must take and pass an examination on the principles and practice of photogrammetry and an examination on the Board's rules and regulations as referred to in the section R.49-104B(5) of this Chapter.

(2) A person licensed as a professional photogrammetric surveyor may practice as a professional land boundary surveyor only by meeting the requirements of the section R.49-201A of this Chapter, and may practice as a professional GIS surveyor only by meeting the requirements of the section R.49-201D of this Chapter.

D. TIER A Professional Geographic Information System (GIS) Surveyor.

(1) Education Requirement—GIS Surveyor.

(a) Education must be evaluated by an Education Consultant and approved by the Board before an application can be considered for further processing.

(b) In addition to one of the following degrees, an applicant must also submit evidence of completion of discipline specific courses of not fewer than 12 semester hours or the equivalent in quarter hours satisfactory to the Board.

1. Four-year baccalaureate degree in a related field from a program accredited by the Accreditation Board for Engineering and Technology (ABET).

2. Four-year civil engineering technology degree from a program accredited by the Technology Accreditation Commission (TAC) of ABET.

3. Four-year related baccalaureate degree, or equivalent degree, approved by the Board.

(c) Experience Requirements—GIS Surveyor.

1. Geographic Information System Surveyor-in-Training.

a. An applicant applying for certification as geographic information system surveyor-in-training who meets the four-year education requirements must have one year of progressive practical experience.

2. Geographic Information System Surveyor.

a. An applicant applying for licensure as a geographic information system surveyor who meets the four-year education requirements must have four years of progressive practical experience.

b. An applicant applying for licensure as a geographic information system surveyor who holds a master's degree in surveying, geography, or a related field of study approved by the Board must have three years of practical experience.

3. Qualifying Experience and Documentation.

a. Experience must be obtained under supervision of a licensed geographic information system surveyor or a recognized professional in the field of GIS and must be of a character satisfactory to the Board.

b. Qualifying experience approved by the Board is experience beyond elementary level activities. In order for work to be considered as qualifying experience, an advanced level of responsibility must have been placed on the applicant. Work claimed as qualifying experience should demonstrate a sound working knowledge of GIS.

c. At least two years of the required experience must have been at the professional level in responsible charge of geographic information system mapping projects.

d. The applicant must submit proof of employment in responsible charge of at least one project as a GIS Surveyor. Maps and documents, satisfactory to the Board, detailing methods, procedures, amount of applicant's personal involvement must be submitted to document this project. The map and related project information submitted must include the project information.

e. Maps and documents must be signed by the professional who supervised the work and contain a statement describing the part or the work done by the applicant. The applicant must submit appropriate contact information including the name, address and telephone number of references to verify this information.

400 FINAL REGULATIONS

f. An applicant must submit five references as to the applicant's character and quality of work; three or more must be licensed surveyors or practicing professionals in the field of GIS having personal knowledge of the applicant's GIS surveying experience.

(d) Examination Requirements—GIS Surveyor.

1. An applicant applying for certification as geographic information system surveyor-in-training must take and pass the written examinations on the Fundamentals of Surveying (FS), prepared and graded by the NCEES.

2. An applicant applying for licensure as a geographic information system surveyor must have taken and passed the FS examination and must take and pass an examination on the principles and practice of geographic information systems and pass an examination on the Board's rules and regulations.

F. TIER B Professional Land Surveyor.

(1) An applicant shall be licensed as a TIER A Land Boundary Surveyor prior to submitting an application for licensure or registration as a TIER B Land Surveyor.

(2) An applicant must meet the requirements of education, experience and examinations.

(a) Education – Tier B Land Surveyor.

An applicant must meet the education requirements in S.C. Code Ann. § 40-22-225(D).

(b) Experience – Tier B Land Surveyor.

1. Applicant must have qualifying experience acceptable to the Board in the design of storm drainage systems and preparation of sedimentation and erosion control plans associated with the development of residential subdivisions.

2. The experience must be obtained under the supervision of a licensed Tier B surveyor or a licensed professional engineer.

(c) Examinations—TIER B Land Surveyor.

1. An applicant must have taken and passed the written examinations required for licensure as a TIER A Land Boundary Surveyor which include the FS and PS examinations, prepared and graded by the NCEES, and the State Specific Land Surveying Examination.

2. An applicant must also take and pass a special written examination pertaining to the practice of TIER B land surveying in the State which includes the design of storm drainage systems and preparation of sedimentation and erosion control plans associated with the development of residential subdivisions.

(3) A TIER B land surveyor may practice as a professional photogrammetric surveyor only by meeting the requirements of the section R.49-201C of this Chapter, and may practice as a professional GIS surveyor only by meeting the requirements of the section R.49-201D of this Chapter.

49-202. Classifications and Scopes of Authority: Engineers and Surveyors.

A. Professional Engineer.

(1) A professional engineer who by reason of his special knowledge of the mathematical and physical sciences and the principles and methods of engineering analysis and design, acquired by professional education and practice experience, is qualified to practice engineering as defined in Section 40-22-20 of the Practice Act, all as attested by his legal license and registration as a professional engineer in this State.

(2) The professional engineer license holder is entitled to the unrestricted practice of engineering as described in Section 40-22-20 of the Practice Act.

B. TIER A Land Surveyor.

(1) The practice of TIER A land surveying consists of three separate disciplines: (a) land boundary surveying, (b) photogrammetry, and (c) geographic information systems (GIS). A land surveyor may be licensed in one or more of the disciplines and practice is restricted to only the discipline or disciplines for which the land surveyor is licensed.

(2) The scopes of authority for the individual disciplines of TIER A land surveying are identified as follows:

(a) Professional Land Boundary Surveyor (PLS).

1. Locates, relocates, establishes, re-establishes, lays out or retraces any property line or boundary of any tract of land or any road, right-of-way, easement, alignment, or elevation of any fixed works embraced within the practice of land surveying, or makes any survey for the subdivisions of land;

2. Determines, by use of principles of land surveying, the position for any survey monument or reference point; or sets, resets, or replaces such monument or reference; determines the topographic

configuration or contour of the earth's surface with terrestrial or extraterrestrial measurements; conducts hydrographic surveys;

3. Conducts geodetic surveying which includes surveying for determination of geographic position in an international three-dimensional coordinate system, where the curvature of the earth must be taken into account when determining directions and distances; geodetic surveying includes the use of terrestrial measurements of angles and distances, as well as measured ranges to artificial satellites;

4. Creates graphical representations of the data related to items C(2)(a)1.2.3 above.

5. Performs work of a professional photogrammetric surveyor as described in the item C(2)(b).

(b) Professional Photogrammetric Surveyor (PPS).

1. Determines the configuration or contour of the earth's surface or the position of fixed objects thereon by applying the principles of mathematics on remotely sensed data, such as photogrammetry.

2. Creates graphical representations of data relating to the item (b)1 above.

3. Performs work of a land boundary surveyor as described in the item C(2)(a) above or as a geographic information systems (GIS) surveyor as described in the item C(2)(c) below only after obtaining a license in those categories.

(c) Professional Geographic Information System Surveyor (GIS).

1. Creates, prepares, or modifies electronic or computerized data including land information systems and geographic information systems relative to the performance of the activities described in subsections (a) and (b) above.

2. Creates digital spatial data based on integration, interpretations, transformations, and/or the manipulation of primary data sources that affects the health, welfare, or safety of the public.

3. Performs work of a land boundary surveyor as described in subsection C(2)(a) above or as a photogrammetric surveyor as described in the item C(2)(b) above only after obtaining a license in those categories.

(3) The practice of TIER A land surveying does not include the use of GIS or LIS to create maps pursuant to Section 40-22-290 of the Practice Act, analyze data, or create reports.

C. TIER B Professional Land Surveyor.

(1) Persons registered as both Professional Land Surveyor and Professional Engineer are classified as TIER B Professional Land Surveyors.

(2) The practice of TIER B land surveying as described by Section 40-22-20(27) of the Practice Act, and regulated by the Board shall include the authority, within the limits set by these regulations, to practice the design of storm drainage systems and the preparation of sedimentation and erosion control plans associated with the development of residential subdivisions. Included within this practice of TIER B land surveying is the design of stormwater detention or retention facilities incidental to the surveyor's design of storm drainage systems; provided, however, that these facilities are not lakes, ponds or similar impoundments intended to contain water at all times.

(a) As used in this section, the term "residential subdivision" means property developed for single family residences and other type projects where individual lots are established for each residential unit. The density of these projects shall be limited to two lots or units per acre. Apartment projects and projects for developments of commercial or industrial properties are not included within the scope of authority.

(b) Where reference has been made to "lakes, ponds or similar impoundments intended to contain water at all times," such reference is not intended to limit a TIER B Land Surveyor's authority to prepare calculations pertaining to the hydrology or hydraulics of these impoundments. It is expected, however, that such impoundments will require a more detailed analysis and design with respect to soil mechanics. Consequently, design of impoundments intended to contain water at all times should be based upon appropriate geotechnical evaluations conducted under the direction of a licensed engineer experienced in such matters. The geotechnical investigations and report should, as a minimum, evaluate site conditions and provide recommendations for materials and methods of construction of the impoundment.

