DIVISION 100
General Provisions

SOUTH CAROLINA
DEPARTMENT
OF TRANSPORTATION

May 2004

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Section 101
General Guidelines

101.1 PURPOSE AND ORGANIZATION OF THE *MANUAL*

The *SCDOT Construction Manual* has been prepared to provide the Resident Construction Engineer and SCDOT Inspectors with guidance in performing their day-to-day duties. The *Manual* is not a contractual document. The *Manual* is based on current SCDOT policies and procedures. Division 100 provides guidance on Contract administration from project start to closure; Divisions 200 through 800 provide inspection guidance for Contract pay items; Appendix A provides a descriptive table of SCDOT Construction Forms typically used by SCDOT construction personnel; Appendix B provides information on SCDOT Sample Identification Cards; Appendix C presents typical SCDOT Sampling and Testing Procedures; and Appendix D provides miscellaneous technical information that is typically used in construction. The *Manual* also includes a comprehensive Glossary and Subject Index of key acronyms, terms and definitions. SCDOT construction personnel are expected to become familiar with and employ the content of this *Manual* in conjunction with previous experience and sound engineering judgment. When situations are encountered that are not specifically addressed in this *Manual*, seek the advice of a supervisor.

101.2 SCDOT ORGANIZATION AND PERSONNEL CONSIDERATIONS

101.2.1 <u>Central Office</u>

101.2.1.1 Executive Level

With respect to construction, the executive level of the Department consists of the Executive Director, State Highway Engineer and Deputy State Highway Engineer. The Director of Construction and District Engineering Administrators report directly to the Deputy State Highway Engineer.

101.2.1.2 Program Manager

Most SCDOT construction projects will have a Program Manager from the Program Management Section who is directly responsible for the project until the Contract is closed. Generally, contracts include a 5% contingency. For changes that exceed the budgeted amount, contact the Program Manager.

101.2.1.3 Construction Operations

Figure 101A presents an organizational chart of SCDOT construction operations. The Director of Construction is directly responsible for the following SCDOT construction operations and reports directly to the Deputy State Highway Engineer:

1. Road Construction. The Road Construction Engineer in the Central Office is responsible for Statewide road construction projects that are not directly related to bridge structures. The Construction Applications Manager reports directly to the Road Construction Engineer and is responsible for the implementation and maintenance of construction support software, including BAMS/DSS, PES/LAS, Bid Express, Expedite and SiteManager. The Assistant Construction Engineers in the Central Office report directly to the Road Construction Engineer and provide support on road construction issues to District and field personnel and directly interface with FHWA Engineers on Federal-aid projects.

2. Bridge Construction. The Bridge Construction Engineer in the Central Office is responsible for Statewide construction of structures. The Assistant Construction Engineers in the Central Office report directly to the Bridge Construction Engineer, provide support on structural issues to District and field personnel, and directly interface with FHWA Engineers on Federal-aid projects.

3. Contract Administration. Contract Administration is responsible for administering contracts Statewide for SCDOT road and bridge construction projects through project closure.

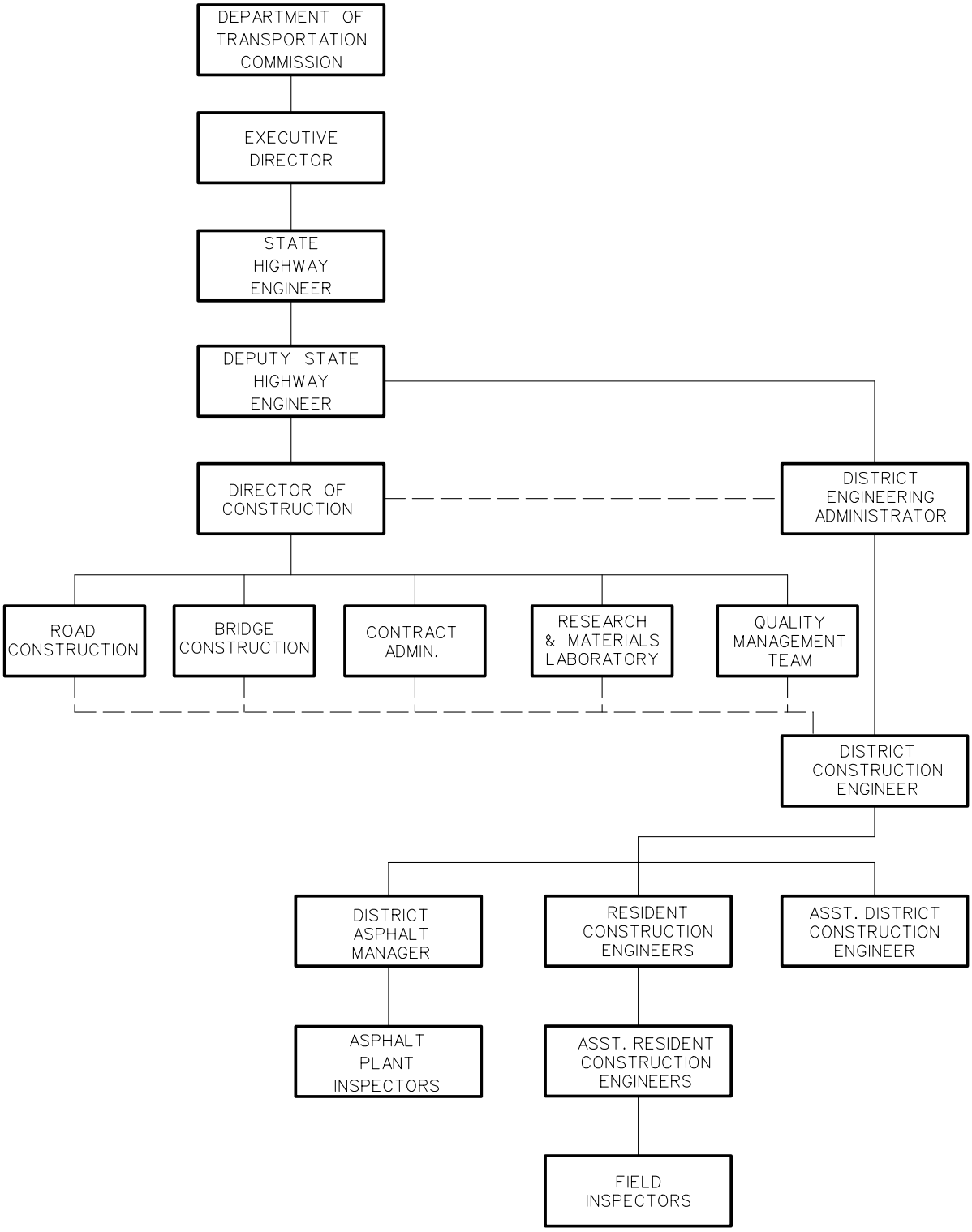
4. Research and Materials Laboratory. The Research and Materials Engineer is responsible for establishing policies and procedures for approval of material sources and the sampling and testing of all materials used Statewide on SCDOT road and bridge projects.

5. Quality Management Team. The Quality Management Team is responsible for the review of construction management and engineering inspection duties performed on SCDOT projects. These reviews provide for adherence to and standardization of SCDOT requirements.

101.2.2 District Office

101.2.2.1 District Engineering Administrator

The State of South Carolina is divided into seven engineering Districts with a District Engineering Administrator in each District. All construction work within each District is the responsibility of the District Engineering Administrator. The District Engineering Administrator is responsible for ensuring that roads and bridges are constructed as specified in the Contract and for ensuring they are adequately maintained upon acceptance from contractors. The authority and responsibilities of the District Engineering Administrator are as delegated by the State Highway Engineer.



ORGANIZATION OF SCDOT CONSTRUCTION OPERATIONS
Figure 101A

101.2.2.2 District Construction Engineer

Each of the seven Districts within the State has at least one District Construction Engineer who reports directly to the District Engineering Administrator. The Assistant District Construction Engineer, if assigned, reports to the District Construction Engineer. The District Construction Engineer is responsible for the District Asphalt Manager and the Resident Construction Engineers within the District. Typical duties of the District Construction Engineer include:

- supervising the work of the Resident Construction Engineer;
- making regular visits to project sites to ensure that the work is being performed in accordance with the requirements of the Contract Plans and Specifications, including Special Provisions;
- ensuring that a sufficient number of samples and tests are being performed;
- ensuring that field and office records of the Resident Construction Engineer are being properly maintained;
- checking the status of As-Built Plans and ensuring they are being prepared on schedule;
- assisting with or making final construction inspections, as assigned by the District Engineering Administrator;
- ensuring that engineering equipment is being properly cared for;
- ensuring that good public relations are being carried out by SCDOT personnel; and
- other duties as assigned by the District Engineering Administrator.

101.2.2.3 District Asphalt Manager

The District Asphalt Manager reports to the District Construction Engineer, or assigned assistant. The District Asphalt Manager is responsible for the Asphalt Plant Inspectors. The District Asphalt Manager will be HMA Level 3 certified, as required by the Department. Typical duties of the District Asphalt Manager include:

- maintaining close contact with plant and roadway personnel;
- making notations of any problems found by the Contractor or SCDOT;
- resolving project problems as quickly as practical;
- checking all computations of roadway and plant reports and tickets;
- notifying the Contractor as soon as problems are noted;
- keeping the Resident Construction Engineer apprised of any problems and corrections;
- forwarding all paperwork to the Resident Construction Engineer for preparing estimates;
- processing check samples and immediately notifying the Contractor;
- maintaining daily records of all samples obtained and how they compared;
- ensuring pay factor sheets are complete and accurate; and
- other duties as assigned by the District Construction Engineer.

101.2.2.4 Asphalt Plant Inspector

The Asphalt Plant Inspector reports to the District Asphalt Manager. Asphalt Plant Inspectors are HMA Level 1 certified, as required by the Department. Typical duties of the Asphalt Plant Inspector include:

- visiting the plant site as needed;
- reviewing the Contractor's plant reports;
- monitoring all plant activities while on site;
- monitoring at least one entire test during the site visit;
- checking with the Contractor on any problems encountered;
- noting any deficiencies spotted by SCDOT personnel;
- obtaining bag samples for testing;
- verifying roadway cores and plant cores;
- checking the lime flow with Contractor;
- checking trucks and truck beds while on site;
- distributing reports as they are completed; and
- other duties as assigned by the District Asphalt Manager.

101.2.3 <u>County Level</u>

101.2.3.1 Resident Construction Engineer

Each District Office has jurisdiction over multiple counties within the State. At the project level, the Resident Construction Engineer has an office representing one or more counties within the District, depending on the size and construction activity in the area. Resident Construction Engineers are responsible for their office facilities and the construction projects assigned to them by the District Engineering Administrator. The Resident Construction Engineer is the SCDOT representative at the job site and reports to the District Construction Engineer. Depending on the level of construction activity, Assistant Resident Construction Engineers may be assigned. The typical duties of the Resident Construction Engineer include, but are not limited to:

- ensuring courteous and professional relations with local property owners and the public;
- ensuring that contractors and subcontractors are treated impartially by SCDOT personnel;
- having a thorough working knowledge of project requirements and the details of the Contract Plans and Specifications, including Special Provisions;
- assigning duties to SCDOT Inspectors and ensuring they understand how to carry out their assigned duties;
- ensuring SCDOT Inspectors are on duty at all required times and checking their activities for satisfactory performance (e.g., setting construction stakes, sampling and testing materials, inspecting items of work);

- regularly reviewing field notes and the Daily Work Reports of SCDOT Inspectors to ensure that adequate records are being maintained as the work progresses;
- maintaining complete and accurate contractual records of project activities and ensuring that all required written reports are promptly and properly furnished;
- maintaining contractual records in such condition that they may clearly and easily be followed by personnel unfamiliar with the project;
- monitoring the project schedule and supervising the timely preparation of As-Built Plans;
- ensuring compliance of material, equipment and work, regularly spot checking all phases of the work on the project;
- assessing the work on pay items for acceptance and directly interfacing with the Contractor Superintendent to resolve any problems encountered;
- ensuring the timely computation of pay item quantities upon acceptance of the work, approving the Daily Work Reports and preparing the Monthly Pay Estimate; and
- other duties as assigned by the District Construction Engineer.

The Resident Construction Engineer prepares Monthly Pay Estimates for each pay item as the work progresses. The Contractor is required to sign off on these Estimates for payment. If the Contract Plans are changed during construction, they are modified and prepared as As-Built Plans. By using this method of administration, the Resident Construction Engineer will not be required to compute final pay quantities at project completion, but must submit with the As-Built Plans the required final project documentation (e.g., Asphalt Recap Sheets, Pile Data Sheets). See Section 110.2 for additional information on As-Built Plans and required documentation.

101.2.3.2 SCDOT Inspector

SCDOT Inspectors report to the Resident Construction Engineer and are directly involved in the construction of road and bridge projects. SCDOT Inspectors include engineering technicians, surveyors, plant inspectors, roadway inspectors and bridge inspectors. Typical duties of SCDOT Inspectors include, but are not limited to:

- monitoring erosion control;
- monitoring Contractor activities on road and bridge construction projects;
- monitoring traffic control for adherence to requirements;
- monitoring the Contractor’s checks for material application rate and yield;
- monitoring the Contractor’s reports for accuracy;
- monitoring placement of material, as directed by Resident Construction Engineer;
- maintaining Daily Work Reports of Contractor activities;
- noting any deficiencies found by Contractor or SCDOT personnel;
- performing required sampling and testing of work and materials;
- accepting or rejecting materials, equipment and work;

- recording accepted pay item quantities in the Daily Work Report; and
- other duties as assigned by the Resident Construction Engineer.

101.2.4 Personnel Policy

101.2.4.1 Rules and Regulations

SCDOT employees are governed by the Department's Personnel Rules and Regulations, which are furnished to all supervisors. Meetings will be held periodically by supervisors to familiarize SCDOT employees with current Department policy. Policy changes and updates will be disseminated to employees by memorandum through their supervisor. Any questions regarding personnel policy should be directed through the proper channels.

101.2.4.2 Integrity

Absolute integrity on the part of SCDOT personnel is essential, if public confidence is to be maintained. Excessive fraternization between SCDOT employees and Contractor personnel is discouraged. Refer to the publication *Guide to the South Carolina State Ethics Act* for additional information.

101.2.4.3 Training and Certification

SCDOT requires formal training and certification to ensure that personnel are properly qualified to perform their respective duties. The Technician Certification Program is generally based on input from representatives from SCDOT, FHWA and the industry. SCDOT typically has a third party, such as a State University, administer the coursework and examinations, for which a Certification of Qualification will be issued upon successful completion. On-the-job trainees will be trained under the direct supervision of a certified technician. Because certification demonstrates competency with procedures unique to South Carolina, reciprocity with other agencies is generally not permitted. See the Department's Technician Certification policy on the SCDOT Intranet Website for additional information.