(3) The practice of TIER B land surveying shall not include the design of drainage structures, drainage systems, or other drainage features which are not incidental to the development of a residential subdivision. Projects which are purely drainage in nature or where a subdivision of a parcel of land into small parcels is not involved shall not fall within the scope of practice authorized for TIER B land surveyors. The design of such

402 FINAL REGULATIONS

features as water systems, sanitary sewer systems, surcharged storm drainage systems or pumping stations which may also be incidental to the project are not included in this practice. The exclusion from the scope of authority of the design of "surcharged storm drainage systems" is not intended to apply to submerged outlet pipes routinely used in detention and retention basins.

(4) The practice of TIER B land surveying is further limited to the use of predesigned structures, which are approved by the county or municipal governmental agency having jurisdiction. Where standard design structures cannot be used because of extra loading, extreme depth or unusually large size, the structure shall be designed by a licensed engineer. "Predesigned Structure" is intended to cover two situations:

(a) As used in this section, the standard design for catch basins, junction boxes, and headwalls that are specified by local governments will be considered "predesigned".

(b) As used in this section, precast basins, junction boxes, and headwalls produced by concrete companies are considered as "predesigned" and may be used where allowed by the local authority.

(5) In exercising powers of a TIER B Land Surveyor, the surveyor shall undertake to perform only those assignments for which he is authorized by the statute and these regulations and for which he is qualified by education or experience in the specific technical area of TIER B land surveying involved.

49-203. Licensure by Comity.

A. Professional Engineer.

(1) An application will be considered for licensure by comity from an applicant who is appropriately licensed in another jurisdiction and has not been previously licensed in this State.

(2) Any applicant holding a valid license to practice engineering issued by a proper authority of a jurisdiction or possession of the United States, based on requirements not less than those specified by the applicable licensure act in effect in the State of South Carolina at the time such other license was issued, may, upon receipt of the proper documents and payment of the fee established by the Board, be considered for licensure without further written examination.

(3) A Model Law Engineer applicant may be licensed as a Professional Engineer by making application on the prescribed form and having the NCEES Council Record sent to the Board. To be considered, the Council Record must be submitted directly to the Board by NCEES. Upon receipt of the proper documents and payment of the fee established by the Board, a Model Law Engineer applicant may be licensed as a Professional Engineer upon further review.

B. Professional Surveyor.

(1) An application will be considered for licensure by comity from an applicant who has not been previously licensed in this State but is appropriately licensed in the state in which the applicant resides or is employed unless there are extenuating circumstances satisfactory to the Board.

(2) An application will be accepted for licensure by comity if the applicant meets the requirements for education, experience and examination as prescribed by the statutes, and the rules and regulations of this Board in effect at the time of filing said application.

(3) An applicant registered in another state may be required to take such examinations as the Board deems necessary to establish that his qualifications meet the requirements of the statutes, rules and regulations of the Board. The applicant shall in all cases be required to pass a written examination including questions of laws, procedures and practices pertaining to the practice of land surveying in this State.

(4) An application will be accepted for licensure by comity as a TIER B Land Surveyor after the applicant first obtains licensure as a TIER A Land surveyor. An applicant in this category will be required to pass the written examination for a TIER B Land Surveyor in addition to meeting the education and experience requirements as established by the statutes and the rules and regulations of the Board.

49-205. Firm Licensure.

A. For the purpose of this regulation, a sole proprietorship is one in which the ownership is held by a single individual who is duly licensed to practice engineering and/or surveying in this State, where there is no stock ownership in the firm, and where the practice name is identical to that in which the individual licensure is held. A licensed engineer or surveyor, practicing in his own name as a sole proprietorship is exempt from this section of the regulations. For multiple firms practicing engineering or surveying as a joint venture for one or more

projects in this State, a Certificate of Authorization will be required for each firm practicing within the joint venture.

B. Failure to notify the Board within thirty (30) days of changes affecting the status of the firm's information shall be grounds for sanctions up to and including revocation of the organization's Certificate of Authorization. An engineer or surveyor on file with the Board as being in full authority and responsible charge shall notify the Board of any change in his employment.

49-207. Seals: Individuals and Firms.

A. Description of Licensee's Seal.

(1) The seal of engineers and surveyors licensed by the Board shall be at least 1 1/2 inches in diameter and similar to that prescribed for the Board. In the center there shall appear the license number of the licensee along with the words:

- (a) "Registered Professional Engineer", for engineers licensed prior to July 1, 2001.
- (b) "Licensed Professional Engineer", for engineers licensed after July 1, 2001.
- (c) "Professional Engineer and Surveyor", for engineers holding dual licenses.
- (d) "Professional Land Surveyor", for TIER A land boundary surveyors.
- (e) "Professional Photogrammetric Surveyor", for photogrammetric surveyors.
- (f) "Professional GIS Surveyor", for geographic information systems surveyors.
- (g) "Professional Land Surveyor—TIER B", for TIER B land surveyors.

(2) Rubber stamps (wet seal), raised embossed seals or computer-generated seals, identical in size, design and content with the approved impression seals may be used by the licensee.

B. Description of Firm's Seal.

(1) The seal evidencing issuance of a Certificate of Authorization by this Board shall be at least 1 1/2 inches in diameter and similar to that prescribed for the Board. In the center there shall appear the name of the certificate holder and the assigned Certificate of Authorization number. In the space between the circle and the outside of the Seal there shall appear the words "South Carolina" and the words "Certificate of Authorization".

(2) Rubber stamps (wet seal), raised embossed seals, or computer-generated seals, identical in size, design and content may be used by the firm.

C. Seal on Documents.

(1) The seal and signature of a licensee on a document constitutes a certification that the document was prepared by the licensee or under his direct supervision, and in the case of prototypical documents, that the licensee has reviewed the document in sufficient depth to fully coordinate and assume responsibility for application of the plans.

(2) When sealing documents is required by statute, other authority or contract, each sheet of design or construction plans and drawings for engineering practice and of maps, plats, and charts for land surveying practice shall be sealed and signed by the licensee or permit holder preparing them, or in responsible charge of their preparation. The signature and date when the document was prepared must be affixed under or across the face and beyond the circumference of the seal but in a manner that does not obliterate or render illegible the licensee's name and number. Where the engineering or surveying practice is provided through a firm, such documents shall also carry the Certificate of Authorization seal.

(3) Where more than one page is bound together in one volume of documents, specifications or reports, the licensee or permit holder who prepared said volume, or under whose direction and control said volume was prepared, may seal, date and sign only the title or index sheet, provided that the signed sheet clearly identifies all of the other sheets comprising the bound volume, and provided that any of the other sheets which were prepared by, or under the direction and control of, another licensee or permit holder, be sealed, dated and signed by said other licensee or permit holder with responsibility clearly delineated. This provision, however, shall not apply to design drawings and construction plans prepared by or under the responsible charge of a licensee. Such documents shall carry the required seals, date and licensee's signature on each sheet.

(4) Additions, deletions or other revisions to sealed documents shall not be made, unless such changes are sealed, dated and signed by the licensee who made the revisions or under whose directions and control said revisions were made.

404 FINAL REGULATIONS

(5) Documents transmitted electronically shall have the computer-generated seal removed from the original file and a copy of the project report shall be signed, sealed and sent to the client. The electronic data shall have the following inserted in lieu of the signature and date: "This document originally was issued and sealed by (name of sealer), (license number), on (date of sealing). The electronic media shall not be considered a certified document."

ARTICLE 3 RULES OF PROFESSIONAL CONDUCT

49-300. Preamble.

A. In order to safeguard the life, health, property and welfare of the public and to establish and maintain a high standard of integrity, skills, and practice in the profession of engineering and surveying, the following Rules of Professional Conduct are promulgated in accordance with the Code of Laws of South Carolina (1976, as amended), Title 40, Chapter 22, and shall be binding upon every person holding a certificate of registration as a Professional Engineer or Surveyor. Reference to engineer or surveyor in this Article shall mean any engineer, surveyor, corporation, professional corporation, partnership or firm, authorized to offer or perform engineering or surveying services in this State.

B. The Rules of Professional Conduct delineate specific obligations engineers and surveyors must meet. In addition, each engineer and surveyor is charged with the responsibility of adhering to standards of generally accepted ethical and moral conduct in all aspects of the practice of professional engineering and surveying.

C. The Rules of Professional Conduct as promulgated herein are an exercise of the police power vested in the South Carolina State Board of Registration for Professional Engineers and Surveyors by virtue of the acts of the legislature, and as such the South Carolina State Board of Registration for Professional Engineers and Surveyors is authorized to establish conduct, policy and practices in accordance with the powers herein above stated.

D. All engineers and surveyors registered under the Code of Laws of South Carolina (1976, as amended), Title 40, Chapter 22, are charged with having knowledge of the existence of these Rules of Professional Conduct, and shall be deemed to be familiar with their several provisions and to understand them. Such knowledge shall encompass the understanding that the practices of engineering and surveying are privileges, as opposed to rights, and the registrants shall be forthright and candid in their statements or written responses to the Board or its representatives on matters pertaining to professional conduct.

49-301. Responsibility to the Public.

The Engineer or Surveyor shall hold paramount the safety, health, and welfare of the public in the performance of their professional duties.

A. The Engineer or Surveyor shall at all times recognize that their primary obligation is to protect the safety, health, property and welfare of the public and shall conduct their practice to fulfill this obligation.