101.2.4.4 Intra-Department Cooperation

Good relationships with fellow employees and with other departments within SCDOT are of vital concern. All SCDOT employees should be working in a professional manner toward a common goal. An understanding and appreciation of the functions of other SCDOT departments is a valuable asset. Written or verbal instructions are given regularly to the Resident Construction Engineer, and this information should be transmitted to other SCDOT personnel in a timely manner. A bulletin board in each office is suggested. The Resident Construction Engineer should keep the District Construction Engineer informed of any unusual condition or circumstances that may arise. This can be performed by letter, facsimile, e-mail, telephone or during visits to the project site.

101.2.4.5 Public Relations

SCDOT construction personnel are under the critical public eye, such as adjacent property owners, local residents and passing motorists. It is essential that all SCDOT employees conduct themselves in a manner that will command the respect and confidence of the public. The public will ask SCDOT representatives many questions during the construction of a project. All questions should be answered as accurately and as courteously as possible. Questions that cannot be answered should be referred to a supervisor, or to other sections of the Department, if necessary. Adjacent property owners are always concerned with the construction work to be performed within the limits of their property. A problem that may seem minor to an SCDOT employee may be of grave concern to the property owner. Any issues should be addressed promptly and courteously with the property owner involved. See Section 101.7.3 for information on SCDOT's policy concerning the media.

101.2.5 Safety

101.2.5.1 General

Accidents are not only costly to the employee and the Department, but result in pain, disability and possibly death. Employees should be safety conscious at all times, both as to proper driving and safe working conditions. One should be aware of the potential hazards in each duty performed and take every precaution to prevent injuries. Resident Construction Engineers should have monthly meetings with all employees under their supervision to discuss safe driving and working conditions. At these meetings, it is advisable to discuss any accidents that may have occurred to determine their cause and what steps could have been taken to prevent these accidents.

101.2.5.2 Safe Driving

Employees should realize that, because they are employed by the State and driving State-owned vehicles, the public is observing their driving practices and is prone to criticize employees of the Department for all violations whether they are minor in nature or serious. All employees are, therefore, urged to set a good example for the traveling public. Employees should know and observe all laws.

101.2.5.3 Surveying

When a survey party is working on a heavily traveled highway, it is necessary to have signs or flaggers to direct traffic. If signs are in place, they should be the proper distance ahead of the survey party so as to warn traffic of its presence on the highway. If placed too far in advance of a survey party, signs lose their effectiveness. When flaggers are used, they should wear the proper colored clothing, be furnished with proper flagging equipment, and be given instructions on the proper method of directing traffic. Part 6 of the *MUTCD* addresses proper flagging attire and techniques. When using such tools as axes, hammers or bush axes, adequate space should be maintained between personnel so that there will be no danger of being struck by these tools. When cutting overhead, care must be taken to prevent limbs or other foreign matter

from causing injury. All employees should be alert for snakes and insects, particularly in areas where there is heavy growth. When working near power lines, extreme care should be exercised so as not to come in contact with electrical wires. Remember that chains and metallic tapes are conductors of electricity and should never be allowed to touch electrical wires.

101.2.5.4 Medical Treatment

In case of injury, seek medical treatment promptly. A minor injury may become infected if medical treatment is not provided and may result in painful and costly injuries. First-aid kits are available from the Supply Depot. These should be obtained and kept in a convenient location for use if and when needed. Resident Construction Engineers should be familiar with necessary forms to be submitted in the event of injuries and ensure that these reports are submitted promptly with all necessary information furnished. Complete and process OSHA Form 300, SCDOT Form 12A, SCDOT Form 12B and SCDOT Form 576, as appropriate, for personnel injuries and motor vehicle accidents.

101.2.5.5 Safety Equipment

Personal protective equipment (e.g., hard hats, vests, boots) will be made available to all SCDOT personnel. SCDOT personnel will wear only hard hats and safety vests bearing the SCDOT seal. Contractor personnel must not wear SCDOT hats or vests. Consult the *Employee Safety Manual* for current policies.

101.2.5.6 Nuclear Density Gauges

101.2.5.6.1 <u>General Guidelines</u>

Nuclear density gauges are used by certified technicians to test the density of materials on the project. Adhere to the following guidelines:

- Do not operate a nuclear density gauge unless you are certified and authorized to do so.
- Keep unauthorized personnel away from the nuclear density gauge.
- Follow the established operating procedures when using the nuclear density gauge.
- Maintain the nuclear density gauge in the "SAFE" position when stored or not in use.
- Ensure that the nuclear density gauge is properly secured when stored or not in use.
- Ensure that the nuclear density gauge is stored in an approved location.

Contact the Research and Materials Laboratory Radiation Protection Officer for any needed assistance. See the *SCDOT Guide Instruction Manual for Inspectors of Earthwork and Base Course Construction* for additional information on nuclear density gauges.

101.2.5.6.2 Certification and Licensing Considerations

Only certified technicians are permitted to operate and transport nuclear density gauges. The use and transport of nuclear density gauges also require licensing by SCDHEC, because misuse or mishandling of these devices can pose hazards to personnel and the environment.

101.2.5.6.3 Transporting and Storage Considerations

In preparing the nuclear density gauge for transport or storage, or if it is necessary to leave the gauge unattended for any length of time, lock the source rod in the "SAFE" position, place the gauge in its transport case and lock the case. When not in use, the nuclear density gauge must be stored behind two locked doors. The lock on the transport case does not count as one of these locks. The storage area cannot be in a regularly occupied work area. All storage areas must be approved by the Central Laboratory Radiation Protection Officer and must be posted with the proper signage and notices. When transporting the nuclear density gauge, it must be placed in the rear area of an SUV or vehicle (e.g., trunk). The folder containing the Bill of Lading and the SCDHEC Radioactive Material License must be kept with the nuclear density gauge at all times. Each day the gauge is used, complete SCDOT Form 100.08 – Monthly Report of Testing Activities with Nuclear Gauge. At the end of each month, forward a copy of Form 100.08 to the Research and Materials Laboratory Engineer, which is due no later than the 15th of the month. Carefully adhere to these reporting requirements. Non-compliance will result in penalties imposed by SCDHEC.

101.2.5.6.4 Emergency Procedures

If a nuclear density gauge is involved in a vehicular crash, is lost or stolen, gets crushed by heavy equipment, is dropped from a moving vehicle or is damaged in another mishap that could damage or break the source rod:

- stop any vehicle that may have collided with the gauge and which could possibly have radiation contamination on tires, cleats or tracks;
- do not move the gauge or any of its parts;
- use rope or colored survey marking tape to cordon off the area for a distance of 20 feet from the gauge and any of its scattered parts;
- post SCDOT personnel outside the cordoned area to prevent others from walking through the site; and
- immediately notify the Research and Materials Laboratory personnel by calling the numbers listed on the Emergency Telephone List for Central Laboratory Personnel. They will then decide if it is necessary to call the Department of Health and Environmental Control Emergency Radiological Assistance.

For other non-emergency incidents (e.g., source rod being jammed in an unshielded position, source rod coming out of gauge, malfunction of the gauge), contact the Research and Materials Laboratory for assistance.

101.3 PROJECT DEVELOPMENT CONSIDERATIONS

101.3.1 Constructability Review

101.3.1.1 Purpose of the Review

Prior to construction, SCDOT construction personnel will participate in a Constructability Review for the following types of projects:

- Interstate and interchange reconstruction or widening projects;
- non-Interstate projects with an estimated construction cost over $25 million;
- projects that are considered sensitive, innovative or have multi-stage construction; and
- other projects, as directed by the Program Manager.

During the meeting, the Constructability Review Team will discuss key issues related to the construction of the project, including:

- traffic staging requirements and impacts on construction activities;
- materials availability and procurement time;
- availability of on- and off-site storage and staging areas;
- equipment access and the need for additional access;
- types of waste that may be encountered and availability of disposal areas;
- utility conflicts and the potential for project delays; and
- geotechnical issues and environmental obligations.

The objective of the Constructability Review is to ensure:

- the project, as detailed in the Contract Plans and Specifications, can be constructed using standard construction methods, materials and techniques;

- the Contract Plans and Specifications will provide the Contractor with clear and concise information that can be utilized to prepare a competitive, cost-effective bid; and

- the project, when constructed in accordance with the Contract Plans and Specifications, will result in a project that can be maintained in a cost-effective manner by SCDOT over the life of the project.

101.3.1.2 Constructability Review Team

The Constructability Review Team will consist of the Program Manager, Designer, personnel from the Director of Construction's Office, the appropriate District Construction Office, the FHWA, and one or more contracting firms representing the construction industry.

101.3.1.3 Selection of Contracting Firms Representing the Industry

The Director of Construction will be responsible for contacting and selecting one or more contracting firms representing the construction industry to participate in the Constructability Review. Invitations are distributed annually and selection for involvement is generally performed on a rotational basis.

101.3.1.4 Meeting Coordination and Scheduling

The Constructability Review will be held at the project site and should only require one full day of participation. The meeting will be scheduled after the Design Field Review but before the final Right-of-Way Plans are completed. The Program Manager will be responsible for coordinating and scheduling the meeting. A representative of the Director of Construction's Office will facilitate the meeting.

101.3.1.5 Constructability Review Report

The Constructability Review Report will be forwarded to the Road, or Bridge, Construction Engineer responsible for the project and will include the final recommendations of the Constructability Review Team. The Resident Construction Engineer and Inspectors assigned to the project should carefully review the Report prior to the Preconstruction Conference.

101.4 PROCUREMENT AND USE OF SCDOT EQUIPMENT

101.4.1 <u>Motor Vehicles</u>

101.4.1.1 General

Motor vehicles are assigned to the Resident Construction Engineer, as deemed necessary by the District Engineering Administrator, and may be transferred from one Resident Construction Engineer to another. The Resident Construction Engineer is responsible for assigning a responsible driver to the vehicle. Although other SCDOT personnel may drive the vehicle, the responsible driver will ensure the proper service, maintenance and care of the vehicle. Service and repair work may be obtained at any SCDOT Maintenance Shop or at the SCDOT Equipment Depot in Columbia, South Carolina. However, the Maintenance Shop in the county in which the vehicle is principally used usually performs such work.

101.4.1.2 Care of Motor Vehicles

There is wide variation in manufacturers' recommendations for periodic servicing of automotive vehicles. The frequency of servicing should be controlled by the conditions under which the vehicle is operated. For this reason, periodic servicing and a preventive maintenance program will be carried out as prescribed by the District Engineering Administrator or the Director of Supply and Equipment. In the absence of such a prescribed program, the manufacturer's recommendations are to be followed. The Resident Construction Engineer and the responsible driver assigned to the vehicle will ensure that the vehicle is kept clean and properly serviced,

arranging with the Maintenance Shop for such service work to be performed. Remember that the Maintenance Shop will not always be able to service equipment upon request due to other scheduled work; however, a satisfactory appointment can usually be arranged.

101.4.1.3 Use of Motor Vehicles

Motor vehicles assigned to Resident Construction Engineers are intended for official use only and may not be operated for personal use. Vehicles will usually be parked at the Resident Construction Engineer's office or at the Maintenance Shop at night. In some cases, however, where it is considered most advantageous to the Department, employees may, at the recommendation of the District Engineering Administrator and by approval of the Executive Director, be permitted to drive vehicles home at night. When this is permitted, the driver of the vehicle will be expected to take reasonable precautions to protect the vehicle from damage and vandalism. The driver of any motor vehicle is expected to care for it as though it were personal property. Negligent operation or willful abuse may result in penalizing the driver for all or part of any loss sustained. A vehicle trip log should be maintained for each vehicle.

101.4.2 Equipment and Supplies

101.4.2.1 Acquisition of Equipment and Supplies

Requests for acquisition of SCDOT supplies and equipment should follow the most current procurement procedures.

101.4.2.2 Expendable and Non-Expendable Equipment

All equipment owned by SCDOT is categorized as either expendable or non-expendable. In general, expendable equipment is confined to low-cost units that have rather limited service lives. Where any appreciable capital investment is involved, equipment is classified as non-expendable and will be securely controlled to impose strict custodial accountability on employees to whom the equipment is assigned. When non-expendable equipment is purchased, the Supply and Equipment Division will assign an SCDOT property number to the equipment, and a Property Receipt (Form 557) will be prepared. After being signed by the custodian of the property, copies of the Property Receipt will be properly distributed. Once accountability has been assigned to the custodian, responsibility for the equipment can be relieved by properly executing either a Property Transfer (Form 524) or a Property Disposal Authorization (Form 529). See Section 101.4.2.4 for additional information on disposal of equipment. Equipment custodians will be held fully accountable for the proper use and care of the equipment assigned to them. See Section 101.4.1 for information on motor vehicles.

101.4.2.3 Equipment Inventory

Annually, on June 30th, a complete field inventory will be made of all SCDOT non-expendable equipment. Equipment custodians will receive a list from the Director of Finance for checking

and certifying all non-expendable equipment assigned to them. Expendable equipment will be reported on Form 3055B at the same time. Equipment custodians must maintain accurate records of equipment, especially copies of Property Receipts (Form 557), Property Transfers (Form 524) and Property Disposal Authorizations (Form 529) for non-expendable equipment.

101.4.2.4 Disposal of Equipment

Non-expendable equipment may be disposed of by junking or salvaging useable parts, by trading in when purchasing new equipment or by selling outright in an advertised sale. Disposal of the equipment must be processed using a Property Disposal Authorization (Form 529), which will be prepared by the Director of Supply and Equipment and approved by the Executive Director. To initiate the process, the custodian will prepare a Request to Dispose of Accountable Property (Form 3024) for review and approval. As a rule, most equipment assigned to Resident Construction Engineers will be turned in to either the Equipment Depot or to the Office Supply Room for disposal. Under such circumstances, the Custodian is relieved of accountability through the execution of a Property Transfer (Form 524).

101.5 DOCUMENTATION CONSIDERATIONS

101.5.1 Purpose

To ensure compliance before payment is made to the Contractor, the Resident Construction Engineer and the SCDOT Inspectors are responsible for documenting the day-to-day accounts of the work in progress. The information collected and documented serves two purposes:

- to assess contractual compliance with respect to legal issues, scope of work, control of materials and project schedule; and
- to determine the quantity to pay the Contractor for progress on the pay item.

Although both types of information are necessary, they serve different purposes. For example, an SCDOT Inspector could measure and document a quantity for payment; but without the required test results, SCDOT has no way of knowing if the work and materials for the pay item warrant payment in terms of acceptability. In other words, the test results could have conceivably shown that the work and materials measured warranted rejection, not acceptance and payment. Such project records must be accurate and detailed, because they are the only means by which SCDOT can ensure that a project has been constructed as specified. In addition, these project records are critical for project closure and may become important evidence in assigning responsibility for project incidents and determining time, money and liability if a claim is filed.