B. If the judgment of the engineer or surveyor is overruled under circumstances where the safety, health, and welfare of the public are endangered, they shall inform their employer of the possible consequences and notify other proper authority of the situation, as may be appropriate.

49-302 .Competency for Assignments.

The Engineer or Surveyor shall perform services only in the areas of their competence.

A. The Engineer or Surveyor shall undertake to perform engineering or surveying assignments only when qualified by education or experience in the specific technical field of professional engineering or surveying involved.

B. The Engineer or Surveyor may accept an assignment requiring education or experience outside of their own field of competence, but only to the extent that their services are restricted to those phases of the project in which they are qualified. All other phases of such projects shall be performed by qualified associates, consultants, or employees.

C. The Engineer or Surveyor shall not affix their signature and seal to any engineering or surveying plan or document dealing with subject matter to which they lack competence by virtue of education or experience, nor to any such plan or document not prepared under their direct supervisory control.

D. In the event a question arises as to the competence of an Engineer or Surveyor to perform an engineering or surveying assignment in a specific technical field of engineering or surveying which cannot be otherwise resolved to the Board's satisfaction, the Board, either upon request of the Engineer or Surveyor or by its own volition, may require them to submit to an appropriate examination as determined by the Board.

49-303. Public Statements.

The Engineer or Surveyor shall issue public statements only in an objective and truthful manner.

A. The Engineer or Surveyor shall be completely objective and truthful in all professional reports, statements, or testimony. He shall include all relevant and pertinent information in such reports, statements, or testimony.

B. The Engineer or Surveyor shall express a professional opinion only when it is founded upon adequate knowledge of the facts in issue, upon a background of technical competence in the subject matter, and upon honest conviction of the accuracy and propriety of their statement.

C. The Engineer or Surveyor will issue no statements, criticisms or arguments on engineering or surveying matters connected with public policy which are inspired or paid for by an interested party, or parties, unless they have prefaced their comment by explicitly identifying themselves, by disclosing the identities of the party or parties on whose behalf they are speaking, and by revealing the existence of any interest they may have in the matters.

49-304. Conflicts of Interest.

The Engineer or Surveyor shall avoid conflicts of interest.

A. The Engineer or Surveyor shall conscientiously strive to avoid conflicts of interest with employer or client, but when unavoidable, the Engineer or Surveyor shall forthwith disclose the circumstances to their employer or client. In addition the Engineer or Surveyor shall avoid all known conflicts of interest with their employer or client and shall promptly inform their employer or client of any business association, interests, or circumstances which could influence their judgment or the quality of their service.

B. The Engineer or Surveyor shall not accept compensation, financial or otherwise, from more than one party for services on the same project at the same time, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to, by all interested parties.

C. The Engineer or Surveyor shall not solicit or accept financial or other valuable considerations from material or equipment suppliers for specifying their projects.

D. The Engineer or Surveyor shall not solicit or accept gratuities, directly or indirectly from contractors, their agents, or other parties dealing with their client or employer in connection with work for which they are responsible.

E. When in public service as a member, advisor, or employee of a governmental body or department, the Engineer or Surveyor shall not participate in considerations or actions with respect to services provided by them or their organization in private engineering or surveying practices.

49-305. Solicitation of Work.

The Engineer or Surveyor shall solicit and accept work only on the basis of their qualifications.

A. The Engineer or Surveyor shall not offer to pay, either directly or indirectly, any commission, political contribution, or a gift, or other consideration in order to secure work. It is not a violation of law to seek or secure salaried positions through employment agencies.

B. The Engineer or Surveyor shall not falsify or permit misrepresentation of their, or their associates' academic or professional qualifications. They shall not misrepresent or exaggerate their degree of responsibility in or for the subject matter of prior assignments. Brochures or other presentations pertaining to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures, or their past accomplishments with the intent and purpose of enhancing their qualifications and work.

C. The Engineer or Surveyor shall not review the work of another engineer or surveyor for the same client, except with the knowledge of such engineer or surveyor, or unless the connection of such engineer or surveyor with the work has been terminated.

49-306. Improper Conduct.

406 FINAL REGULATIONS

The Engineer or Surveyor shall conduct their work with honesty and integrity.

A. The Engineer and Surveyor shall not knowingly associate with or permit the use of their name or organization's name in a business venture by any person or organization which they know, or have reason to believe, is engaging in business or professional practices of a fraudulent or dishonest nature.

B. If the Engineer or Surveyor has knowledge or reason to believe that another person or organization may be in violation of any of these provisions or of the Code of Laws of South Carolina (1976, as amended), Title 40, Chapter 22, they shall present such information to the Board in writing and shall cooperate with the Board in furnishing such further information or assistance as may be required by the Board.

C. Engineering and surveying registrants shall recognize and honor practice restrictions placed upon them by their designated license category or practice tier.

ARTICLE 4

STANDARDS OF PRACTICE MANUAL FOR SURVEYING IN SOUTH CAROLINA

49-400. Purpose.

A. These regulations are intended to establish minimum standards for the practice of surveying in South Carolina.

(1) The standards set forth are to promote uniform requirements for and accurate surveys by surveyors practicing in South Carolina.

(2) The established guidelines will assist a surveyor in meeting the needs of their clients so that surveyed properties henceforth can be readily located, mapped and described in a definitive and easily understood manner.

B. These regulations are also intended to provide guidelines that will assist property owners and others who deal with real property such as those in the legal, banking, and real estate professions.

(1) The manual should be of value to property owners in South Carolina when engaging the services of qualified surveyors to establish corners, boundaries and maps of their respective properties.

(2) The manual should assist the Clerks of Court in the various counties of South Carolina in receiving and accepting for recordation maps that are in compliance with appropriate standards and statutory requirements.

49-410. Compliance.

A. All Surveyors shall comply with these regulations governing minimum standards for the practice of surveying in South Carolina.

B. A surveyor who practices surveying in South Carolina in violation of the minimum standards contained in this manual, on complaint in writing, sworn to by the complainant and submitted to the Board of Registration for Professional Engineers and Surveyors, shall be notified of the complaint and afforded an opportunity to be heard before the Board.

C. The repeated failure to adhere to minimum standards for surveying as contained in this manual may be considered as prima facie evidence of misconduct in the practice of surveying on the part of a Surveyor.

D. The Board will investigate information from Clerks of Court, clients, individuals, and land owners if in the Board's opinion a surveyor appears to have performed surveying which is not in compliance with this manual. When a surveyor obligates themselves and contracts to survey real property in South Carolina by virtue of the license granted them by this State, they accept the responsibility to comply with minimum standards prescribed by this manual.

E. The Board shall provide for each Surveyor and for each Clerk of Court in this State a copy of the Standards of Practice Manual for Surveying in South Carolina. Copies will be made available, upon request, for other State officials and the general public.

49-420. General.

A. For the purpose of these regulations, the following terms or words are defined as meaning:

(1) The term "Board" shall mean the South Carolina State Board of Registration for Professional Engineers and Surveyors.

(2) The term "manual" shall mean the Standards of Practice Manual for Surveying in South Carolina.

(3) The term "minimum standards" shall mean the standards of practice for surveying in South Carolina.

(4) The term "surveyor" shall mean a surveying practitioner duly registered by the Board for the practice of surveying in the State of South Carolina.

(5) The terms "Clerk of Court", "Register of Deeds" and "Register of Mesne Conveyance" shall refer to the office in the county having responsibility for recording plats, maps and deeds.

(6) The term "seal" shall mean the raised embossed seal, rubber stamp (wet seal) or computer-generated seal of the Surveyor.

(7) The term "accurate" shall mean that degree of accuracy consistent with the standards and tolerances specified in this manual.

B. The proper execution of surveying, platting and mapping procedures and all other details of a survey are the direct responsibility of the Surveyor whose seal and signature shall appear on the plat or map to be prepared. The fact that a plat or map is approved by a planning department or accepted by Clerk of Court for recordation in no way relieves the surveyor whose seal appears upon the drawing of the full responsibility to make certain that the plat or map meets the requirements of these standards.

C. The plat or map shall remain for a period of time required by the statute of repose in the possession of the surveyor whose seal appears thereon. It should, therefore, be professionally and accurately prepared as a permanent record and after prints or copies have been made for recordation or other purposes the original plat should be carefully preserved by the surveyor or their firm along with the surveyor's original field notes, calculations, and work sheets for, at a minimum, the length of time the statute of repose applies. Such material, in original form, is to be made available when required either by the Board or by the courts.

D. The words "course" and "bearing" are used interchangeably in this manual.

E. Where survey requirements are more stringent than those set forth herein, the surveyor shall comply with those standards as mandated by federal, state, or local governmental requirements.

F. Surveys which are performed for a specific stated purpose other than boundary surveys as defined herein shall be permitted where unusual conditions make it impractical or impossible to perform the survey to the standards set forth herein, provided the purpose and conditions shall be clearly stated on the survey drawing. This section is not to be used in any way to circumvent the standards in this manual on a survey which can be performed to these standards.

G. Additions and/or deletions to survey drawings by other than the signing party or parties are prohibited without written consent of the original signing party or parties.

H. The surveyor shall comply with the minimum survey classifications noted herein but has the option to negotiate with each client an agreement for a higher classification.

49-430. Nomenclature.

A. In surveying work, it is acceptable to employ abbreviations and symbols. When use of such abbreviations and symbols are necessary, the following are acceptable and may be employed in land surveying work in South Carolina:

- (1) Acres: AC
- (2) Acrylonitrile Butadiene ABS
- (3) American Society of Photogrammetry and Remote Sensing: ASPRS
- (4) Angle: Ang
- (5) Avenue: AVE
- (6) Azimuth: Az
- (7) BeiDou Navigation Satellite System: BeDou
- (8) Bench Mark: BM
- (9) Catch Basin: CB
- (10) Calculated Course(s): CC
- (11) Calculated Distance: CD
- (12) Corrugated Metal Pipe: CMP
- (13) Crimp /Clip/ Pinch Top: CT
- (14) Curb Face: CF or FOC
- (15) Curb Inlet: CI
- (16) Curb and Gutter: CG

408 FINAL REGULATIONS

- (17) Chord: CH
- (18) Center Line: CL or C/L or CL
- (19) Concrete Monument: Con. Mon.
- (20) Continuously Operating Reference Station: CORS
- (21) Degree of Curve: D
- (22) Deed Book: DB
- (23) Deflection Angle: Defl Ang
- (24) Departure: Dep
- (25) Ductile Iron Pipe: DIP
- (26) Drop Inlet: DI
- (27) Drill Hole: DH
- (28) Delta Angle: Δ or I
- (29) Double Meridian Distance: DMD
- (30) Easement: ESMT
- (31) East: E
- (32) Error of Closure: EC
- (33) Elevation: EL
- (34) Edge of Pavement: EP
- (35) Foot: Ft.
- (36) Found: Fd. or F
- (37) Global Navigation Satellite System: GNSS
- (38) Global Positioning System: GPS
- (39) Global'naya Navigatsionnaya Sputnikovaya Sistima: GLONASS
- (40) Gutter: Gut
- (41) Highway: Hwy
- (42) Invert Elevation: I.E. or Inv.
- (43) Iron Pipe, Set: IPS
- (44) Iron Pipe, Found: IPF
- (45) Length of Curve: L or Arc
- (46) Latitude: Lat
- (47) Long Chord: LC
- (48) Mag Nail: MN
- (49) Magnetic course: MC
- (50) Manhole: MH
- (51) Mile: Mi
- (52) Marker: Mk
- (53) Monument: Mon
- (54) Nail and Cap: N & C
- (55) National Spatial Reference System: NSRS
- (56) New: N or (N)
- (57) Not To Scale: NTS
- (58) North: N
- (59) North American Datum 1927: NAD 27
- (60) North American Datum 1983: NAD 83
- (61) North American Vertical Datum 1988: NAVD 88
- (62) National Geodetic Survey: NGS
- (63) National Geodetic Vertical Datum 1929: NGVD 29
- (64) Offset: O.S. OR O/S
- (65) Old: O or (O)
- (66) On-line Positioning User Service (NGS): OPUS
- (67) Parts Per Million: PPM
- (68) Perimeter: P
- (69) Pavement: Pave

- (70) PK Nail: PK
- (71) Plat Book: PB
- (72) Point of Beginning: POB
- (73) Point of Curvature: PC
- (74) Point of Compound Curve: PCC
- (75) Point on Curve: POC
- (76) Point of Intersection: P.O.I. or P.I.
- (77) Point of Tangent: POT
- (78) Point of Reverse Curvature: PRC
- (79) Point on Tangency: PT
- (80) Point: Pt
- (81) Polymerized Vinyl Chloride: PVC
- (82) Position Dilution of Position: PDOP
- (83) Private: Pvt
- (84) Property Line: PL
- (85) Radius: R
- (86) Reference Point: RP
- (87) Railroad: RR
- (88) Railroad Spike: RRS
- (89) Reinforced Concrete Pipe: RCP
- (90) Register of Mesne Conveyance: RMC
- (91) Railway: Rwy
- (92) Real Time Kinematic Surveying: RTK
- (93) Real Time Network: RTN
- (94) Rebar: RB
- (95) Register of Deeds: ROD
- (96) Right of way: R/W
- (97) Satellite Receiver for RTK or VRS Surveying: Rover
- (98) Satellite Receiver Base Station: Base
- (99) South: S
- (100) SC State Plane Coordinate System SPCS
- (101) South Carolina Geodetic Survey: SCGS
- (102) Square: Sq
- (103) Square Feet: SF or FT²
- (104) Street: St
- (105) Station: Sta
- (106) Stake: Stk
- (107) Tangent of Curve: T
- (108) Tack: Tk
- (109) Traverse: Tra
- (110) Track: Trk
- (111) US Bureau of Standards: USBS
- (112) Vertical: Vert
- (113) Vitrified Clay Pipe: VCP
- (114) Virtual Reference Station Network: VRS
- (115) West: W
- (116) Wood: Wd
- (117) Symbols:
 - (a) Degree: °
 - (b) Minute: ‘
 - (c) Second: “
 - (d) Foot or Feet: ‘

410 FINAL REGULATIONS

B. The following are acceptable abbreviations for metric measures:

- (1) Area: A
- (2) Centimeter: CM.
- (3) Decimeter: DM.
- (4) Hectare: HA.
- (5) Kilometer: KM.
- (6) Meter: M
- (7) Millimeter: MM.
- (8) Square Meter: M2

C. Definitions: The following definitions and terminology shall be used in land descriptions:

(1) Boundary Line: Any line bounding an area or dividing separate properties; adequately dimensioned and described. Such lines may be straight, irregular, circular, or spiral.

(2) Point of Beginning: A defined, readily located, and permanent point or monument that is the starting point on a parcel for a metes and bounds description; and also is the final point of such description.

(3) Point of Commencement: A defined, readily located, and permanent point or monument that is the point to which the Point of Beginning is tied for a permanent reference.

(4) Convey: The act of transferring title or rights to a property.

(5) Grantor: A person or party conveying property or rights to a grantee.

(6) Grantee: A person or party receiving title or rights to property.

(7) Title: A written claim or right which constitutes a just and legal cause of exclusive possession.

(8) Metes and Bounds Description: A description in which the boundary lines start from a given point and is described by listing the direction, distance, and description of corners of the lines forming this boundary; in succession and adjoining owners.

(9) Description by Lot Number: A description which identifies a lot or tract of land by reference to a previously surveyed subdivision plat together with other pertinent information.

(10) Recorded: Placed on record in the office of the Clerk of Court, Register of Deeds or Register of Mesne Conveyance for the county in which all or part of the land lies.

(11) Coordinate Description: A description of lands in which the angle points or other points in the boundary are each referred to by grid coordinates on the South Carolina State Plane Coordinate System (current Datum) or similar coordinate system.

(12) Grid Coordinates: Distances measured at right angles to each other in a rectangular system having two base lines at right angles to each other.

(13) Survey: The orderly process of determining data relating to the physical characteristics of the earth, which may be further defined according to the type of data obtained, the methods and instruments used, and the purpose(s) to be served.

(14) Boundary Survey: A survey, the primary purpose of which may include, but is not limited to, the determining of the perimeters of a parcel or tract of land by establishing or reestablishing corners, monuments, and boundary lines for the purpose of describing, or platting or dividing the parcel.

(15) Closing/Loan or Mortgage Survey: A boundary survey of a parcel or lot which includes all improvements obvious and apparent found on the property, to be used in the preparation of a mortgage, loan or deed document.

(16) Topographical Survey: A survey of the natural and selected man-made features of a part of the earth's surface by remote sensing and/or ground measurements to determine horizontal and vertical spatial relations.

(17) Compiled Map: A map drawn from previously recorded or unrecorded documents, photographic material or tax maps which represent the general configuration of the parcel where partial or no actual surveying has been performed by the land surveyor preparing the map.

(18) Right of Way Survey: A Survey of any strip or area of land, including surface, overhead, or underground, for a designated use, such as for drainage and irrigation canals and ditches; electric power, telegraph, and telephone lines; gas, oil, water, and other pipe lines; highways, and other roadways, or other similar uses.

(19) Geodetic Survey: A survey of areas and points affected by and taking into account the curvature of the earth using a nationally defined horizontal and vertical datum. Geodetic surveys may be performed with terrestrial or satellite surveying technology but must be connected to the coordinate realization of the National

Spatial Reference System (NSRS). All geodetic surveys, both vertical and horizontal, in the State of South Carolina shall conform to the datums currently supported by NSRS. Geodetic surveys shall be performed by a surveyor licensed by this board.

(20) Geodetic Datum: The recognized horizontal and vertical datum for South Carolina shall be currently adopted or recognized datum by the NSRS which is maintained by the National Geodetic Survey.

(21) State Plane Coordinate System: A map projection that is a mathematical transformation of latitudes and longitudes on the surface of sphere or ellipsoid representing the earth to grid coordinates (northing, easting, or y x values) on a plane. The official coordinate system for surveying purposes in South Carolina is the South Carolina State Plane Coordinate System. For the purpose of the South Carolina State Plane Coordinate System, the foot is the International Foot with one inch being exactly 2.54 centimeters. To convert metric coordinates to the international feet multiply by 3.280839895.

(22) Hydrographic Survey: A survey having for its principal purpose the determination of data relating to bodies of water, and which may consist of the determination of one or several of the following classes of data; depth of water and configuration of bottom; directions and force of current; heights and times and water stages; and location of fixed objects for survey and navigation purposes.