101.5.2 SiteManager and SCDOT Construction Forms

SCDOT uses SiteManager for Contract administration. SiteManager is an AASHTO computer application that is used to administer construction contracts and facilitates the gathering and maintenance of critical contract records. SCDOT Inspectors are primarily responsible for processing the Daily Work Reports, and Resident Construction Engineers are responsible for

processing and approving the Daily Work Reports and Monthly Pay Estimates. SiteManager will maintain a running track of quantities paid and pending, and payment may be initiated once the Resident Construction Engineer approves the Daily Work Reports and generates the Monthly Pay Estimate. In addition, various types of construction forms are required by the Department to supplement the information that is entered into SiteManager. Become familiar with the SCDOT Construction Forms that are required for Contract administration, inspection and sampling and testing and make certain they are legible and thoroughly and accurately prepared. Also consider the benefits of gathering data using digital and video cameras. Such information will be especially useful if a claim or litigation is anticipated. Unless otherwise directed, hard-copy documents will be retained by the Resident Construction Engineer and referenced, as appropriate, in the Daily Work Report. See Section 101.6 for additional information on the use of SiteManager. See Appendix A for a descriptive table of the SCDOT Construction Forms typically used by SCDOT construction personnel.

101.5.3 Documentation for Payment

In general, the Resident Construction Engineer and SCDOT Inspectors must review the Contract and clearly understand, for each pay item:

- key points of inspection;
- acceptance criteria;
- applicable deductions for non-compliance;
- criteria for rejection;
- unit of measurement used to determine the quantity for payment;
- measurements that need to be obtained to calculate the quantity;
- location where the measurements need to be obtained (i.e., field or plans);
- work and materials that should not be measured separately for payment;
- calculations required for determining progress payments; and
- supplemental documents required (i.e., delivery tickets, invoices).

Improper payment documentation may cause administrative delays and difficulties with Contractors. The importance of clearly understanding the method of measurement and basis of payment for each pay item in the Contract cannot be overemphasized. Notwithstanding the responsibilities of SCDOT personnel, this information must be clearly communicated to the Contractor at the Preconstruction Conference. Most Contract pay items will be defined in the *Standard Specifications*; however, as SCDOT policy and methods change, Contract documents may contain overriding criteria in the Supplemental Specifications and Special Provisions.

101.6 SITEMANAGER CONSIDERATIONS

101.6.1 Daily Work Reports

101.6.1.1 General

The Daily Work Reports should begin on the date of the Notice to Proceed. A Daily Work Report should be completed for each day of the project, from the Notice to Proceed until the

charging of time is stopped. If additional work is performed on the project (e.g., corrective work, punch list items, etc.), a Daily Work Report also should be completed for each day that such work is performed.

101.6.1.2 Information Tab

Use the following guidelines to complete the information under the Information Tab:

1. General DWR Information. Displays specific information for the Daily Work Report, including Contract ID, Inspector name and date.

2. Locked. This field indicates that the current monthly estimate has been approved. A locked Daily Work Report can not be edited.

3. Authorized. This field indicates whether or not the Daily Work Report has been authorized by the Resident Construction Engineer. The date of authorization will be displayed. An authorized Daily Work Report can not be edited.

4. Weather Conditions. Enter the weather conditions for the day.

5. No Work Items Installed / No Contractors on Site / No Daily Staff on Site. This will indicate whether or not there is information under any of the subject tabs. Note: This checkbox is not always accurate. If a user adds an item and then deletes it, the checkbox will remain empty. Please double-check these boxes to confirm that they are correct.

6. Work Suspended. This feature suspends time charged to the Contractor. Do not use this feature.

7. Remarks. As needed, enter remarks in text box on the right after selecting the appropriate category.

101.6.1.3 Contractor Tab

Use the following guidelines to complete the information under the Contractor Tab:

1. General DWR Information. Displays specific information for the Daily Work Report, including Contract ID, Inspector name and date.

2. Contractor. Use this function to indicate the contractors that are present on the job site. Additional contractors can be added by clicking the New button. Contractors must be included in this window in order to credit their installation of items under the Work Item Tab. All contractors that are present on the jobsite for that given day are to be selected.

3. Supervisor / Foreman Name. Use this location to select the supervisors that were present on the job site. Additional supervisors can be added by clicking the New button.

4. Personnel Type. Use this location to select the personnel types present on the job site. Additional personnel types can be added by clicking the New button.

101.6.1.4 Contractor Equipment Tab

Use the following guidelines to complete the information under the Contractor Equipment Tab:

1. General DWR Information. Displays specific information for the Daily Work Report, including Contract ID, Inspector name and date.

2. Contractor. Use this location to select the contractors that were present on the job site.

3. Equipment ID / Description. Use this location to select the equipment on the job site. Additional equipment can be added by clicking the New button.

101.6.1.5 Daily Staff Tab

Use the following guidelines to complete the information under the Daily Staff Tab:

1. General DWR Information. Displays specific information for the Daily Work Report, including Contract ID, Inspector name and date.

2. Staff. All SCDOT personnel present on the job site are to be entered. New staff members can be added by clicking the New button. Any visitors such as FHWA, consultants, etc. can be entered in the Remarks box.

3. S / C. Use this location to identify the employee as a staff member or consultant.

4. Staff Information. Use this function to input Inspector's hours.

101.6.1.6 Work Items Tab

Use the following guidelines to complete the information under the Work Items Tab:

1. General DWR Information. Displays specific information for the Daily Work Report, including Contract ID, Inspector name and date.

2. General Item Description. Displays the project number, line item number, item code, description, unit price, status and unit type of the present item. This information is loaded into the system with the basic Contract data after award or is entered via a Change Order.

3. Quantity Installed to Date / Quantity Paid to Date. Both of these fields display the quantity of the present item that has been approved and included on an Estimate. The quantity displayed will only apply to the particular project number listed above, not the total Contract quantity for this item.

4. Bid Quantity. This field displays the original Contract quantity.

5. Current Contract Quantity. This field displays the original Contract quantity in addition to any quantity added to the Contract via an approved Change Order.

6. Pay to Plan Quantity. This field primarily applies to lump sum items. Items identified as Pay to Plan Quantity will not allow the system to pay for any quantity in excess of the bid quantity.

7. Location List. This field allows users to enter multiple locations for the same item on one screen. A new location can be entered by clicking on New from this zone and entering the new information.

8. Placed Quantity. Use this field to enter the quantity placed in a particular location.

9. Contractor. This is a drop-down list displaying all contractors who have been approved to install this item and have been added to the Contractor Tab.

10. Plan Page Number. Use this field if referring to a particular page in the plan sheet.

11. Reference Document. Use this field if attaching a reference document.

12. Location. Each individual location installed should be entered in this field.

13. Measured Indicator. Use this field if the installation of this item quantity was measured.

14. Station Numbers. Use this field to enter station numbers, "from" and "to", offset (i.e., "lt" or "rt" for left or right) and distances. Information pertaining to stations, offsets and distances are required for all applicable items. All roadway items should be referenced to station numbers and bridge items may be referenced to bent numbers.

101.6.2 Diaries

101.6.2.1 Approval of Daily Work Reports

The Resident Construction Engineer will use the Diary window to review and approve the Daily Work Reports submitted by SCDOT Inspectors. Once reviewed and approved, the Resident Construction Engineer will check the Approve box on the Diary window. All quantities approved by the Resident Construction Engineer will be included in the next Estimate, provided that the date of the Daily Work Report date is no later than the period end date of the Estimate. A Daily Work Report cannot be edited once approved. If the Daily Work Report has already been approved and editing is necessary, consult the Resident Construction Engineer. Daily Work Reports are irrevocably locked once the estimate they are included in is approved.

101.6.2.2 Charging Contract Time

Each time a Diary is created by entering a date and saving the Diary, a day is charged to the Contractor. A Daily Work Report does not have to be approved for a day to be charged. If a Diary has been created, but a day should not be charged (e.g., before Notice to Proceed date,

waiting on punch-list items), the Resident Construction Engineer should click on the Charge Tab on the Diary window and make that day a No Charge day. Diaries must be completed for each charged day beginning with the Notice to Proceed and continuing through the Substantial Work Complete Date at a minimum.

101.6.2.3 Changing the Status of Existing Diaries

When a Diary is created, a day is automatically charged to the Contractor. Once an estimate is generated and approved, a Diary cannot be altered from the Diary window. However, the Resident Construction Engineer can change the status of a Diary to a Charge or No Charge day by using the Diary Adjustments window. To adjust a Diary, the user must first open the Diary Adjustments window and open the Contract and the day to be adjusted via the Open button. Once the individual Diary has been opened, the user can enter the new status and reason code and reason (e.g., prior to Notice to Proceed date, waiting on punch-list items). This window is often used to correct a day charged to the Contractor that should not have been charged.

101.6.3 Change Orders

101.6.3.1 Explanations and Reason Codes

SCDOT personnel who create a Change Order in SiteManager for a Supplemental Agreement or Contract Modification Request must provide an explanation and Reason Code that accurately describes why the Change Order is necessary. This information is critical, because Contract Administration analyzes this data for recurring changes to improve SCDOT's planning process, thus avoiding such changes in the future. Prior to the use of SiteManager, it was not unusual to prepare a single Change Order for the purpose of adding multiple items of work for a variety of reasons. This practice must not be used when creating Change Orders in SiteManager, because it causes administrative delays and defeats the purpose of using the integrated database.

The Reason Code selected for the Change Order must correspond to the explanation and accurately apply to the items of work listed on the Change Order. Before creating a Change Order in SiteManager, review and organize each subject item of work under an appropriate Reason Code. Create one Change Order for each Reason Code identified, listing only those items of work that apply to the Reason Code selected. A full set of Reason Codes is available in SiteManager. Contact Contract Administration with any suggested improvements or additions. Consider the following Reason Codes when creating Change Orders in SiteManager:

1. Claims Settlement. This Reason Code is mostly self-explanatory. If the Contractor pursued a claim on the Contract and the Department completed a Change Order to pay the claim, use this Reason Code, which is applicable if the Department settled the claim internally, if the claim went to a dispute review board or if the claim was concluded through litigation.

2. Contract Time Adjustment. This Reason Code may need to be broken up into more refined categories, because there are a number of reasons that Contract time

adjustments may be justified (e.g., utility delays, utility accommodations, changes to traffic control, allowable work hours, allowable lane closures, additional work or quantities). The use of this Reason Code assumes that a time adjustment is the only function of the Change Order, which is not the typical case. Until Contract Administration and the SiteManager Administrator can effectively refine this Reason Code, ensure that the explanation provides the appropriate details.

3. Cost Savings Proposal/Suggestion. This Reason code pertains to Change Orders initiated as a result of a Value Engineering Proposal submitted by the Contractor.

4. Decreasing/Increasing Quantities. Use this Reason Code when actual and bid quantities for items of work in the original Contract vary to the extent that it is reasonable to adjust the Contract quantities. Overrun and underrun items are included to offset each other to avoid increasing the original Contract amount.

5. Deleting/Adding Items. Use this Reason Code when it is necessary to delete or add completed items of work and their respective quantities. Such items are usually incidental in nature. This Reason Code should not be used when the basis is a significant change to construction or an error in the Contract Plans and Specifications.

6. Design Oversights. This Reason Code should only be used when an error or oversight in the Contract Plans and Specifications has been discovered that could have been foreseen during the design phase. Do not use this Reason Code for changes that arise from field conditions or conflicts that could not have been reasonably anticipated during design. It is anticipated that this category will be further refined. Contact the SiteManager Administrator for additional information.

7. Extension. Use this Reason Code only when the items and quantities are required because of an approved extension request. An extension request must be processed through the proper SCDOT channels and approved by the State Highway Engineer. The Change Order will establish the extension work for administration in SiteManager and will become a supporting document to the approved extension request.

8. Final Quantity Adjustment. This Reason Code should be used only when an audit of the reported quantities or Contractor concurrence of final quantities requires adjustment.

9. Force Account. Work performed on a Force Account Basis will ultimately need to be resolved by negotiating unit prices with the Contractor for the items under dispute. The negotiations must be supported by cost data collected during the actual prosecution of the disputed work. As such, this Reason Code and the Force Account function under the Change Order header in SiteManager must be used to establish, track and resolve the items, quantities and unit prices for the disputed work.

10. Incentive/Disincentive Payment. Use this Reason Code to create a Change Order only when it is necessary to establish an authorized incentive/disincentive payment schedule that is not in the original Contract. Otherwise, use SiteManager's Contract Adjustment or Line Item Adjustment functions for incentive/disincentive payments.

11. Modification by Construction Personnel. This Reason Code should be used when construction personnel encounter field conditions that necessitate changes to the work

or when the District prefers changes to the original design. If the change is due to a condition that could have been reasonably foreseen during the design phase, use the Design Oversights Reason Code.

12. Plan Revision. Use this Reason Code when the Change Order is required to accommodate changes to the work that are shown in a revision to the Contract Plans that has been issued by the Director of Construction. Note, however, if the revision has been issued due to a field modification or design oversight, other Reason Codes will apply (e.g., Design Oversights). Ensure that the proper one is used. Plan Revision applies to changes to typical sections and right-of-way areas that arise from late right-of-way settlements or from public or political requests to revise the original design.

13. Price Adjustment. If conditions are encountered that significantly affect the scope or the work and a price adjustment is warranted, use this Reason Code. This Code generally will apply when major items of work (see Section 101.33 of the *Standard Specifications*) are affected; however, other items may be considered as well. Do not use this Reason Code for price adjustments related to Fuel or Asphalt Price Indices, which will already be authorized in the original Contract provisions. Rather, use SiteManager's Contract Adjustment or Line Item Adjustment functions to adjust payment.

14. Traffic Control Modification. When traffic situations encountered during construction require a change to the Traffic Control Plans and the change results in revised costs to the Contractor, this Reason Code should be used.

15. Other. This Reason Code should be used sparingly and only when the basis for the change cannot be categorized with previously established Reason Codes. When used, however, ensure that the explanation provides adequate detail of the basis for the change. Contract Administration will coordinate with the SiteManager Administrator to create an additional Reason Code, if warranted.

101.6.3.2 Item Quantity and Price

Change Order functions are located on the Change Order Header window. If the quantity of an existing item is being changed, the Overrun/Underrun box should be checked. If the price of an existing item is being changed, or a new item is added, the Extra Work box should be checked.

101.6.3.3 Classification and Approval

Contract changes are classified as either minor or major. Minor changes are those which revise the total Contract amount by no more than $50,000, enforce penalties (e.g., price reductions) in accordance with the Contract Specifications or revise Contract time due to the scope or difficulty of the additional work. All other Contract changes will be classified as major, including Contract time extensions due to weather and utilities. The administration of Federal-aid projects will be based on the FHWA/SCDOT Agreement. Change orders on all Federal oversight projects must be approved by the FHWA (see Figure 107A).

A Change Order under $25,000 with no time adjustment can be processed and approved by the Resident Construction Engineer. If the amount of the Change Order is between $25,000 and $50,000, with or without a time adjustment due to an increase in the scope of work, the District Engineering Administrator must approve the Change Order. All other Change Orders will be considered major (e.g., over $50,000 or with time adjustments due to utility delays, weather, etc.) and must be approved by the Director of Construction. If a Change Order is deemed major, the Resident Construction Engineer will be required to click the check box for Override Approval Rules and manually establish the approval chain as follows:

- Resident Construction Engineer,
- District Construction Engineer,
- District Engineering Administrator,
- Assistant Construction Engineer,
- State Road or Bridge Construction Engineer,
- Director of Construction, and
- FHWA, for Federal oversight projects.

101.6.3.4 Contract Extension Approval

Additional projects will be added to the Contract only after approval by the State Highway Engineer. Once approved, the Assistant Construction Engineer in Columbia will create the project in SiteManager. It will then be the responsibility of the Resident Construction Engineer to create a Change Order adding the items of the project to the Contract. Once items are included in the Change Order contact the Assistant Construction Engineer to establish the funding for the work. See Section 104.4 for additional information.

101.6.3.5 Contractor Concurrence

Once the prices on a Change Order have been agreed upon by the Resident Construction Engineer and the Contractor, the Resident Construction Engineer should create a listing of the prices, quantities, explanations, Reason Codes, etc., and the listing should be signed by the Resident Construction Engineer and the Contractor.

101.6.4 <u>Estimates</u>

101.6.4.1 Generating Estimates

Estimates can only be generated by the first level of approval (i.e., Resident Construction Engineer). Prior to generating an Estimate, the Resident Construction Engineer should check all Diaries to make sure all days are accounted for. From the Generate Estimate window, the ending date should be entered and the type of Estimate should be selected (i.e., Progress, Final, Supplemental), and, finally, the Generate button should be clicked to submit the estimate.

101.6.4.2 Approving Estimates

The Estimate can be approved by up to five levels of approval. From the Approve Estimate window, select the desired Contract from the list box. Select the desired estimate and click the Approved check box for the appropriate level. Click the Save button.

101.6.4.3 Deleting Estimates

From the Estimate History window, select the estimate. Click the Delete button on the toolbar at the top of the page. The user can only delete Pending estimates. Once the estimate has been approved, it cannot be deleted.

101.6.4.4 Final Estimates

To generate the Final Estimate, all Progress Estimates must be approved. All discrepancies must be resolved before the Final Estimate can be approved. To generate an Estimate, select the Final button on the Generate Estimate panel.

101.6.4.5 Estimate Routing

Estimates will be routed as follows:

1. Monthly Estimates. The original signed copy of the Summary to Contractor Report should be mailed to the Contracts Engineer. A copy of the Summary to Contractor Report should be faxed to Accounting.

2. Final Estimate. The original signed copy of the Summary to Contractor Report and the Item Quantity Report should be mailed to the Contracts Engineer.

3. Contractor. A copy of the Summary to Contractor and the Item Quantity Report should be mailed to the Prime Contractor for all Monthly Estimates and for the Final Estimate. Complete SCDOT Form 100.05 – Contractor Concurrence and Prompt Payment.

101.6.5 Payrolls

The first time a Contractor's payroll is recorded, the Contractor must first be selected from the Services / Choose Keys option on the menu bar. Once selected, the user will enter the Date Received, Ending Date, and Select the Certified check box. No payrolls can be entered until the Work Begin Date has been submitted via the Director of Construction Intranet Page. Users are not required to enter individual employee information on subsequent tabs. Payrolls should be certified for the Prime Contractor every week throughout the life of the Contract. Subcontractors, on the other hand, should only be certified for the weeks that they are on site. If a Prime Contractor is not present for a given week, the user must complete the certification process as mentioned above and click the No Employee Hours Worked check box. To see all

payrolls entered for a given Contractor, click on the Open button and select the Contractor. The pick list will display all payrolls entered for that Contractor, if that payroll has been certified.

101.6.6 Stockpiles

101.6.6.1 Creating Stockpiles

To create a stockpile in SiteManager, the stockpiled material must first be in compliance with the Contract Specifications. Before payment to the Contractor can be made for a stockpile, it is to be entered in the Stockpiles window in SiteManager, making sure to enter the invoice number, the correct information on the form and the Initial Invoice Payment.

101.6.6.2 Installation of Items

The stockpile amount paid to the Contractor will be displayed on the front sheet of the Summary to Contractor Report, minus any quantities installed that estimate period. The per-unit amount previously paid to the Contractor will continue to be subtracted from the total Stockpile amount as items are installed. This will continue for each stockpile until each one has been depleted and the amount on the front sheet reaches zero.

101.6.6.3 Closing Stockpiles

If a stockpile is to be manually closed out, the user should click on Services and then Close out Balance. This will subtract the remaining dollar amount for that stockpile from the Summary to Contractor report.

101.6.6.4 Replenishing Stockpiles

If a stockpile is replenished, the user must click on Services and then Replenish Material, entering the required information. This should be done instead of creating a new stockpile for that item.

101.7 RESOURCE AND COMMUNICATION CONSIDERATIONS

101.7.1 Revisions to the *Manual*

Recommended changes or additions (e.g., errata, enhancements) to the *Construction Manual* will be received by the Director of Construction. Upon receipt, the recommendations will be reviewed by the Evaluation Committee, which is comprised of SCDOT and FHWA personnel. If approved, updates to the publications will be provided. This is a recurring process that is scheduled as deemed necessary by the Director of Construction. Updates will be made available through the SCDOT Intranet and Internet Web Sites, electronic mail and standard mail, as appropriate.

101.7.2 SCDOT Intranet and Internet Web Site

Most of the Department's information applicable to construction projects is maintained in electronic format on the SCDOT Intranet and Internet Web Site. Significant other information about specific SCDOT operations is also available. The SCDOT Intranet is also used quite frequently during the administration of a construction Contract to communicate between Central, District and Resident Offices (e.g., Material Test Reports).

101.7.3 Inquiries from the Media

Because transportation facilities and services provided by SCDOT are vital to the citizens of South Carolina, the Department receives numerous inquiries from the media regarding the status of various projects, funding, regulations, etc. To ensure that the most accurate and current information is always provided to the media, whether it be newspaper, radio or TV, media inquiries concerning the issues of highway funding, new projects, project updates and any issues that could be considered controversial or sensitive should be referred to the Director of Communications. The Director will be responsible for contacting the appropriate individuals to obtain the information requested and then discussing the issue with either the State Highway Engineer or Director of Construction before contacting the media. An exception to this procedure is answering routine questions regarding construction operations. Another exception to this policy is public meetings where information is provided to the public and the media and where questions are answered face-to-face. This procedure also pertains to press releases. The Communications Office will write and distribute all press releases, except those addressing traffic operations or weekly construction and / or maintenance notices that are routinely provided to the media by District or Resident Offices.

101.7.4 Public Notification

101.7.4.1 Construction Projects

To keep the traveling public informed of construction projects and any delays or closures associated with construction projects, each District should inform the Communications Office by e-mail on a weekly basis. This information should include a listing of construction projects in the District with any lane closures, road closings or special circumstances that may cause traffic delays. The Office will publicize this information and place it on the SCDOT Internet Web Site. This list should be updated every week or, if a special situation occurs, it should be updated as soon as practical.

101.7.4.2 Bridge Replacement Projects

SCDOT requires that the public, legislators and other local officials be properly notified of bridge closings and replacement projects. This notification will be provided through press releases, letters and similar methods. Once a bridge replacement project is let to Contract and awarded, District personnel will send the information to the Communications Office so that a proper notification can be prepared. The following information is required:

- County, route and crossing;
- local road name and/or local bridge name;
- whether the bridge is to be closed or whether traffic will be maintained during construction (explain if traffic will be maintained by off alignment, detour bridge or staging);
- date of expected closure; and
- approximate length of closure and/or completion date.

Other methods of notifying the public may also be used on a case-by-case basis, such as signs, letters to property owners, etc. Figure 101B presents the distribution list that should be used for press releases.

Item	Responsible Office
Local Newspaper(s)/Media outlets	Communications – News Release
City, County and/or Regional Chamber of Commerce	Communications – News Release
US Senator(s) and/or US Representative(s)	District Engineering Administrator – Letter from State Highway Engineer
State Senator(s) and Representative(s)	District Engineering Administrator – Letter from State Highway Engineer
SCDOT District Commissioner	District Engineering Administrator – Letter from State Highway Engineer
COG and MPO Representatives (as appropriate)	District Engineering Administrator
Chairman of the County Council	District Engineering Administrator
County Administrator/Manager	District Engineering Administrator
County Planner	District Engineering Administrator
Chairman of City Council	District Engineering Administrator
Mayor (if different from above)	District Engineering Administrator
City Planner and/or Manager	District Engineering Administrator
Emergency Response Personnel and School Districts	District Engineering Administrator
Local US Post Office	District Engineering Administrator

DISTRIBUTION LIST FOR PRESS RELEASES
Figure 101B

Section 102
Bidding Requirements and Conditions

Section 102 of the *Standard Specifications* governs the requirements and conditions under which bids may be accepted from prospective bidders. Contract Administration, under the Director of Construction, will be responsible for administering the provisions of Section 102. Construction contracts estimated to cost $10,000 or more will be advertised for at least 3 weeks in one or more daily newspapers. If warranted, however, SCDOT may advertise for a longer period and in other publications. The advertisement will be prepared by Contract Administration and signed by the Director of Construction. The advertisement will include the time and place bids will be received, the Project Number or File Number, a brief description of the work, the cost of plans and proposals for each project, prequalification requirements and whether or not a mandatory pre-bid conference will be held.

102.1 PREQUALIFICATION

Section 102.01 of the *Standard Specifications* governs the prequalification of bidders and licensing of contractors. Unless stated otherwise in the advertisement, all prospective bidders must be prequalified with SCDOT prior to bidding. To improve the quality of contracting, SCDOT construction personnel who experience performance problems with a Contractor or subcontractor should document and report the situation to the Director of Construction.

102.2 CONTENTS OF PROPOSAL FORMS

Section 102.02 of the *Standard Specifications* defines the proposal content that will be provided by SCDOT. The proposal form will show the approximate quantities of work to be performed, the time in which the work must be completed, the date, place and time of opening bids, the amount and character of the Proposal Guarantee and any special provisions pertinent to the project.

102.3 INTERPRETATION OF QUANTITIES

Section 102.03 of the *Standard Specifications* governs the interpretation of quantities. The quantities listed in the Contract are based on an engineering estimate and are for bidding purposes only. SCDOT Inspectors must document for payment only those quantities that have been incorporated into the work and accepted by the Department.

102.4 EXAMINATION OF PLANS, SPECIFICATIONS, ETC.

102.4.1 Pre-Bid Conference

If SCDOT specifies a mandatory pre-bid conference, the time and location of the conference will appear in the advertisement. In such cases, bids will only be accepted from prequalified bidders that attended the pre-bid conference. The Program Manager will be responsible for coordinating and facilitating the conference.

102.4.2 Project Examination

In accordance with Section 102.04 of the *Standard Specifications*, it is the responsibility of each prospective bidder to carefully examine the site of the proposed work. Bidders sometimes ask questions requiring the interpretation of contractual documents. In such cases, SCDOT personnel should inform the bidder to bid on the job as the documents are written. Do not provide statements regarding contractual intent. If revisions to Contract Plans and Specifications have been published and distributed, ensure that bidders are equally informed. Document the minutes of each meeting.

102.5 PREPARATION OF PROPOSAL

All bids submitted to SCDOT must be completed on the official proposal form furnished to the Contractor by the Department. Section 102.05 of the *Standard Specifications* defines how the proposal should be prepared and submitted to the Department for consideration.

102.6 ELECTRONIC BIDDING SYSTEM

Section 102.06 of the *Standard Specifications* governs the procedures for using the Electronic Bidding System and the Schedule of Price Sheets provided by the Department to prepare bids for construction projects. The EBS program is available on the SCDOT Internet Web Site. Contact Contract Administration for additional information on how SCDOT receives and processes electronic bids.

102.7 COUNTERPROPOSALS

Section 102.07 of the *Standard Specifications* governs the contractual provisions of counterproposals.

102.8 QUALIFYING LETTERS PROHIBITED

Section 102.08 of the *Standard Specifications* prohibits the submission of qualifying letters with proposals.

102.9 IRREGULAR PROPOSALS

Section 102.09 of the *Standard Specifications* defines what SCDOT will consider to be an irregular proposal. Once let, if the Resident Construction Engineer or an SCDOT Inspector discovers an irregularity in the Contract (e.g., a unit bid price that appears to be materially unbalanced to the detriment of the Department), the Resident Construction Engineer should immediately notify Contract Administration.

102.10 PROPOSAL GUARANTEE

No proposal will be considered unless accompanied by a Proposal Guarantee of the character and amount indicated in the proposal form. Section 102.10 of the *Standard Specifications* defines the requirements of the Proposal Guarantee and requires that each Proposal Guarantee be submitted in the form of a Bid Bond on a properly executed SCDOT Form 674.

102.11 DELIVERY OF PROPOSALS

Section 102.11 of the *Standard Specifications* provides detailed instructions on how to submit the proposal for consideration by the Department.

102.12 WITHDRAWAL OF PROPOSALS

Section 102.12 of the *Standard Specifications* governs the provisions of withdrawing proposals once submitted to the Department.

102.13 PUBLIC OPENING OF PROPOSALS

SCDOT personnel in Contract Administration, under the Director of Construction, will be responsible for coordinating and facilitating the letting. Proposals will be opened and read publicly at the time and place indicated in the proposal form, at which time bidders or their authorized agents are urged to be present.

102.14 DISQUALIFICATION OF BIDDERS

Section 102.14 of the *Standard Specifications* defines the criteria for which the Department will disqualify a bidder.

Section 103
Award and Execution of Contract

The procedures for determining the successful bidder and entering into the Contract are governed by Section 103 of the *Standard Specifications*. Contract Administration, under the Director of Construction, is responsible for administering the provisions of Section 103.

103.1 CONSIDERATION OF PROPOSALS

The provisions of Section 103.01 of the *Standard Specifications* govern how SCDOT will evaluate, accept or reject proposals once they have been opened and read.

103.2 AWARD OF CONTRACT

Section 103.02 of the *Standard Specifications* governs the provisions of awarding the Contract to the successful bidder. The Contract will be awarded to the lowest responsible bidder whose proposal complies with all prescribed requirements. Unless the low bidder agrees to a delay, or unless there exists a Special Provision to the contrary, the award must be made within 30 days after the opening of bids. The Notice of Award will be prepared by Contract Administration, signed by the Director of Construction and forwarded to the successful bidder.

103.3 CANCELLATION OF AWARD

Section 103.03 of the *Standard Specifications* provides for the right of SCDOT to cancel the award without liability to the Department.

103.4 RETURN OF PROPOSAL GUARANTEE

In accordance with Section 103.04 of the *Standard Specifications*, proposal guaranties will be retained by SCDOT until a Contract with the successful bidder has been properly executed. SCDOT then will destroy or dispose of the proposal guaranties as requested in the bidders' proposals.

103.5 BOND REQUIREMENTS

Section 103.05 of the *Standard Specifications* defines the type and value of bonds that are required by the successful bidder prior to executing the Contract.

103.6 EXECUTION AND APPROVAL OF CONTRACT

Section 103.06 of the *Standard Specifications* defines the requirements for executing and approving of the Contract, which must occur within 20 days after the Notice of Award.

103.7 FAILURE TO EXECUTE CONTRACT AND FILE BOND

In accordance with the provisions of Section 103.07 of the *Standard Specifications*, if the successful bidder fails to execute the Contact and file the required bonds within 20 days after the Notice of Award, such failure is just cause for annulment of the award and forfeiture of the bidder's Proposal Guarantee.