(23) Wetlands Survey: A survey showing the Wetland Boundaries tied by course and distance to either 1) property corners that are properly monumented, or 2) project boundaries that have been properly monumented, or 3) State Plane Coordinates. This shall be done in a manner that permits future surveyors to readily retrace the wetland boundary. The error of closure of such ties must be consistent with the land use classification of the parcel being surveyed as described in section 49-440 Classification of Surveys. Data collection and platting of these types of wetland boundaries must be performed by or under the direct supervision of a surveyor. A surveyor may not accept wetlands survey data from non-licensed individuals who are not under their direct supervision for the purpose of recording the information on survey plats.

(24) Corner: A point on a land boundary.

(25) Monument: A shaft of ferrous metal, concrete, stone or concrete and metal; placed to designate a fixed point; placed near vertically in the earth; designed for maximum permanency, placed by a land surveyor to mark corners.

(26) Witness Monument: Any monument that does not occupy the same defined position as the corner itself, but whose relationship to the corner is established.

(27) Reference Point: Any defined position that is or can be established in relation to another defined position.

(28) Benchmark: A relatively permanent material object, natural or artificial, bearing a marked point whose elevation above or below a referenced datum is known.

(29) Plat: A diagram drawn to scale showing all essential data pertaining to the boundaries and subdivisions of a tract of land, as determined by a survey and must be signed and sealed by the surveyor.

(30) Map: A representation on a plane surface, at an established scale, of the physical features of a part of the earth's surface, shown by the use of, but not limited to lines, arcs, signs, alpha numeric characters and symbols.

(31) Map of Survey, Plat of Survey, Survey for or other Similar Titles: Any drawing of a parcel or tract of real property used for the purpose of depicting the results of a field survey. Each survey drawing shall state the type of survey it depicts as defined in this manual.

(32) Global Navigation Satellite System (GNSS): Any satellite system which can be used to determine a precise location on the surface of the Earth. The US system is known as NAVSTAR Global Positioning System (GPS). The Russian system is known as the Global'naya Navigatsionnaya Sputnikovaya Sistema or GLONASS. The European Space Agency system is known as GALILEO.

(33) Position Dilution of Precision (PDOP): A numerical measure of the predicted accuracy of a geodetic position determined from GNSS satellites. The term represents the reliability of the geometry of the satellites with respect to the receiver location. A PDOP of 3 or less will generally ensure accuracy of the highest survey quality. A PDOP of 5 or less may be acceptable for most surveying and mapping projects where the distance between Rover and the nearest Base station is less than 10KM.

(34) Multipath: Multipath is an erroneous GNSS distance measurement between a GNSS satellite and either the Rover or Base. The multipath signal results from the receiver using a signal that has been reflected off a

412 FINAL REGULATIONS

structure or water surface on its way to the receiver. The resulting measurement of distance from the satellite to the receiver is longer.

(35) Base Station: The name given to a GNSS receiver located over a known point or geodetic control monument.

(36) Rover: The name given to a GNSS receiver located over an unknown survey point whose coordinates are to be determined or checked against known geodetic control.

(37) Static GNSS Survey: A geodetic survey that uses multiple survey grade satellite receivers each collecting the same satellite data simultaneously. At least one satellite receiver must be on a known geodetic control station. The data are post-processed to yield three dimensional vectors between the known and unknown control stations. Static vectors solutions yield a “no check” solution and therefore by themselves do not meet minimum standards without additional independent checks. An expected relative accuracy of 0.07 foot plus 1:50,000 of the distance separating the Base and Rover can be obtained dependent on the length of time of simultaneous observations, the quality of the receivers, multipath and PDOP of less than 5.

(38) Static GNSS Positioning of Property Corners: If GNSS STATIC survey techniques are used to establish SC State Plane Coordinates on property corners, the corners shall be positioned from the nearest two (2) first or second order horizontal control monuments in the National Geodetic Survey (NGS) data base. Property corners shall be positioned to a horizontal accuracy of at least $0.07' + 1/20,000$ or 0.2 feet (whichever is smaller) with relation to the nearest NGS horizontal control monument.

(39) Real Time Kinematic (RTK) GNSS Survey: A geodetic survey that uses multiple survey grade satellite receivers each collecting the same satellite data simultaneously. At least one Base receiver must be on a known geodetic control station and is capable of transmitting satellite data in real time to other Rover receivers. The data are processed by the Rovers in real time to yield three dimensional vectors between the Base and Rover stations. RTK vectors solutions yield a “no check” solution and therefore by themselves do not meet minimum standards without additional independent checks. RTK surveys require a site calibration to the NAD83 and NAVD88 in the vicinity of the survey. An expected relative accuracy of 0.05 foot plus 1 PPM of the distance separating the Base and Rover can be obtained dependent on the length of time of RTK observations, the quality of the receivers, PDOP of less than 3, a minimum of 5 GPS satellites, multipath and quality of the site calibration.

(40) VRS GNSS Survey: A geodetic survey that uses multiple dual frequency survey grade satellite receivers each collecting the same satellite data simultaneously. Base stations are operated by the SCGS and data are streamed to the Rovers via the Internet and processed in real time to yield three dimensional vectors between the Base Stations and Rovers. VRS vectors solutions yield a “network check” solution and therefore will meet minimum standards without additional independent checks. VRS surveys require an “independent check” by occupying a known geodetic control point in the National datum in the vicinity of the survey to verify the proper operation of the Rover. An expected relative accuracy of 0.05 foot can be obtained dependent on the length of time of VRS observations, the quality of the receivers, PDOP of less than 3, a minimum of 5 GPS satellites and minimal multipath.

(41) Classification of Geodetic Surveys (Performed using GNSS Technology)

Type	Relative Accuracy (95%)	Max PDOP	Min # of Satellites	Site Calibration
Static	GNSS $0.07' + 1:50,000$	5	4	N
Property Corner	Positions $0.07' + 1:20,000$	5	4	N
RTK GNSS	$0.07' + 1\text{PPM dist from Base}$	3	5	Y
VRS GNSS	$0.07'$	3	5	N

All the above Geodetic Surveys will achieve the required minimum accuracy for Land Surveys

(42) Spatial Data: Information about the locations and shapes of geographical features and relationships between them, usually stored as coordinates and topology. Any data that can be mapped.

(43) Ground Coordinates: A coordinate system that has its own origin within the region being investigated and is used principally for points within that region.

49-440. Classification of Surveys.

A. The accuracy of the measurements for a survey shall be based upon the character of the land, the type of survey and the current use of the land. Unadjusted Ratio of Precision permissible shall be no less than the errors

of closure prescribed below. In lieu of an Unadjusted Ratio of Precision, a Relative Positional Accuracy may be used. Relative Positional Accuracy may be tested by: (1) comparing the relative location of points in a survey as measured by an independent survey of higher accuracy or (2) the results of a minimally constrained, correctly weighted least square adjustment of the survey.

B. On the basis of the size and character of the land, boundary surveys for conveying, platting, mapping, or describing property shall be classified as follows:

(1)(Class A) Urban Land Surveys: Urban surveys include land properties which lie within or adjoin city or town limits, or other high valued properties. Bearings shall be shown in degrees, minutes and seconds and distances shall be shown to hundredths of a foot.

(2)(Class B) Suburban Land Surveys: Suburban surveys include properties surrounding the urban area of a town or city. Bearings shall be shown in degrees, minutes and seconds and distances shall be shown to hundredths of a foot.

(3)(Class C) Rural Land Surveys: Rural surveys include properties located outside suburban properties. Bearings shall be shown in degrees and minutes or less and distances shall be shown to hundredths of a foot.

(4)(Class D) Farm and Timber Land Surveys: Timber surveys include properties located throughout the State and represent land which may be cultivated; may provide space for farm houses and buildings; or may be employed as timber land. Bearings shall be shown in degrees and minutes or less and distances to the nearest tenth of a foot or less.

(5)(Class E) Vertical Control Surveys: Surveys involving vertical control (leveling) for land areas where a common datum is necessary shall be classified on the basis of accuracy.

(a) Urban Control: Control loops employed for commercial, industrial, or urban land surveys shall be executed with a precision or error of closure not to exceed in feet $0.04 \sqrt{m}$ (m = number of miles in the level circuit)

(b) Other: Other leveling surveys shall be conducted with a precision or error of closure not to exceed in feet $0.10 \sqrt{m}$ (m = number of miles in the level circuit). The VRS will achieve this accuracy when using a dual frequency GNSS receiver, PDOP less than 3 in the absence of multipath.

C. Table of Classifications:

Classification	A	B	C	D
	Urban Surveys	Suburban Surveys	Rural Surveys	Farm & Timber Surveys
Unadjusted Linear Closure				
Closure				
(Minimum)	1:10000	1:7500	1:5000	1:3000
Angular				
Closure	$15'' \sqrt{N}$	$20'' \sqrt{N}$	$30'' \sqrt{N}$	$50'' \sqrt{N}$
(Maximum)				
Location of Improvements, Structures, Paving, Etc.:				
(Tie Measurement)	$\pm 0.1'$	$\pm 0.2'$	$\pm 1.0'$	$\pm 2.0'$

N = Number of Points in Traverse

As an option:

Relative Positional Accuracy

$0.07' + 50 \text{ PPM}$ or $0.07' + 1/20,000 * \text{Perimeter}$ (95% confidence level).