103.8 CONTRACTOR'S LIABILITY INSURANCE

Section 103.08 of the *Standard Specifications* defines the type and amount of coverage for liability insurance that must be provided by the Contractor. Required Certificates of Insurance must be filed with Contract Administration prior to starting work on the project.

103.9 DEFERRAL AND CANCELLATION OF CONTRACT

Once the Contract has been executed, Section 103.09 of the *Standard Specifications* defines the provisions under which SCDOT can defer or cancel the Contract with respect to indictment or conviction on criminal charges.

103.10 MOBILIZATION

Mobilization is considered the preparatory work required for the Contractor to start the project. Section 103.10 of the *Standard Specifications* defines the work for mobilization.

103.11 MEASUREMENT AND PAYMENT (MOBILIZATION)

Section 103.11 of the *Standard Specifications* defines how mobilization (see Section 103.10) will be measured and paid. Unless otherwise specified, mobilization, which includes demobilization, will be a lump sum Contract pay item which will be measured and paid for in the first, second and last Monthly Payment Estimates. These partial payments will be as defined in Section 103.11 of the *Standard Specifications*. If the final payment for mobilization occurs on the last Monthly Payment Estimate of the project, do not approve the Estimate for payment until all work on the project has been completed and accepted.

103.12 PROJECT INITIATION

Upon receipt of a properly executed Contract from the successful bidder, Contract Administration will upload from BAMS the required data to initiate the project in SiteManager. Once the District Construction Engineer has assigned a Resident Construction Engineer to the

project and authorized the Resident Construction Engineer in SiteManager, then the Resident Construction Engineer will be responsible for initiating the project in SiteManager and preparing and forwarding the Notice to Proceed to the Contractor. See Section 101.6 for additional information on administering contracts via SiteManager. Mobilization will be measured and paid for in accordance with Section 103.10 and 103.11.

Section 104
Scope of Work

As soon as practical after being assigned to the project, the Resident Construction Engineer should study the Contract Plans and Specifications in relation to existing field conditions and initiate any changes to the Contract deemed necessary to complete the project in accordance with best highway engineering practices and the intent of the design. In addition, once the work has begun, immediate action should be taken to facilitate Contract changes that may be required so that the Contractor's schedule of operations will not be impeded. Section 104 of the *Standard Specifications* governs the scope of work of the Contract and provides for its revision, if necessary. A revision to the scope of work will require the creation and proper execution of a Change Order using SiteManager (see Section 101.6.3).

104.1 INTENT OF CONTRACT

Section 104.01 of the *Standard Specifications* defines the intent of the Contract. In general, the intent of the Contract is to provide for the construction and completion of the scope of work described.

104.2 ALTERATION OF PLANS OR CHARACTER OF WORK

104.2.1 Overview

Section 104.02 of the *Standard Specifications* provides SCDOT with the right to increase or decrease quantities and to alter the work within the scope of the original Contract. In such situations, a Change Order will need to be created and properly executed using SiteManager, as discussed in Section 101.6.3. The *Standard Specifications* and the Contract Special Provisions will govern the limits on such revisions and the extent to which quantities and unit prices may be adjusted.

104.2.2 Deletion of Roads and Road Sections

Do not confuse the deletion of work items with the deletion of roads or road sections from the Contract. For example, an authorized deletion of a surface course pay item from a Contract for a particular road section does not imply an authorized deletion of the entire road section from the Contract. Similarly, an authorized deferment of work on a particular road does not imply an authorized deletion of the road from the Contract. The temporary deferment of work on roads or road sections requires authorization and is sometimes necessary due to factors such as right-of-way difficulties. Such deferment provides SCDOT time to resolve the difficulties so that the work can be resumed under the original Contract. However, when progress on the Contract has neared completion and it is unreasonable to expect the Contractor to proceed with the deferred work once the difficulties have been resolved, deletion of the road or road section may be warranted.

104.2.3 Changes to Construction Quantities

Overruns and underruns in pay item quantities require the creation and proper execution of a Change Order, as discussed in Section 101.6.3. During the life of the project, the Resident Construction Engineer should try to balance overruns and underruns in pay item quantities to maintain the total amount of the original Contract. The potential for an increase in the total Contract amount due to gross overruns in pay items should be closely monitored, especially for unclassified excavation and roadway leveling courses. If problems are suspected, immediately investigate the matter and contact the District Construction Engineer for any needed assistance.

If a construction change involves changing, adding or deleting quantities or pay items, a revised Summary of Estimated Quantities sheet must be provided with the changed plan sheet(s). Figure 104A presents an example note to be placed below the original quantities. The original quantities must not be changed. The note should include the date of the revision and the sheet number(s) of the revised sheet(s). The changes should be listed in the order shown in the example, as applicable. The quantities shown should include a (+) for additional or a (-) for subtracted quantities. Future revisions should be listed beneath the previous revision. Additional Summary of Estimated Quantities sheets may be added if necessary.

104.3 VALUE ENGINEERING

The provisions of Section 104.03 of the *Standard Specifications* encourages Contractors to submit Value Engineering Proposals. Upon receipt, the Resident Construction Engineer will contact the appropriate SCDOT personnel to discuss the original design intent and the potential merits and cost savings of accepting the proposal. Contact the District Construction Engineer for guidance in determining who should be involved in the review. If approved by the Department, the Value Engineering Proposal will require the creation and proper execution of a Change Order using SiteManager, as discussed in Section 101.6.3.

104.4 EXTENSION OF CONTRACT

104.4.1 Overview

Section 104.04 of the *Standard Specifications* defines the provisions within which SCDOT may offer Contractors additional work beyond the limits of original Contracts or extend Contracts to include additional roads. Although Contractors are required to accept quantity increases and decreases within the limits specified, as discussed in Section 104.2, Contractors are not obligated to accept Contract Extensions offered by the Department.

SUMMARY OF ESTIMATED QUANTITIES

Item No.	Pay Item	Quantity	Pay Unit
1031000	MOBILIZATION	1	LS
1050800	CONST. STAKES, LINES & GRADES	1	EA
1071000	TRAFFIC CONTROL	1	LS
1090200	AS-BUILT CONSTRUCTION PLANS	1	LS
2012000	CLEAR. & GRUB. WITHIN ROADWAY	1	LS
2013050	CLEARING & GRUBBING DITCHES	0.5	ACRE
2031000	UNCLASSIFIED EXCAVATION	4165	CY
2033000	BORROW EXCAVATION	7797	CY
2034000	MUCK EXCAVATION	3717	CY
3050108	GRADED AGGR. BASE COURSE – 8″ UNIF	10215	SY
3069900	MAINTENANCE STONE	50	TON
3103000	H/M ASPH. AGG. BASE CR. – TYPE 2	2746	TON
4010005	PRIME COAT	2759	GAL
4011004	LIQUID ASPHALT BINDER PG64-22	232	TON
4013990	MILL. EXISTING ASPHALT PAVEMENT – VARIABLE	2820	SY
4023000	H/M ASPHALT. CONCRETE BINDER CR. – TYPE 2	991	TON
	Revised Pay Items – DD/MM/YY – Affected Sheets 4, 6, 7		
	Pay Items Revised	**Adjustments to Quantities**	
2034000	MUCK EXCAVATION	-500	CY
3069900	MAINTENANCE STONE	+25	TON
	Pay Items Deleted		
4013990	MILL. EXIST. ASPH. PVMT. – VARIABLE	-2820	SY
	Pay Items Added		
4031100	H/M ASPH. CONC. SURF. CR. TYPE 1	+1013	TON

CHANGES TO CONSTRUCTION QUANTITIES
Figure 104A

104.4.2 Highway-Railroad Grade Crossings

Highway-railroad grade crossings, which may occur in roadway sections of Contract Extensions, must be brought to the attention of the Central Office so that the grade crossings can be properly coordinated with the Railroad Company.

104.4.3 Municipal-State Highway Projects

When a road or section of road is within the corporate limits of a municipality, it will be necessary to obtain a Municipal-State Highway Project Agreement (SCDOT Form 807). The execution of this Agreement is usually the responsibility of the Right-of-Way Section; however, some Contract Extensions may require the Resident Construction Engineer to become involved. In such cases, contact the District Engineering Administrator for assistance.

104.4.4 Authorization Process

Requests for Contract Extensions must be approved by the State Highway Engineer and can only be initiated after the right-of-way has been acquired, the plans have been completed, the proposed work has been programmed and the funding made available. The following procedures will be used to authorize all Contract Extensions:

1. Upon arrival of the request by the State Highway Engineer, the District Engineering Administrator will review projects in the county in which the proposed work is to be performed. If no similar projects are underway in the same county, similar projects in adjacent counties will be considered. The District Engineering Administrator will figure the total estimated cost for the extended work for each project being considered. The same unit prices as in the existing Contracts will be used to determine the cost. To make an accurate assessment, it may be necessary to make preliminary Contracts with Contractors having the existing Contracts and obtain quotes for items not included in each respective Contract. The District Engineering Administrator will establish a list of projects, prioritizing them in order, from the least to the highest cost to the Department.

2. The stipulations in Item #1 may be waived if, in the opinion of the District Engineering Administrator, it is in the best interest of SCDOT to extend the additional work to a particular Contract. Documentation supporting this position will be submitted along with the other information required by these procedures. If this option is used, Item #5 would be the next step. Also, only the applicable portions of Item #7 would be necessary.

3. After this determination has been made, the Contractors for the projects should be contacted in order of priority to determine their interest and willingness to accept the additional work. Results of the contacts should be documented. If contacts are made by telephone, the results of the contacts should be confirmed in writing to those Contractors expressing no interest in the additional work.

4. When reviewing Contracts to be extended, other factors, such as Contract status and completion dates, should be considered. If extenuating circumstances, such as those previously stated, prevent a Contract from being considered for extension, the District Engineering Administrator will document the reasons.

5. Once the Contract to be extended has been determined, the District Engineering Administrator will obtain a signed statement from the Contractor indicating their willingness to accept the extension. The Statement will also address the need for additional time or state that no additional time will be necessary. Consider the following:

   a. The amount of additional time will apply only to the additional work and will be commensurate with the amount and difficulty of the added work, thereby not affecting the original/revised completion date for previously authorized work in the Contract.

   b. Consideration may be given to allowing additional time for the entire Contract, including the additional work. However, the extension will not be issued to allow additional time to avoid liquidated damages for any original Contract work.

   c. If a Contractor is unwilling to accept the additional work with a reasonable time extension, as detailed in Item #5a and #5b, these facts should be documented, and the next Contractor in order of priority should be contacted.

6. If no Contractor is willing to accept the work in accordance with the above conditions, the State Highway Engineer will be advised, in writing, accordingly.

7. If a Contractor is found who is willing to accept the extended work as detailed above, the District Engineering Administrator will forward the recommendation for the extension to the State Highway Engineer. The recommendation should include the File Number to which the additional work is to be extended and should indicate if the Contract recommended for extension resulted in the least cost to the Department. If the Contract recommended for extension is not the Contract that would result in the least cost, the documentation supporting the recommendation will be forwarded to the State Highway Engineer with the letter of recommendation. The signed Statement from the Contractor, as required by Item #5, will also be transmitted along with the letter.

8. After all information necessary to authorize the extension has been received, including any Supplemental Agreements, a letter to the Contractor will be prepared for the State Highway Engineer's signature, authorizing the extension. Final authorization will be subject to the approval of the Executive Director. Verbal request for authorization will not be considered, and verbal authorization to proceed with work will not be issued until the Executive Director has approved the extension.

9. If the amount of the extension exceeds 50% of the total amount of the original Contract, or $100,000.00, whichever is the lesser amount, the State Highway Engineer will present the extension to the Commission and receive approval prior to any work being performed.

10. The District Engineering Administrator will be sent a copy of the Letter of Authorization, signed by the State Highway Engineer and approved by the Executive Director. This letter will serve as authority to proceed with the extended work.

104.4.5 Change Orders

Upon authorization of a Contract Extension by the State Highway Engineer, a Change Order for the additional work will need to be created and properly executed using SiteManager, as discussed in Section 101.6.3.

104.5 EXTRA WORK

Section 104.05 of the *Standard Specifications* requires the Contractor to perform unforeseen work for which there is no price scheduled in the Contract. Because this is considered Extra Work, the Resident Construction Engineer must use SiteManager to create and properly execute either a Change Order or a Force Account Work Order, as appropriate, before initiating the work (see Section 101.6.3). The Change Order will be used to establish the unit prices for the unforeseen work and to revise the allotted Contract time, if the addition of the unforeseen work will negatively impact the critical path of the project. On the other hand, if the item is lump sum and its scope has changed significantly from what was originally intended or a change to the Contract Specifications is required, the Change Order will be used to revise the amount of the original lump sum. A Force Account Work Order will be used to provide for unforeseen work when SCDOT and the Contractor cannot agree on unit prices for the additional items of work. See Section 109.4 for additional information on Extra Work and Force Account Work.

104.6 DETOURS AND HAUL ROADS

Section 104.06 of the *Standard Specifications* governs the provisions for establishing, constructing, using and maintaining detours and haul roads.

104.7 MAINTENANCE AND MAINTAINING TRAFFIC

104.7.1 Overview

Section 104.07 of the *Standard Specifications* governs the provisions for maintaining roadways open to traffic and for maintaining traffic through the work zone. It is the responsibility of the Resident Construction Engineer to ensure compliance with these provisions, paying particular attention to public convenience and safety. These provisions cover the maintenance of adjacent roadways and access drives until the facility has been completed. At the Preconstruction Conference, the Resident Construction Engineer should stress to the Contractor the importance of these provisions. Changes to the Traffic Control Plan and associated pay items in the Contract will require a Change Order, as discussed in Section 101.6.3. See Sections 601, 602 and 603 for additional information.

104.7.2 Maintenance of Secondary Highways

Neither the Contractor nor SCDOT will assume responsibility for maintenance of Secondary Highways added under SC Code Annotated Section 57-5-70 (1976) until the Contractor begins construction. The Contractor will be responsible for maintenance as soon as work is begun on a road regardless of the nature of the work being performed by the Contractor. The agency or

governmental entity having jurisdiction over the road prior to its being placed in the State Highway Secondary System will be responsible for maintenance until the Contractor assumes the responsibility.

Maintenance by the Contractor will include the maintenance of bridges. If a bridge is damaged as a result of being overloaded by the Contractor's equipment, the Contractor will be responsible. The Contractor will not be responsible for the failure of a bridge through general public use and the use of equipment within the licensed capacity of the equipment.

If there are sections of a road on which the Contractor is requested to perform no work due to right-of-way difficulties of for other reasons, the Contractor will be expected to maintain these sections of road until such sections are deleted from the Contract. After deletion of these sections, the Department will maintain them until they are removed from the Construction Program.

In the event the Contractor, after beginning construction, fails to provide adequate maintenance on a road being used by traffic and does not correct unsatisfactory conditions immediately upon notice, necessary maintenance will be provided by the Department and the cost of such work will be charged to the Contractor.