The VRS can achieve of a Relative Positional Accuracy of $0.07'$ with a 95% confidence level and therefore can be used for all Classifications

414 FINAL REGULATIONS

49-450. Plats and Platting.

A. A plat, as defined by this manual, is an accurate graphical representation, properly dimensioned, report of a survey made by a Surveyor of a finite piece of real property, including pertinent data and appropriate information.

B. A survey requiring a plat should be accurately presented and should reveal all of the pertinent information developed by the survey.

C. Primary reference materials which provide the basis for the establishment of the survey boundaries shall be listed on the face of the plat.

49-460. Survey Types and Requirements.

A. General Property Surveys: The following general requirements apply to all survey types included in this manual, other than GIS Surveys and Photogrammetric Surveys (see section 49-460D and section 49-460E of these standards for the general requirements of these surveys).

(1) The size of the plat should conform to the requirements of the Clerk of Court, Register of Deeds or the Register of Mesne Conveyance of the county in which the plat is to be recorded with minimum size to be eight and one-half inches by eleven inches.

(2) All survey plats shall have a title and contain the following information:

(a) The seal and the signature of the Surveyor in responsible charge for the full conduct of the survey;

(b) A location map and/or adequate descriptive location of the property surveyed;

(c) The state, county and/or city in which the property is located;

(d) The name of the owner, company or agent of the property who requested the survey document;

(e) The date the field survey was completed;

(f) A graphic scale;

(g) A numerical scale;

(h) The name, license number, address and phone number of the land surveyor.

(i) A certification executed by the Surveyor which will contain a statement of the class of the survey performed as follows:

"I hereby state that to the best of my professional knowledge, information, and belief, the survey shown hereon was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements for a Class _ survey as specified therein."

(j) The area of the parcel of tract surveyed will be shown consistent with the class of survey or at least to the nearest one-hundredth (0.01) of an acre.

(k) At least one corner of the property surveyed shall be referenced so as to form a tie-line which can be used to help establish or verify the correct location of the property.

(l) The distances to the nearest intersections of street centerlines or street right-of-way intersections shall be shown on the survey document.

(m) The North arrow shall be shown and shall be correlated accurately with the courses so that it is accurately positioned and designated as astronomic, grid or magnetic or record source.

(n) All property lines shall be defined by bearings and horizontal distances and plotted to the scale indicated on the plat.

(o) Bearings and distances shall be shown consistent with the class of the survey.

(p) The Land Surveyor shall retrace the boundaries of the property being surveyed and set or reset monuments or corners consistent with the class of survey and accepted practices of boundary retracement. All monuments found or placed must be described in detail on the survey plat or drawing, with data given to show their location upon the ground in relation to the boundary lines. When a property corner is inaccessible and cannot be set, a witness or reference monument shall be placed on the boundary line and the offset distance noted on the survey document, plat or drawing. Control corners, monuments or property corners, on adjoining properties, used in the establishment or verification of property corners, shall be identified, located and defined, by course and distance, to an accuracy consistent with the class of survey. Primary reference materials which provide the basis for the establishment of survey boundaries shall be listed on the face of the plat.

(q) All new or re-established corners shall be in accordance with 49-470 F:

1. Metal, concrete, or other durable material and detectable with conventional instruments for finding ferrous or magnetic objects;

2. No less than 1/2 inch in diameter for metal corners and 4 inches in diameter for concrete;
 3. No less than 24 inches in length;
 4. If the corner location falls on pavement, concrete, or other material where one of the above cannot be placed, it is permissible to use nails, spikes, scribes, etc. in or on the surface;
 5. In place prior to the signing, sealing and issuance of the plat.
- (r) Where a boundary is formed by a curved line, the curve will be defined by curve data to include the radius, delta, arc length and the long chord, by course and distance. The curve may also be defined as a traverse of chords around curve. Chord shall be defined by course and distance.
- (s) All visible items across the property line shall be indicated with their extent shown or noted on the survey plat/map. The use of the words projection or encroachment shall be at the discretion of the surveyor.
- (t) Visible indications of easements and rights-of-way on the site (i.e. power lines, etc.), obvious and apparent at the time of the survey or known to the surveyor, shall be shown and shall include their widths, if known.
- (u) Cemeteries and burial ground located within the premises surveyed shall be located and shown upon the drawing, plat or map if obvious and apparent observed by the surveyor at the time of the survey, or if knowledge of their existence and location is furnished to the land surveyor prior to or during the performance of the survey.
- (v) Lot and block numbers and/or the full names of adjoining land owners, and the names and/or numbers of principal highways, roads, streets or railroads, shall be shown, on the plat, with their rights-of-way. The plat book and page number of the subdivision as recorded by the Register of Mesne Conveyance, Register of Deeds or Clerk of Court of the county where the survey document is recorded should be included, if known.
- (w) Boundaries formed by water courses shall be located and plotted to scale as shown in the title.
- (x) If calculated lines are not shown, traverse lines and/or off-set lines used to close water course boundaries shall be shown, plotted to scale, and defined by course and distance. Note "Creek the line" where applicable.
- (y) Maps prepared partially or entirely from reference or source data, such as compiled maps, do not represent land surveys as defined herein, and shall be clearly marked accordingly. Compiled maps must have a prominently displayed statement that the said document does not represent a land survey and is unsuitable for deeding of property or recordation.
- (z) Plot plans representing planned locations prepared for city, county, state, federal governmental or other uses may be signed and sealed. A prominent statement shall be placed on the face of the document stating "This plot plan does not represent a land survey, was not prepared for recordation, and is not suitable for deeding of property. No ground survey was performed."
- B. Closing/Loan or Mortgage Surveys:** In addition to the requirements set forth in Section 49-460 A., General Property Surveys, the following applies to closing/loan or mortgage surveys:
- (1) If a survey is all or a portion of a lot which is part of or adjoining a recorded subdivision, lot and block numbers or other designations including those of adjoining lots must be shown on the drawing.
 - (2) Structures shall be dimensioned to show size and location in relation to the boundary.
 - (3) Location distances are to be measured perpendicular from the closest side and front lines.
 - (4) Physical features obvious and apparent at the time of the survey to the surveyor such as storm drains, power lines, etc. on the subject property shall be shown and plotted to scale.
 - (5) Accuracy requirements of residential lots shall be consistent with the class of survey or a maximum closure of 0.05 foot, whichever is less restrictive.
 - (6) A certification shall be executed by the Surveyor as follows:
 "I hereby state that to the best of my professional knowledge, information, and belief, the survey shown herein was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements for a Class _ survey as specified therein; also there are no visible encroachments or projections other than shown."
- C. Topographical Surveys:** The following applies to topographical surveys:
- (1) Structures shall be shown in relation to the boundary.

416 FINAL REGULATIONS

(2) Physical features obvious and apparent at the time of the survey to the surveyor such as storm drains, sanitary sewers, power lines, gas lines and water lines on the subject property shall be shown and plotted to scale.

(3) Elevations may be shown as spot elevations and/or contours.

(4) Contour intervals shall be noted.

(5) The vertical and horizontal error of contour lines and physical features shown shall not exceed one-half the contour interval.

(6) An on-site temporary bench mark shall be established with reference to datum currently adopted by NGS and plotted to scale as shown on the title.

(7) The following items from Section 49-460 A. (3) shall be used when a general property survey is not made in conjunction with the topographic survey: a through h, l through n, and t through w.

(8) Where the property boundaries are not surveyed, the source from which the boundary data was taken must be clearly noted thereon.

(9) A certification shall be executed by the Land Surveyor which will contain a statement as follows:

"I hereby state that to the best of my professional knowledge, information, and belief, the survey shown herein was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements as specified therein."

D. Geographic Information System Surveys: The following applies to Geographic Information System Surveys.

(1) Purpose: The purpose of these standards is to provide the Surveyor with a guideline for surveys that provide the location of infrastructure information used in a geographic information system (GIS). The primary objective of this standard is to ensure that surveyed information in a GIS is reliable and can be used to make definitive decisions. These standards are not to be used in place of professional judgment.

(2) The Survey: Geographic information system (GIS) surveys are defined as the measurement of existing surface and subsurface features for the purpose of determining their geospatial location for inclusion in a GIS database. All GIS surveys as they relate to property lines, rights-of-way, easements, subdivisions of land, the position for any survey monument or reference point, the determination of the configuration or contour of the earth's surface or the position of fixed objects thereon, and geodetic surveying which includes surveying for determination of the size and shape of the earth both horizontally and vertically and the precise positioning of points on the earth utilizing angular and linear measurements through spatially oriented spherical geometry, shall be performed by a Surveyor who is a licensee of this Board.

The Surveyor shall select the proper equipment and methods necessary to achieve at least the Minimum Horizontal and Vertical Accuracy required in Sections 5a and 5b of these standards. The survey work will be executed in a professional manner by the Surveyor or by personnel under the direct personal supervision of the Surveyor. In the event that more stringent survey requirements are required for a given project than what is provided for herein, the more stringent requirements shall be followed.

(3) Coordinate values: Coordinate values should be in the South Carolina State Plane Coordinate System or Geographic Positions based on the National Coordinate System. Horizontal coordinate values should be in the NSRS or the most current datum published by the National Geodetic Survey (NGS). Vertical coordinate values should be in the North American Vertical Datum of 1988 (NAVD 88) or the most current datum published by the National Geodetic Survey (NGS). If coordinates are not referenced to the NSRS, identify the local coordinate system used and its relationship to the NSRS. Coordinates shall be given in either metric or English units. The English unit in South Carolina is the international foot.

(4) Results: The results of the survey shall be transmitted to the client in the form of a document in a digital format. The following information shall be included in the drawing or in the Federal Geographic Data Committee (FGDC) Metadata and certified to by the Professional Surveyor in responsible charge;

(a) The accuracy classification to which the data was gathered.

(b) The methods and procedures used to obtain the data, including but not limited to: equipment, (i.e. global positioning system, theodolite and electronic distance meter, transit and tape), documentation of positional inaccuracies, control points, bench marks, and PDOP levels for GPS surveys.

(c) Date of the survey work.

(d) Datum used for the survey.

(5) Accuracy - General: The minimum positional accuracy of the survey data is a Geospatial Positional Accuracy that is relative to the mapping scale, and therefore it is the accuracy of the base map on which the GIS is based. The reporting methodology shall be in accordance with the Federal Geographic Data Committee, Geospatial Positioning Accuracy Standards, Part 1 Reporting Methodology. The Geospatial Position Accuracy shall be reported by positional accuracy as defined in two components: horizontal and vertical. Horizontal Positional Accuracy is the radius of the circle of uncertainty, such that the true or theoretical location of the point falls within that circle 95-percent of the time. Horizontal Accuracy may be tested by comparing the planimetric coordinates of surveyed ground points with the coordinates of the same points from an independent source of higher order. Vertical Positional Accuracy is a linear uncertainty value, such that the true or theoretical location of the point falls within + /- of that linear uncertainty value 95-per cent of the time. Vertical Accuracy may be tested by comparing the elevation of surveyed ground points with the elevations of the same point determined from a source of higher accuracy.

(a) Horizontal Accuracy: The horizontal accuracy is based upon the American Society of Photogrammetry and Remote Sensing (ASPRS) Standard for Class 2 and reported in agreement with the National Standard for Spatial Data Accuracy. The NSSDA Horizontal Positional Accuracy Statistic at the 95% confidence level is determined by multiplying the Root Mean Square Error (RMSE) of the data set by 1.7308.

Acceptable	
Base Mapping Scale of LIS/GIS	Positional Accuracy Statistic of Survey Data
1"= 20 ft.	0.7 feet
1"= 50 ft.	1.7 feet
1"= 100 ft.	3.5 feet
1"= 200 ft.	6.9 feet
1"= 400 ft.	13.8 feet
1"= 500 ft.	17.3 feet
1"= 1000 ft.	34.6 feet
1"= 2000 ft.	69.2 feet

(b) Vertical Accuracy: The vertical accuracy is based upon the ASPRS Standard for Class 1 and reported in agreement with the National Standard for Spatial Data Accuracy. The NSSDA Vertical Positional Accuracy Statistic at the 95% confidence level is determined by multiplying the Root Mean Square Error (RMSE) of the data set by 1.9600.

Acceptable	
Base Mapping Contour Interval	Positional Accuracy Statistic of Survey Data
1 foot	0.7 feet
2 feet	1.3 feet
5 feet	3.2 feet
10 feet	6.5 feet
15 feet	9.7 feet

(6) Certification: A certification shall be executed by the Surveyor which will contain a statement of the class of survey performed as follows:

"I hereby state that to the best of my professional knowledge, information, and belief, the GIS survey shown herein was made in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements as specified therein."

E. Photogrammetric (Airborne and Spaceborne) Surveys:

(1) Airborne and spaceborne surveys are defined as the use of photogrammetry, American Society of Photogrammetry and Remote Sensing (ASPRS), IFSAR, or other similar measurement technologies for obtaining reliable information about physical objects and the environment, including terrain surface, through the process of recording, measuring, and interpreting images and patterns of electromagnetic radiant energy and

418 FINAL REGULATIONS

other phenomena. This Rule establishes minimum allowable photogrammetric production procedures and standards for photogrammetric mapping and digital data production.

(2) Production procedures for topographic and planimetric mapping surveys shall be in accordance with the standards established by Chapter 3 of the Federal Geographic Data Committee (FGDC) Geospatial Positioning Accuracy Standard and applicable extensions and revisions. These standards are incorporated by reference including subsequent amendments and editions.

(3) Topographic or planimetric maps, orthophotos, or related electronic data, unless clearly marked as "Preliminary Map," shall meet contractually specified FGDC Standards for horizontal and vertical accuracies (in the absence of specified standards, the ASPRS applies) and shall be sealed, signed and dated by the licensee.

(4) When the issued product is a digital (electronic) data set, or a map or document consisting of more than one sheet or otherwise cannot be signed and sealed, a project report shall be certified, signed and sealed. Such report shall be clearly marked "Preliminary" if applicable.

(5) Ground control for topographic and planimetric mapping projects shall be in South Carolina State Plane Coordinate System grid coordinates, and distances in International feet or meters. A minimum of one permanent project vertical control point shall be shown.

(6) A project map or report shall contain the applicable following information:

(a) Date of original data acquisition;

(b) Altitude of sensor and sensor focal length, as applicable;

(c) Date of document or data set compilation;

(d) If hard copy product is produced, the maps shall contain a north arrow, map legend, final document scale, including barograph, and contour interval, as applicable;

(e) Coordinate system for horizontal and vertical denoting SI (System International English units (i.e., latest datum adjustment maintained by the NSRS, assumed, or other coordinate system);

(f) A list or note showing the control points used for the project. The minimum data shown for each point shall include: physical attributes (i.e. iron rod, railroad spike, etc), latitude and longitude (or Easting and Northing Grid coordinates), and elevation, as applicable;

(g) If other data is included, the source and accuracy of those items must be clearly indicated;

(h) A statement of accuracy complying with contractually specified FGDC standards consistent with 49-460C of this Rule;

(i) For topographic maps or data sets, contours in areas obscured by man-made or natural features shall be uniquely identified or enclosed by a polygon clearly identifying the obscured area. The accuracies of the contours or of features in this obscured area shall be noted "No reliance is to be placed on the accuracy of these contours";

(j) A vicinity map depicting the project location shall appear on the first sheet of all hard copy maps or in the report accompanying digital files;

(k) Company name, address and phone number; and

(l) The name of the client for whom the project was conducted.

(7) A certificate, substantially in the following form, shall be affixed to all maps or reports:

"I hereby state that to the best of my professional knowledge, information, and belief, that this photogrammetric project was performed in accordance with the requirements of the Standards of Practice Manual for Surveying in South Carolina, and meets or exceeds the requirements as specified therein."

F. Right of Way Surveys: Right-of-way surveys are surveys of the boundaries of a strip, area or parcel of land being used for some designated public or private use. When these rights of way are taken in fee simple, the surveys and plats shall be performed in accordance with the requirements of Section 49-460-A "General Property Surveys."

49-470. Methods of Marking Property Boundaries.

A. Corner Tree: "X" and three (3) chops on the sides where the line enters and leaves the tree.

B. Corner Witness Tree: One (1) blaze and three (3) chops or three (3) chops facing the corner.

C. Side Line Tree: Two (2) chops facing the property line.

D. Property Line Tree or Center Line Tree: One (1) blaze and two (2) chops, at points where the line enters and leaves the tree.

E. Monuments shall be placed at all property corners where there is a change in direction of a property line.

F. Inaccessible Point: In the event a corner cannot be marked or monumented, one or more witness monuments or metal stakes shall be placed on the boundary line and described by bearings and/or distances so that the inaccessible point may be located accurately on the ground.

G. Boundary Monument or Witness Monument: In the event the location falls on pavement, concrete, or other material, it is permissible to use spikes or scribes in or on the surface.

49-480. Land Descriptions.

A. Land Description: A land description is the detailed statement of appropriate information necessary to locate, relocate, or define the boundaries of a certain area or tract of land.

(1) A land description can be part of a land survey and can be used in connection with the preparation of deeds or similar documents.

(2) It is the surveyor's responsibility to make certain that the surveyor's description is complete and proper. The fact that some element or object which should be described is not included in the above does not justify the surveyor's omitting it from the description.

B. Preparing a Description: In a land survey the land description may be prepared by the surveyor. The writing of a deed is the practice of Law and is not the practice of surveying. In a description the full name, address and signature of the surveyor, their license number and seal, the date the land description was prepared, and the date of survey from which the information was procured, or the book and page number of the recorded map or deed, if it is used in preparing the description, shall appear as part of the document.

C. Types of Land Descriptions and Their Content: In describing a lot located in a subdivision by number; the plat or map must be referenced with the name of the subdivision, the surveyor's name, the date, the township and the general location of the property. In addition, the book and page number in which the particular lot is recorded shall be included.

D. Metes and Bounds Description: A metes and bounds description shall include the general location of the tract or lot with sufficient accuracy such that the tract can be readily located on the ground. This is commonly known as a "being clause" and it should also include the source of title of the tract or lot. The point of beginning must be selected such that it can be readily and accurately located from some previously established monument or corner of record and can be readily described. The description shall include the names of adjoining property owners on all lines and at all points. The monument or marker at each corner shall be described. A metes and bounds description shall describe all courses in logical sequence around a tract or lot in a clockwise direction such that the ending point is the beginning point. All lines adjacent to streets, roads, or other rights-of-way shall be referenced to these and all pertinent distances and curve data shall be listed in addition to the parcel's area.