104.7.3 Road and Bridge Damage By Contractor

The Resident Construction Engineer should be very watchful of any damage being done to a base, pavement or structure by loaded vehicles of the Contractor. Such damage will shorten the life of the roadway and will not be tolerated by SCDOT. Quite often an existing pavement is being retained on a project, and special care must be exercised not to let the Contractor damage such pavements.

In most instances, pipe lines are laid prior to the grading operation. The Contractor should be required to take every precaution against damaging pipe lines by knocking them out of line and grade by careless use of heavy equipment. After the grading operations have been completed, the Resident Construction Engineer should inspect all pipe lines and structures to determine if there has been any damage during the grading operations. Necessary corrections should be made by the Contractor prior to the placing of the base course.

Quite often the appearance of bridges, culverts, concrete curb and gutter and sidewalk are marred by lack of proper protection during the asphalt surfacing operations or the application of other asphalt material. When asphalt work is being performed adjacent to such structures, the work must be carried out in such fashion to prevent the asphalt material from marring their appearance. Any asphalt which is splattered on the structure must be removed.

The Contractor should be instructed to use care in rolling operations at the ends of structures so as not to damage flared curbs or ends of concrete decks. Occasionally during the pulling of ditches and the dressing of shoulders, freshly laid asphaltic surfacing is damaged by the Contractor's equipment. The Contractor should be required to use such equipment and methods as necessary to prevent such damage. In the event of damage to the surfacing, necessary repairs must be made.

104.8 REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS

104.8.1 General

Section 104.08 of the *Standard Specifications* governs the provisions for the work and the disposition of materials related to the removal of structures and obstructions.

104.8.2 Merchantable Timber

104.8.2.1 Contract Review

Prior to clearing and grubbing, the Resident Construction Engineer will review the Contract Plans and Specifications, Special Provisions and right-of-way agreements, including landowner agreements, to determine the disposition of any merchantable timber. Verify that the trees are clearly marked in the field as merchantable timber.

104.8.2.2 Property of Contractor

The timber will generally become the property of the Contractor and will be removed from SCDOT right-of-way. Do not allow the Contractor to stockpile the timber on private property unless the Contractor has a properly executed agreement with the landowner. Do not allow the Contractor to cut timber outside the construction lines except as specified or otherwise designated by the Resident Construction Engineer.

104.8.2.3 Property of Landowner/Grantor

When the Contract specifies that the timber will become the property of the landowner, contact the landowner before the timber is cut to determine the desired length of sections, stockpile location and time of pickup. Verify that the Contractor performs this activity as desired by the owner. There may be some locations on primary projects where the timber will become the property of the land grantor. Check the Special Provisions, and verify that the timber is cut and stockpiled for the land grantor. Merchantable timber on secondary road construction becomes the property of the grantor, unless specified otherwise.

104.8.2.4 Property of SCDOT

When the Contract specifies that the timber will become the property of the Department, verify that the timber is cut and stockpiled on the project right-of-way. The lengths of sections should be in the best interest of the Department with respect to transport and resale. Once a sufficient quantity of timber has been stockpiled, notify the District Construction Engineer in writing to discuss disposition and pickup. On most projects, the value of the timber is included in the appraisal of the property, and the owner is compensated for the timber within the right-of-way. Contact the South Carolina Forestry Commission, as needed, for information on tree types, sizes, cutting methods and merchantable lengths of timber.

104.9 RIGHTS IN AND USE OF MATERIALS FOUND ON THE WORK

Section 104.09 of the *Standard Specifications* defines the contractual rights of excavated or dismantled materials and how they may be used on the project.

104.9.1 Legal Reference

The reuse or disposal of non-hazardous surplus materials generated from SCDOT projects is governed by the provisions of the Contract with respect to rights of ownership and the regulations promulgated by SCDHEC. Depending on the disposition of the material, other Federal, State and local environmental regulations may apply, as discussed further in Section 107.26.

104.9.2 Reuse of Excavated Material

104.9.2.1 Embankment and Shoulder Material

Where suitable material is encountered during excavation and near locations where embankment material is to be placed, the material will be salvaged and reused. The decision to salvage the material must be based on economics. Shoulder material is the most commonly salvaged material. The salvaging of this material is usually performed during the first stages of the grading operation with the material being stockpiled at selected locations within the right-of-way for future use. This material should not be stockpiled in excess of its need. If staged construction is specified, the needs of the remaining Contract also must be considered.

104.9.2.2 Embankment Topping

The Contract Specifications require the Contractor to preserve the best material for constructing the top portion of embankments. This material should not be excavated and stockpiled but should remain in its original position until the embankment is built up to the elevation where the best material can be excavated and placed on the fill. Use experience and available soil test reports in selecting the material to be preserved for topping embankments.

104.9.2.3 Stone, Gravel and Sand

If the material is suitable and its use will be in the best interest of the Department, the Resident Construction Engineer may elect to allow the Contractor to reuse stone, gravel and sand that is uncovered during project excavation. In such cases, measure and pay for both the excavation of the material and for the pay item on which the excavated material is used. However, if the excavated material was needed for fill but the Contractor elected to use the material elsewhere, the Contractor must replace the excavated material at their own expense. Note that the Contractor is not permitted to excavate material within the right-of-way from locations outside the grading limits, unless authorized by the Resident Construction Engineer.

104.9.3 Surplus Soil Material

104.9.3.1 General

Where surplus soil material is generated from cutting high shoulders, cleaning of ditches, reducing backslopes or other construction or maintenance activities, SCDOT will require the Contractor to dispose of the material in such a manner as to promote the best interest of the Department.

104.9.3.2 Reuse of Surplus Soil

Prior to earthwork operations, inspect the project to determine whether surplus soil material will be generated and if it can be used on the project. Contact the Resident Maintenance Engineer to determine if the material can be used on other SCDOT right-of-way. Surplus soil material can be effectively used as follows:

- topsoil;
- correcting low shoulders;
- widening shoulders;
- regrading eroded ditch lines;
- backfilling washes in foreslopes, backslopes and fills;
- widening fills and flattening slopes for safety;
- landscaping at interchanges and other areas with wide right-of-way; and
- stockpiling, if SCDOT storage is sufficient and haul distance is reasonable.

104.9.3.3 Disposal of Surplus Soil

Where surplus soil cannot be reused, the following applies to the disposal of the material on private property:

- surplus soil can be placed on private property only if SCDOT has determined that such placement is in the Department's best interest;

- placement of surplus soil on private property must be approved by the District Engineering Administrator;

- placement of surplus soil on private property will be limited to the landowner whose property adjoins the roadway that is being reworked, and the location where the surplus soil is deposited must be within 300 feet of the roadway in accordance with SC Code Annotated Section 57-3-770; and

- an agreement with the landowner, SCDOT Form 200.04 – Agreement for Placing Debris on Private Property, must be properly executed before any surplus soil is placed on private property.

If any unusual request for surplus soil or other condition not covered in the above arises, contact the District Engineering Administrator for assistance in determining the proper disposition of the material.

104.10 FINAL CLEANING UP

Section 104.10 of the *Standard Specifications* governs the provisions for cleaning up after construction, which is required prior to acceptance and final payment.

Section 105
Control of Work

105.1 AUTHORITY OF THE ENGINEER

The Resident Construction Engineer will be the final SCDOT spokesperson to the Contractor Superintendent with respect to decisions regarding the quality and acceptability of the work, materials and rate of progress, all interpretations of the Contract Plans and Specifications and the acceptability of the progress toward completion of the Contract. Contact the District Construction Engineer for any needed assistance.

105.2 THE PLANS, WORKING DRAWINGS AND SHOP PLANS

Section 105.02 of the *Standard Specifications* governs the provisions for interpreting the Contract Plans, Working Drawings and Shop Plans. See Section 725 for additional information.

105.3 CONFORMITY WITH PLANS AND SPECIFICATIONS

Section 105.03 of the *Standard Specifications* governs the provisions of the Contract with respect to the Contractor's conformity with the Contract Plans and Specifications.

105.4 COORDINATION OF PLANS, SPECIFICATIONS, ETC.

Section 105.04 of the *Standard Specifications* defines how to interpret discrepancies in contractual documents. If the Resident Construction Engineer finds a discrepancy in the Contract documents before or during construction, immediately investigate the matter and initiate a Change Order, when appropriate, on behalf of the Department as discussed in Section 101.6.3.

105.5 COOPERATION BY CONTRACTORS

Section 105.05 of the *Standard Specifications* establishes the provisions for the expected cooperation by the Contractor. The primary interface will be between the Resident Construction Engineer and the Contractor Superintendent. Impartial enforcement of Contract requirements should be administered. SCDOT Inspectors must be thoroughly familiar with the Contract Plans and Specifications. Evidence of such knowledge will gain respect and cooperation.

105.6 COOPERATION WITH UTILITIES

105.6.1 Overview

Utility facilities that may be affected by SCDOT construction projects may be publicly or privately owned and any needed utility work, such as relocations or adjustments, will require the cooperation of the affected utility companies, the Contractor and the Department. When required, utility work will be coordinated and executed in accordance with the applicable sections of 23 CFR 645A & 645B and Chapter 5 of the *SCDOT Highway Design Manual*. SCDOT personnel should strive to minimize utility conflicts through all stages of project development and construction. Section 105.06 of the *Standard Specifications* governs the contractual responsibilities of the Contractor for cooperating with utility companies. Section 107.22 of the *Standard Specifications* governs the Contractor's responsibility for protecting utility property and services and for damage to utility facilities caused by the Contractor's operations.

105.6.2 Investigation of Prior Rights

Prior to advertising for bids, the Resident Construction Engineer will examine the project plans carefully to determine utility coordination requirements and then arrange a meeting with affected utility companies to locate existing utilities and schedule relocations and adjustments. If utility work is necessary, the Resident Construction Engineer will request from the utility company information on easements and other documentation necessary to determine whether SCDOT or the utility company has prior rights. If the utility company cannot establish prior rights or is located within SCDOT right-of-way by encroachment permit, utility work must be performed at the cost of the utility company and the utility company must prepare relocation plans and furnish SCDOT with a Letter of No Cost. If the utility company can establish prior rights and SCDOT is to participate in the cost of the utility work, the utility company will prepare and submit the necessary forms, drawings and information as discussed in Section 105.6.4. Copies of the project plans will be furnished to each affected utility company to assist in their drafting any needed plans for relocation or adjustments.

105.6.3 Notification of Utilities

A minimum of 10 days notification of a Preconstruction Conference will be given to utility companies. In addition to the standard information, this notification will include a copy of the proposed agenda for the conference and a request that the utility company be prepared to discuss all aspects of the relocation of its facilities including the submission of a progress or work schedule. The utility company will be requested to send someone to the Conference who is knowledgeable and who can speak with authority for the company. The company will be requested to furnish the name of a contact person or persons who will be available for the duration of the project for coordination with the Department and the Contractor. On projects with major utility involvement, a utility agreement, cost estimate and plans may be necessary prior to the Conference.

105.6.4 Utility Agreement, Cost Estimate and Plans

If the utility company has no prior rights, the company is required to prepare and submit plans for the utility work together with a Letter of No Cost. However, if the utility company has prior rights and requests reimbursement, the company will prepare and submit SCDOT Form 100.12 – Utility Agreement, together with a detailed cost estimate and plans for the utility work. Upon receipt, the Resident Construction Engineer will review the submittal for completeness and prepare and forward recommendations through the District Construction Engineer for review and approval by the Utilities Office. The Utilities Office will coordinate any needed review by the FHWA. Utility plans must include the following information:

- legend;
- location of facilities to be relocated or adjusted in relation to centerline stationing;
- utility facilities that are occupying public lands;
- vertical and horizontal clearances; and
- location, type, size and class of major items of material for:
    - existing facilities to be adjusted,
    - temporary facilities to be installed,
    - permanent facilities to be installed, and
    - facilities to be abandoned.

Cost estimates for utility work must include the following information:

- items of work to be performed;
- detailed costs for the utility work, including:
    - labor costs,
    - construction overhead charges,
    - costs for materials and supplies,
    - handling charges,
    - transportation and equipment charges,
    - right-of-way costs,
    - preliminary engineering costs, and
    - construction engineering costs.
- items of material representing major components;
- factors included in construction overhead charges;
- betterment and extended-service-life credits due, including calculations; and
- itemized salvage credit due.

105.6.5 Authorization to Proceed

The term "authorize utility companies to begin relocation work" means that, if possible, after consulting with the Resident Construction Engineer, the utility will begin relocating their facilities. If this is not feasible, the companies should begin procuring the necessary materials, etc., and be prepared to perform the work. For Federal-aid projects, the Utilities Office will authorize all utility companies to begin relocation work. For C Projects and Non-Federal-aid projects, the Utilities Office will authorize those companies with executed agreements to begin relocation work. The District Engineering Administrator will authorize companies with relocation sketches to begin relocation work.

105.6.6 Inspection of Utility Work

When SCDOT participates in the cost of utility work, the Resident Construction Engineer will be responsible for ensuring that the utility work is properly inspected and that field notes are adequately maintained. Periodic inspections should be performed to ensure that the utility work is being performed in accordance with utility plans. Document these inspection records as discussed in Section 105.6.7. When the work is performed by the utility company in which SCDOT does not participate, ensure that the Contractor maintains complete and accurate records of the utility work as it progresses and that the work is being performed in compliance with the utility plans. Although it is not necessary for SCDOT personnel to maintain detailed records of utility work in which SCDOT does not participate, SCDOT records should minimally indicate compliance and the approximate dates on which the utility work was performed. It is the responsibility of the Resident Construction Engineer, the District Utilities Coordinator and the District Construction Engineer to follow-up as often as necessary with utility companies to ensure that appropriate progress is being made. If assistance is needed in this area, after efforts by the Resident Construction Engineer and the District Construction Engineer have not produced results, then the Utilities Office must be notified with a request for assistance and the type of assistance needed.

105.6.7 Inspection Records

Records of utility work, including temporary work performed in which SCDOT participates, are to be maintained in the Daily Work Report and SCDOT Form 100.13 – Utility Field Daily Diary. A diary sheet is to be fully completed for each day the utility company works on the project. The first diary sheet should be labeled Report #1 and subsequent diary sheets should be numbered consecutively. A different diary is to be maintained for each utility agreement, even though the agreements may be for utility work on the same project. Major materials (e.g., poles, cross-arms, guy-wires, conductors, lengths and size of pipe) must be recorded on the diary sheets and labor records are to be fully completed for each day. The labor and material records must be compared against the final billing prior to payment. If material from the utility work is scrapped or junked, the material must be inspected and an entry in the Daily Work Report provided as to the disposition of the material. The Utility Field Diary must be forwarded to the Utilities Office with the final invoice for each utility agreement.

105.6.8 Utility Agreement Revisions

If changes are made after a utility agreement has been executed and the changes affect the utility agreement, notify the Utilities Office. If an urgent condition exists, verbal authorization may be granted upon approval by the Utilities Office, until the revised utility agreement can be processed and approved. Such practice will avoid delaying construction. Minor changes in construction or minor changes in cost need only be noted in the Daily Work Report.

105.6.9 As-Built Plans

The final location of all utilities within the project limits will be shown on the As-Built Plans.

105.6.10 Final Invoice

In accordance with requirements to close out utility agreements within 6 months of completing the utility work, once a utility company has completed its work under the terms of an agreement, the Resident Construction Engineer will request a final invoice from the company. The utility invoices will be reviewed and recommended for approval by the Resident Construction Engineer and District Engineering Administrator and then forwarded to the Utilities Office for processing.

105.7 COOPERATION BETWEEN CONTRACTORS

Section 105.07 of the *Standard Specifications* establishes the expected cooperation and assignment of prior rights to Contractors under separate Contract on the same highway facility.

105.8 CONSTRUCTION STAKES, LINES AND GRADES

105.8.1 Responsibility for Survey Work

Section 105.08 of the *Standard Specifications* governs the contractual requirements of construction stakes, lines and grades, including the division of responsibilities between SCDOT and the Contractor (i.e., partial SCDOT responsibility, 100% Contractor responsibility for roadway work, 100% Contractor responsibility for bridge structures). Check the Special Provisions of the Contract for additional information.

The most predominant case is that the Contractor performs 100% of the construction surveying and staking, which allows the Contractor full control over scheduling to prevent project delays. When the Contractor is fully responsible for surveying and staking, the Resident Construction Engineer will be responsible for ensuring compliance. See Figure 105A for guidelines on the minimum frequency of verifying Contractor surveying and staking.

BRIDGES			
Item	**Verification of**	**Shot Location**	**Frequency**
Footings	Elevation	Corners	Each Footing
Columns	Elevation	Top of Column	Each Column
Bent Caps	Elevation	Corners	Each Cap
Drilled Shafts	Elevation	Top of Shaft	Each Shaft
Piles	Elevation	Cut-off Elevation	One Pile per Bent
Bridge Beam Seats	Being Level	Corners and Mid-point	Each Seat
Armor Plates	Elevation	Crown and Face of Parapet	Each Plate
Bents	Distance Between	Bents	Each Span
ROADWAYS			
Item	**Verification of**	**Shot Location**	**Frequency**
Curb and Gutter	Line and Grade	Top of Curb	10% of hubs
Pipes / Culverts	Flow Line	Invert	Each Line of Pipe (excluding driveway pipe)
Catch Basins	Flow Line / Top of Box	Invert / Top of Box	10% of Boxes
Subgrade	Line, Grade and Cross-slope	Stagger Across Roadway (C/L, EOP, Lanes)	Every 500' on Station
Base	Line, Grade and Cross-slope	Stagger Across Roadway (C/L, EOP, Lanes)	Every 500' on Station
Surface Course	Line, Grade and Cross-slope	C/L, EOP. Lanes	Every 500' on Station
Retaining Walls	Line and Grade	Top of Wall	Every 100'
Barrier Walls	Line and Grade	Top of Wall	Every 250' on Station

Notes:

1. *Alignment and elevations should be checked more frequently at the beginning of the project to ensure that proper benchmarks, etc. are being used.*

2. *All survey checks should be kept in one central location.*

MINIMUM FREQUENCY OF VERIFYING SURVEY CONTROL
Figure 105A

When SCDOT is partially responsible for survey work, the work is usually for setting hubs, slope stakes, centerline stakes and grade stakes (i.e., blue tops) and it will be the responsibility of the Resident Construction Engineer to ensure that the Contractor is provided with sufficient control to the proper degree of accuracy to allow the Contractor to construct the work in accordance with the Contract Plans. Due to the frequently high rate of progress of the Contractor's forces, especially during the early rough grading operations, detailed planning and cooperation with the Contractor is required. The Resident Construction Engineer should see that sufficient stakes are furnished to the Contractor. The Contractor's preferences as to the location and manner of staking should be given consideration. Under no circumstances, except when the Resident Construction Engineer is not properly notified of the Contractor's plan of work, will any delay in staking be permitted that may hinder the construction operations.

105.8.2 Protection of Stakes and Markers

It is the obligation of the Contractor to preserve and to protect all stakes and markers. When the Contractor neglects to take normal precautions and, due to the Contractor's negligence, stakes are destroyed, the Contractor should be charged with the cost of resetting.

105.8.3 NPDES Lines and BCA Lines

The NPDES lines designated on the Contract Plans must be clearly delineated in the field. See Section 815.2.4 for additional information on NPDES areas. During construction of a new bridge, a large crane needs access to one of the four corners of the structure. An access road and staging area will be designated on the Contract Plans. Desirably, the area will be on project right-of-way; however, if unattainable, a landowner agreement will be required. The symbol delineating Bridge Construction Access (BCA) is shown in Figure 105B, which must be clearly delineated in the field.

– – – – – BCA – – – – – BCA – – – – – BCA – – – – –

SYMBOL FOR BCA LINES ON CONTRACT PLANS
Figure 105B

105.8.4 Survey Party Organization

The technical control of the party is usually under the direction of the Party Chief; however, the methods used and the work to be accomplished are the Resident Construction Engineer's responsibility. To produce satisfactory quality and quantity of work, there must be close cooperation between all members of the party. It is essential that personnel understand what is expected of them. Some members of the party will at times be idle while other members of the party are preparing to perform an operation. All operations should be performed as concurrently as practical. For instance, when a surveyor has completed set-up, a sight should be ready for

shooting. All needs of the work should be anticipated. Supplies and equipment that are required should be on hand when needed.

The number of personnel necessary in a survey party will depend on the type of work being performed. The taking of cross-sections or setting of finish grade stakes may require four or five people, while the final measurement of pipe lines may require only two or three. The Resident Construction Engineer should organize survey parties according to conditions, rather than maintaining a set number in a party regardless of the type of work to be performed.

The Party Chief should not tolerate inefficiency among any members of the survey party. The bad habits of one employee are quite often picked up by other members.

It is the responsibility of the Resident Construction Engineer and SCDOT Inspectors to instruct survey party personnel on the methods used by SCDOT and the duties to be performed. Each member of the party, showing promise of being able to advance within the Department, should be trained in as many duties as practical so that personal abilities will be an asset to the Department, as well as to the promising employee.

The Party Chief should have a thorough knowledge of surveying theory and practice as applied to highway construction. The survey party should maintain a book of surveying tables. The Resident Construction Engineer should maintain on hand a good surveying text for use as a reference.

105.8.5 Relations with the Public

Survey parties performing field work are more conspicuous to the passing public than other SCDOT personnel on the project. The appearance and conduct of all party members should always be beyond reproach.

105.8.6 Care of Equipment

Surveying instruments are precise and expensive pieces of equipment and are based on sophisticated electronic computer, GPS and laser technology. Total Station Instrumentation is typically used to set up control points because the system allows many points to be shot from one location, acquiring both planar and elevation data and directly interfacing with construction and CADD computer software. Such equipment should receive proper care and should be maintained in good adjustment at all times. Survey instrumentation should not be left unattended.

The care of equipment applies just as much to hand levels, range poles, level rods, bush hooks, axes and related equipment as it does to surveying instruments. The progress of the survey party will be much impeded if proper care and maintenance of equipment is not provided. The Party Chief should make frequent inspections, preferably weekly, of all surveying instruments and equipment maintained by the survey party.

All surveying instruments, including hand levels, should be checked at frequent intervals to ensure they are maintaining the required accuracy. A two peg check should occasionally be

made of hand levels and engineer levels. Checking of engineer levels can be performed as follows. Hand levels can be checked in a similar manner, except the distances should be much closer:

- Level the instrument over a point B halfway between two points A and C, approximately 300 feet apart. Determine the difference in elevation between points A and C by subtracting the two rod readings. The true difference in elevation is thus obtained even though the axis of sight is not exactly horizontal since the distance to the two points is the same.

- Set the level very close to point A in line with A and C. Read the rod on points A and C and determine the difference in elevation between points A and C.

- If the line of sight is parallel to the axis of the level bubble, the two differences in elevation, as determined previously, will be the same. If not, the level should be adjusted to give the true difference in elevations as was determined when the instrument was sitting halfway between points A and C. While the level is still at the point near A, dumpy levels may be adjusted by moving the horizontal cross hairs up or down (while looking at point C) until the true difference in elevation between A and C is read.

The Party Chief should see that the survey party transportation vehicle is maintained in a clean and presentable condition, both inside and out. The vehicle should be periodically washed.

105.8.7 Survey Notes

All survey notes should be recorded neatly, clearly and legibly and in sufficient detail. A line should be drawn through errors and the corrections entered directly above. Notes are not to be copied. The first sheet of each set of notes should show the contents, the File Number, the road or route number and other desirable information that might be helpful for identification. Notes should show the date and the survey party personnel at the beginning of each day's notes. The duties of each employee of the survey party should also be indicated. Persons making computations and checking computations must always be identified by name.

105.8.8 Re-Establishing Centerline

105.8.8.1 Alignment Notes

In most instances field alignment notes can be prepared before beginning the centerline survey. The alignment notes should show the complete curve data for each curve and the curve deflections. The referencing of control points should be placed on the alignment notes during the staking operations. The Contract Plans should be carefully studied for any alignment changes to be made during construction. Equalities, whether caused by alignment changes during construction or whether indicated on the Contract Plans, should be noted in the alignment notes.

105.8.8.2 Staking

The centerline of construction should be reproduced from the Contract Plans and marked by stakes driven on the centerline with the station number facing the zero station of the survey. Along the traveled way, centerline stakes should be offset at right angles with the station and offset distance from the centerline marked on the side of the stake facing the centerline. Offset the stakes a uniform distance throughout, as practical. Offset stakes should not be placed where pedestrians might fall over them or in locations where they will obviously not remain in place for any length of time. Where the line follows on an existing pavement, nails and caps or other suitable markers should be driven on the centerline to denote the actual centerline points.

On work such as secondary road construction where the cuts and fills will not be of appreciable heights, hubs should be placed in front of the offset stakes for future use in conjunction with cut or fill stakes.

Tangent sections should typically be staked at 100-foot intervals and horizontal curves should be staked at 50-foot intervals.

105.8.8.3 Referencing Control Points

At the time the centerline is reproduced, or immediately thereafter, control points should be referenced so that the line can be readily and accurately re-established when required. In general, it is necessary to reference the beginning and end of curves, points on tangents at approximately 1000-foot intervals and points of tangent intersections, where practical. Reference points placed at points of minimum cut and fill are particularly desirable.

There are various methods of referencing control points and the selection of the proper method should be left to the judgment of the Party Chief. Reference points should be placed at locations where there is little probability of their being disturbed during the construction work and where it is practical to re-establish the centerline from the points with a minimum of delay.

The following methods of referencing points are most commonly used:

- Points set at right angles to the roadway tangent.
    - One point placed on each side of the centerline at recorded distances with one or more additional points for line and distance, or for line only and approximate distance.
    - Two points at recorded distance from the centerline on same side of road with one or more additional points for line and distance, or for line only and approximate distance.
- Points on angle with roadway tangent and stakes set as above.
- Intersection method where the angle of intersection between the lines from the reference hubs should be as near to 90° as practical.

The marking on guard stakes for reference hubs must include the station number of the referenced station and must also include the distance to the point referenced except when the hub is to be used for line only.

Locations and descriptions of reference points must be noted on the right-hand page of the alignment notes. It should be kept in mind at all times that the Party Chief running the centerline and referencing the points may not be the person re-running the alignment at a future date. The reference notes should be perfectly clear and adequate for any Party Chief, whether familiar with the project or not, to easily re-establish any portion of the alignment.

105.8.9 Profile Levels and Cross-Sectioning

When the computer is to be used for computation of earthwork quantities, it is preferred that all the original or all the final cross-sections be taken with either the engineer's level or the hand level, but not a combination of the two. A reading must be shown at the centerline on both original and final cross-sections. Should it be necessary to show more readings than allowed on one line, the reading may be continued on the next vacant line; however, a connecting directional arrow should be shown. On the station number side of the large cross-section level paper, only one number may be placed in any square and it should be placed in the proper relation as to decimal point. The entire station number must be shown. Notes do not have to be reduced. They can be either elevations or rod readings to be reduced from a profile elevation.

Profile levels and the taking of cross-sections are ordinarily performed simultaneously with the use of an engineer's level. This method is best used in flat and rolling terrain where it is possible to run a profile of the centerline and take cross-sections with the same instrument setup. It is frequently supplemented by the use of a hand level to extend the cross-section where it is not possible to see the level rod from the instrument setup point. When a cross-section is extended by the hand level, the rod reading should be computed and written in the notes just as if the rod had been read by the instrument personnel. A plus will have to be used in the notes when the ground level extends above the height of the instrument. A full description of each bench mark location must be written into the cross-section notes.

Where it is not feasible due to the rough terrain or trees to run profile levels and take cross-sections at the same time, the hand level method may be used to take the cross-sections after the profile has been run. This method is less accurate than the above method and should not be used except when necessary. The recordings in the cross-section notes should be plus or minus from the centerline elevation when this method is used.

Cross-section notes should normally indicate the horizontal distance from the centerline to the level rod to the nearest foot. Where the break to be shown is of a sharp nature, the distance should be recorded to the nearest 0.5 foot.

Profile levels should be run using the bench marks as shown on the Contract Plans. Shots on bench marks, turning points and permanent surfaces must be read to the nearest 0.01 foot. Ground shots should be read to the nearest 0.01 foot. During the running of the profile levels, consecutive benches must be tied together. This will reveal any error between bench marks. If

the bench mark elevation obtained during profile leveling and that shown on the Contract Plans differ by more than 0.03 foot, the Party Chief should re-run a level line to pinpoint the error.

Temporary bench marks, placed during the running of the profile, are especially useful for future use on heavy grading projects and municipal projects where a large number of grade stakes will have to be set. Their location should be selected with care, taking into consideration the changes in the ground surface that will be made during construction. Locations opposite points of minimum cut and fill are particularly desirable.

During the running of the profile on secondary work where the cuts and fills will not be of appreciable heights, the offset hubs as placed during the staking operations should be read. The hubs should be read to the nearest 0.01 foot. Later these hub elevations can be used in computing the cut or fill at each station. A cut or fill stake is usually all that is necessary for grading purposes on this type of construction.

Original cross-sections should be taken at intervals not exceeding 100 feet for flat or gently rolling terrain and not exceeding 50 feet for hilly terrain. Before taking the original cross-sections, the Party Chief should determine at what stations final cross-sections will be necessary and the originals should be taken accordingly. It should be well understood that excavation of materials is a pay item and every effort should be made to ascertain that this item is accurately shown by first truly representing the terrain during cross-sectioning by selecting the proper cross-section interval.

Cross-sections are to be taken perpendicular to the centerline. In rough terrain or where the sections are to extend out to an appreciable length, the use of a transit is usually necessary to determine the perpendiculars.

It is best to take the original cross-sections to the right-of-way line and farther should the slope of the new construction extend beyond the right-of-way. In all cases, original cross-sections should be extended, if necessary, when slopes are to be flattened or where borrow is to be obtained.

The subgrade should be approved and should be within reasonable conformity with the typical sections before taking of final cross-sections. This should include the shape of the surface as well as the shoulder breaks and ditch lines.

Final cross-sections should be taken at all stations as taken in the original cross-sectioning plus any additional sections necessary to show correctly the excavation or embankment. The finals should extend to at least the earthwork construction line. In all instances where practical, the Party Chief should note on the final cross-section notes the station number where the cut and fill begins or ends.