49-490. Instruments and Apparatus.

A. Surveyor's Instruments: Surveying in South Carolina shall be conducted in the field with properly calibrated equipment appropriate for the tolerance of work being performed. The equipment shall be tested at regular intervals and adjusted to maintain its optimum accuracy.

B. Tapes: All tapes shall be of alloy or carbon steel and shall be certified as USBS quality with a known coefficient of temperature and tension corrections, and graduated in feet and decimal parts of a foot or calibrated to another tape or means that has been certified by the USBS or NGS.

C. Baselines: Baselines have been established by NGS throughout the state for the purpose of calibrating electronic distance measuring devices. Some of these baselines have 100' monuments to calibrate tapes. Surveyors shall utilize these baselines to insure calibration of their electronic measuring equipment and tapes. Calibration records for each instrument and tapes shall be maintained by the Surveyor and shall be made available when required by the Board or the courts.

ARTICLE 6 CONTINUING PROFESSIONAL COMPETENCY

49-600. Purpose.

A. Professionals licensed to practice engineering, surveying, or engineering and surveying in South Carolina are required to demonstrate a continuing development of professional competency.

420 FINAL REGULATIONS

B. Each licensee shall meet the continuing professional competency requirements of these regulations as a condition for biennial renewal of license.

49-601. Definitions.

Terms used in this section are defined as follows:

(1) Professional Development Hour (PDH) -A contact hour (nominal) of instruction or presentation. The common denominator for other units of credit.

(2) Continuing Education Unit (CEU) -Unit of credit customarily used for continuing education courses.

(3) College/Unit Semester/Quarter Hour -Credit for courses in EAC/ABET approved programs or other related college courses approved in accordance with provision 49-604 of this section.

(4) Course/Activity -Any qualifying course or activity with a clear purpose and objective which will maintain, improve, or expand the skills and knowledge relevant to the licensee's field of practice. Regular duties are not considered qualified activities.

(5) Dual Licensee -A person who is licensed as both an engineer and a surveyor.

49-602. Requirements.

A. Each licensee is required to obtain 30 PDH units during each biennial renewal period.

B. If a licensee exceeds the requirements in any renewal period, a maximum of 15 PDH units may be carried forward into the subsequent renewal period. If the licensee claims 15 PDH carry over units, the previous renewal period will be subject to audit.

C. PDH units may be earned as follows:

(1) Successful completion of college courses.

(2) Successful completion of continuing education courses.

(3) Successful completion of short courses, tutorials, webinars, and distance-education courses offered for documented individual or group study. The method of delivery can be through the following:

(a) Face-to-face programs or live internet-based programs; or

(b) Archived prerecorded programs or archived correspondence programs.

(4) Teaching or instructing in (1) through (3) above.

(5) Authoring published papers, articles, or books.

(6) Active participation in professional or technical societies.

(7) Successful application for patents.

D. Effective July 1, 2022, no more than fifty percent of PDHs claimed during a renewal cycle may be earned in a business or non-technical subject matter.

49-603. Units of Credit.

The conversion of other credit to PDH units is as follows:

(1)	1 College or unit semester hour	45 PDH
(2)	1 College or unit quarter hour	30 PDH
(3)	1 Continuing Education Unit	10 PDH
(4)	1 Hour of professional development for attendance in course work, seminars, or professional or technical presentations made at meetings, conventions, or conferences	1 PDH
(5)	For teaching as in 49-602C(5)	PDH Credits are doubled
(6)	Each published technical or professional paper, article or book	10 PDH
(7)	Active participation in a professional and technical society	2 PDH
(8)	Each patent	10 PDH

49-604. Determination of Credit.

The Board has final authority with respect to approval of courses, credit, PDH value for courses and other methods of earning credit.

(1) Credit for college or community college approved courses will be based upon course credit established by the college.

(2) Credit for qualifying seminars and workshops will be based on one PDH unit for each hour of attendance. Attendance at qualifying programs presented at professional and/or technical society meetings will earn PDH units for the actual contact time of each program.

(3) Credit determination for activities 49-603-(6) and 49-603-(8) is the responsibility of the licensee, subject to review as required by the Board.

(4) Credit for activity 49-603-(7), active participation in professional and technical societies is limited to 2 PDH units per organization, with a maximum of 4 PDH units per year, and requires that a licensee serve as an officer, or actively participate in a committee of the organization, or have at least a 50% documented attendance at meetings held not less than eight times per year. PDH credits for participation in a professional or technical society are not earned until the end of the administrative year of the society.

(5) Teaching credit is valid for teaching a course or seminar for the first time only. Teaching credit does not apply to full-time faculty.

(6) No more than twelve hours of credit may be obtained in one calendar day.

49-605. Record Keeping.

A. The responsibility for maintaining records used to support credits claimed is that of the licensee. Records required include, but are not limited to:

(1) A log showing the type of activity claimed, sponsoring organization, location, duration, instructor's or speaker's name, and PDH credits earned and;

(a) Attendance verification records in the form of completion certificates or other documents supporting evidence of attendance; or

(b) Records as maintained by the NCEES Records Program or other recognized repositories for such records.

B. These records must be maintained for a minimum period of two renewal cycles during which copies may be requested by the Board for audit verification purposes.

C. If, upon review or audit by the Board, any or all PDH units claimed by the license holders are disallowed, the license holder will be allowed a ninety-day period during which such deficiencies must be remedied. A license will be automatically deemed lapsed if the licensee fails to remedy the deficiencies during the allowed time frame.

49-606. Exemptions.

A licensee may be exempt from the professional development educational requirements for one or more of the following reasons:

A. New licensees by way of examination or comity shall be exempt for their first renewal period.

B. Licensees experiencing physical disability, illness, or other extenuating circumstances may apply to the Board for an exemption or extension of time to obtain the credits subject to the review and approval of the Board. Supporting documentation must be furnished with any such exemption request made to the Board.

C. Licensees who list their occupation as "Retired" on the Board approved renewal form and who further certify that they are no longer receiving any remuneration from providing professional engineering or surveying services shall be exempt from requirements for professional development hours. In the event such a person elects to return to the active practice of professional engineering or surveying, professional development hours must be earned, before returning, for each year exempted, not to exceed 30 PDHs.

D. Engineers and Surveyors continuously licensed by this Board prior to January 1, 1969 will be exempt from continuing education requirements.

49-607. Repealed.

49-609. Dual License Holders.

The total number of PDH units required shall be the same as that required for a single license holder; but at least ten units shall be obtained separately for each profession.

422 FINAL REGULATIONS

49-610. Reporting Forms.

A. All renewal applications will contain a statement of verification that the licensee has obtained the required professional development hours at the time of renewal. Upon audit, the licensee must report the course date, sponsoring organization, location, activity title, brief description and PDH's claimed and provide documentation of attendance or completion as well as any other information required by the Board.

B. Failure to fulfill the professional development requirements or to comply with the Board's audit shall be considered a violation of the Registration Law for Professional Engineers and Surveyors.

Fiscal Impact Statement:

There will be minimal cost incurred by the State or any of its political subdivisions for this regulation.

Statement of Rationale:

The updated regulations will: change references from "registration" and "registered" to "license" or "licensure" or "licensed" where appropriate; change language throughout to make it gender neutral; update terminology; remove all references to Category A and Category B licensure and replace with Professional Engineer licensure; update and clarify Professional Engineer licensure requirements; clarify FE examination exemptions; add early PE examination requirements; remove all references to two year degrees for land surveying licensure; remove all provisions now voided by date; add Tier B land surveyor experience requirements; update statutory and regulatory references throughout regulations; update seal requirements; modify language in Public Statements; add terms and definitions to Standards of Practice Manual for Surveying in South Carolina and update nomenclature and definitions; update and clarify survey types and requirements and methods of making property boundaries; and update and modify PDH requirements.

Document No. 5037

**DEPARTMENT OF LABOR, LICENSING AND REGULATION
BOARD OF FUNERAL SERVICE
CHAPTER 57**

Statutory Authority: 1976 Code Sections 40-1-70, 40-19-60, and 40-19-70

57-06.1. Apprenticeship Requirements.

57-08. Licensure by Endorsement.

57-09. Provisions for Biennial Renewal of Licenses and Reactivation of Expired Licenses.

57-10. Provisions for Permitting of Funeral Establishments.

57-11. Continuing Education Requirements for Embalmers and Funeral Directors.

57-13. Code of Ethics.

57-13.2. Websites. (New)

Synopsis:

The South Carolina Board of Funeral Service proposes to amend: R.57-06 to clarify apprentices' quarterly reporting requirements; R.57-08 regarding licensure by endorsement; R.57-09 regarding renewal applications; R.57-10 establishing a residency requirement for funeral home managers and requiring owners of funeral establishments to be licensed funeral directors; R.57-11 regarding continuing education requirements; and other sections to comply with requirements set forth in Chapter 19 of Title 40.

A Notice of Drafting was published in the *State Register* on August 28, 2020.

Instructions:

Replace regulations as shown below. All other items and sections remain unchanged.