On roads where the Contractor is to be paid quantity for unclassified excavation, a profile line of levels should be run on the centerline of the road after fine grading is complete so as to substantiate that the road is built to plan grade within the grade tolerance permitted.

105.8.10 Grade Computation

Prior to slope staking, it is best for the Party Chief to prepare grade notes. This is necessary to take into consideration the crown of the roadbed, superelevation due to horizontal curvature and transitions. Computations should be made for all stations that are to be slope staked.

The grade notes should include sufficient columns to show the elevation of the centerline, the distance from the centerline to the cut or fill break and the elevation of the break. Time will be saved when grade computations are performed in this manner while in the office.

Where cut and fill stakes are to be used in lieu of slope stakes, grade notes should also be made. They need not show all the information outlined above. The cuts and fills are usually computed directly on these notes using the hub elevations as determined while taking profile levels. The amount of superelevation should also be shown on the notes and should be placed on the cut and fill stakes. It is usually best to reference the cut or fill stakes to the centerline subgrade elevation as the superelevation is usually rotated around the centerline for secondary work.

105.8.11 Slope Stakes

Slope stakes should be set on projects as necessary for guidance and for adequate control of the work. The stakes should be placed at ample intervals, preferably at 50 feet in rough terrain. Prior to beginning of setting of slope stakes, the staking procedure should be discussed with the Contractor and their views should be considered.

The Party Chief or a designated employee should prepare staking notes before the field work begins. It is good practice to set slope stakes with cut or fill reference to the subgrade at the shoulder edge. The break point from the centerline for cut sections can be determined by extending the shoulder elevation over until it intersects with the cut slope.

Slope stakes are set at locations where the toes of fill slopes and the tops of cut slopes meet the original ground. In heavy work or hilly terrain, it is most important to set the stakes at high angles to the centerline on tangents, and on the radial lines on curves. The right angle prisms method or the transit should be used as necessary.

The use of an engineer’s level, level rod and tape is generally best suited for setting slope stakes where the ground is flat or rolling. It is often supplemented by use of a hand level to establish the slope stakes when it is not possible to set the stake from the instrument setup. Where the terrain is rough, the level instrument is often used by running in only one side of the roadway at the time. This necessitates two lines of levels being run but is considered most accurate.

Where the terrain is rough or where high accuracy is not required, the hand level, level rod and tape are commonly used in setting slope stakes. Using this method, it is necessary to run a centerline profile with an instrument to establish the centerline elevations and subsequent cut or fill. From the centerline date, it is then possible to set the slope stakes by use of the hand level.

The placement of slope stakes can be expedited by using two tapes with the zero ends of each tape tied together. The break-point distance is held on one tape at the centerline, thus putting the zero end of the other tape automatically over the break point, and the distance from the break point to the rod reads directly on the second tape.

While there are different methods used for marking slope stakes, a recognized and often used method is to place the station number on the side of the stake away from the roadway, and to show the following on the side facing the roadway:

- amount of the cut or fill to the shoulder subgrade or datum used in computing distances;
- distances from the stake to the centerline; and
- rate of the slope, such as 2:1.

At locations where it does not appear possible to preserve slope stakes or when desired by the Resident Construction Engineer, the stakes should be referenced back by placing a hub and stake a safe distance from the slope stake, usually 5 or 10 feet. It is preferred that the reference stakes be placed at a uniform distance behind the slope stakes so as to facilitate locating the reference stake and the re-establishing of the slope stakes. Indicate on the side of the stake away from the roadway, all of the information that is normally shown on the roadway face of the slope stake and on the roadway face of the reference stake, including:

- the letter “R;”
- amount of cut or fill from the elevation of the reference hub to the slope stake elevation;
- distance from the reference stake to the slope stake; and
- station number.

The slope stake notes should be maintained in a neat and orderly fashion until completion of the fine grading so that reference will be readily available when necessary. After the slope stakes have been placed, it is helpful to let an office employee check the slope stake notes for errors in calculations. This should be performed before grading operations begin.

105.8.12 Finishing Stakes (Blue Tops)

Finish grade stakes are generally required on most projects involving earthwork. When the rough grading or placement of the material to be fine graded has been completed to within reasonable elevation, blue-top stakes should be set at intervals of 50 feet or less. Blue-tops are placed at the required locations, and driven so that the top of the hub is at the elevation of the subgrade or at the elevation of the layer of material being graded. They should be placed to within 0.01 foot of the required elevation.

It is very useful to the Contractor and will expedite the setting of finish stakes, if the Contractor is provided with a line of cut or fill stakes after the rough grading has been performed. Using these stakes, the Contractor can fine grade the roadbed making the blue-top stakes to be within close conformity to the graded roadbed.

105.8.13 Material Pits

Material pits which must be cross-sectioned for pay quantities are usually cross-sectioned from an established base line. Both ends of the base line should extend well beyond any possible area of the Contractor's operations or disturbance. Alignment notes should be made during the staking of the pit with the bearings of the base line being recorded. Points should be referenced at each end of the base line with the referencing noted in the alignment notes.

The normal cross-section interval should not exceed 50 feet with closer intervals being used if necessary to show the earthwork volume correctly. Sections must be taken on a true perpendicular to the base line. The transit is normally used to establish the perpendicular lines. Reference is made to applicable portions of Section 105.8.8 for additional instructions.

If practical, bench mark levels should be run from the road to the material pit. Should this not be practical, an assumed elevation will be satisfactory. Assumed elevations should be so identified. Two or more bench marks should be placed at the pit site well out of the way of construction. The benches should be referenced to the base line with a full description of the location written into the cross-section notes.

105.8.14 Staking Pipe Culverts

The centerline of the pipe should be indicated by driving hubs on the centerline of the culvert at some convenient distance from the ends of the culvert far enough out so as not to be disturbed. The guard stake for the hub should show the following:

- size, length, and type and class of pipe;
- amount of cut or fill from the top of the hub to the flow line at the end of the pipe; and
- horizontal distance from the hub to the end of the pipe.

In addition to the above hubs and stakes, additional stakes should be furnished the Contractor where the pipe is of any appreciable length. The stakes should be offset from the centerline of the pipe and should show the amount of cut or fill to the flow line and the offset distance from the hub to the pipe centerline. When staking out for concrete pipe, the lengths should be staked in multiples of 4 feet.

At the time of staking the pipe, inlet and outlet ditches should be adequately staked to ensure proper drainage. Accurate excavation notes are to be kept on inlet and outlet channels so as to provide adequate data for determination of pay quantities. The excavation notes are to be transmitted to the Central Office with the As-Built Plans. The decision of the exact location and the elevation at which to place a pipe is in most cases a field decision. In a large drainage layout, the elevations and locations of control drainage structures should be determined prior to pipe staking in order that all areas will be drained properly.

105.8.15 Field Layout of Bridge Structures

105.8.15.1 Importance

The staking out of bridges should be a thorough operation so as to completely eliminate the possibility of mistakes due to layout. The layout should be completely checked, preferably by different personnel, so that the various parts of the bridge substructures will be built in the exact positions shown as indicated on the Contract Plans and also that the various parts of the bridge fabricated away from the bridge site will fit exactly and not require expensive alterations in the partially built bridge. If any alterations, such as removing and recasting concrete or shortening or lengthening of beams, are caused by inaccurate layout or level work done by Department personnel, the costs of making the alterations will have to be borne by the Department.

105.8.15.2 Accuracy

Neat and legible layout notes are to be kept of each bridge staked. Steel tapes only should be used. The tape should show no evidence of being spliced or repaired unless the length of the repaired tape is checked with a tape in good condition. The transit and level, if used, should also be in good operating condition and should have been checked recently as to its adjustment. Hub stakes should be at least 12 inches long, and longer if the ground is soft, so as to avoid likelihood of the tack point moving off position during construction. All measurements should be made with the tape level or corrections made if measurement is on a slope or an appreciable sag occurs in the tape. The pull on the tape should be uniform for each measurement, usually 15 pounds where long measurements are made. Horizontal measurements between tacks should be made with the aid of plumb bobs.

105.8.15.3 Procedure

The Contract Plans should be thoroughly studied. Distances between the piers or bents should be verified as being in agreement with the Contract Plans. The various distances between piers or bents should be added to see if the total agrees with the overall distance between the two ends of the bridge. In spite of careful checking, an occasional mistake will be found in the Contract Plans.

The road and bridge centerline should be obtained and points established near the bridge so that they may be used as control points. If the bridge is to span another highway or a railroad track, similar procedures should be followed on the highway or railroad. The intersection of the two lines should be established. Once established, the angle between the two intersecting lines should be measured. Should this angle vary more than a few minutes from the Contract Plans, the Bridge Construction Engineer should be contacted for technical advice.

When a bridge is to span a road or railroad, the intersection of the two lines, established as outlined previously, should be used as the control point for laying out the bridge. With the transit set up on the bridge centerline, the distances in each direction from the intersecting point along the centerline of the bridge to each of the centerlines of the two piers or bents nearest the intersection tack should be measured and a hub and tack placed. In like manner, the centerlines of the remaining piers or bents should be established by measuring from the

intersecting point to the pier or bent where feasible. In measuring the horizontal distance at the end fill slope, drive hub stakes at suitable intervals up the slope on the bridge centerline and place a tack in each such stake. Measure horizontally the distance between tacked points using plumb bobs. Add up the distances thus obtained. A check on the above procedure may be obtained by first running levels on the stakes to determine the difference in elevation between the first and last stakes using a constant slope. The square of the horizontal distance is the square of the measurement on the slope less the square of the difference in elevation between the two stakes.

After setting the hubs and tack points on the centerline of the piers or bents, the transit should be set up on each point and the angle to the centerline of the pier turned. This angle will be 90° if the bridge is not skewed. If the bridge is skewed, the complement to the skew angle (i.e., the angle which added to the skew angle totals 90°) will generally be shown on the Contract Plans. The skew of a bridge or culvert is the angle the centerline of the pier or culvert is rotated from the usual right angle of a square structure. After the transit is turned to the angle on which the pier or bent centerline should lie, two offset hub stakes should be set on this centerline and well beyond the construction area of the pier or bent and tacks driven in them. Two similar offset hubs and tacks should also be placed on the centerline extension on the opposite side of the structure. These offset hubs should be set far enough away from the pier that they will not be disturbed by the construction. The inside offset hubs should also be set a measured distance from the bridge centerline tack a constant distance, if practical, so that the bridge centerline tack can be re-established by measuring the distances back to the centerline tack and obtaining alignment with a stringline between the inside offset hubs.

If conditions will not permit the offset hubs on one side of the bridge, four of such hubs on the other side should be set. Whenever the bent centerline is desired, it may be accurately re-established by setting the transit over one of the outside offset hubs and sighting on the tacks in the three remaining offset hubs. A good alignment of the three remaining hub tacks will check the correct pier or bent centerline.

The use of total station will allow a stakeout of the bridge based on station numbers for each bent or pier, as shown on the Contract Plans. Once the control points have been established (e.g., PC, PT, POT), these control points can be used for layout and spot-checking any and all layout dimensions.

Triangulation is not covered in this manual; however due to obstructions to line of site or to chaining, triangulation may be necessary. Should any assistance be necessary, the Bridge Construction Engineer should be contacted.

105.8.15.4 Checking the Layout

The following information is useful to check angles turned with a transit. The well known ratio of sides of a right triangle of 3:4:5 or multiples of 3:4:5 may be employed to check a 90° angle. If, say, 30 feet is measured on one leg of a triangle and 40 feet is measured on the other leg, then the hypotenuse, or distance between the two ends of the legs, should be 50 feet. Of course, these distances could be 18, 24 and 30 feet or 60, 80 and 100 feet, which distances are all multiples of the base triangle with sides of 3, 4 and 5.

To check an angle of less than 90° between the centerline of bridge and the centerline of pier which has been established with a transit, measure along each centerline the same distance, say 60 feet. The measured distance between the ends of the 60-foot distances should be twice 60 times the sine of half of the angle. To illustrate; if the skew angle is 20°, the angle between centerline of bridge and pier is 70°. If 60 feet is measured along the centerline of bridge and also the centerline of bent, the distance between the ends of the 60-foot distances should be twice 60 times the sine of 35° or (2) x (60) x (0.57358) = 68.83 feet.

Another advantage of a constant distance from the intersection of centerline of bridge and centerline of bent to the inside offset hub tack is that the overall distance between the ends of a short bridge or between several consecutive piers of a long bridge can be measured between the inside offset hub tacks. If the overall distance thus measured is the same as the staked-out distance along centerline of bridge, the staked-out distance and angles turned will be checked.

Bench marks should be established at suitable intervals at the bridge site. Levels between the nearest two or three bench marks shown on the Contract Plans should be run to see if the differences in elevation between the plan bench marks can be checked. If not, the levels should be extended to additional bench marks to find out which plan bench mark elevation is in error. In running levels, the level setups should always be chosen that result in practically the same distance from foresight to instrument as from backsight to instrument. This will give more accuracy to the work since most of the maladjustment in the instrument will be canceled out if equal distances are used as stated above. Care shall also be taken in not setting a bench mark on a location subject to settlement, such as a newly set telephone or power pole or on a new embankment. If a nail is used to set a bench mark, it should be large enough and driven deep enough that it will not change in elevation due to bending.

105.8.16 Miscellaneous Staking

Sufficient stakes should be provided for adequate control of all incidental construction. This is to include both line and grade stakes, where necessary. Stakes should be placed in such positions as not to be destroyed by the Contractor's operation.

105.9 AUTHORITY AND DUTIES OF THE ENGINEER'S REPRESENTATIVE

The Resident Construction Engineer is the SCDOT representative in charge of the project and will communicate all final decisions to the Contractor Superintendent, as governed under the provisions of Section 105.09 of the *Standard Specifications*. Seek guidance, as needed, from the appropriate District personnel.

105.10 INSPECTION OF THE WORK

Under the provisions of Section 105.10 of the *Standard Specifications*, the inspection of all work and materials is the responsibility of SCDOT Inspectors, as assigned by the Resident Construction Engineer for the project. Seek guidance from the Resident Construction Engineer in questionable situations.

105.11 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK

Under the provisions of Section 105.11 of the *Standard Specifications*, the Resident Construction Engineer and SCDOT Inspectors are responsible for ensuring that any unacceptable work or materials is removed and replaced to meet the requirements of the Contract Plans and Specifications.

105.12 LOAD RESTRICTION

During the project, monitor the Contractor's operations to ensure that the weight of haul trucks and equipment on SCDOT roads and bridges do not exceed legal limits and, as needed, enforce the provisions of Section 105.12 of the *Standard Specifications*.

105.13 FAILURE TO MAINTAIN ROADWAY OR STRUCTURE

When the Contractor fails to maintain a roadway or structure as provided for in the Contract, enforce the provisions of Section 105.13 of the *Standard Specifications*.

105.14 TERMINATION OF CONTRACT

Section 105.14 of the *Standard Specifications* provides for the termination of the Contract.

105.15 ACCEPTANCE AND FINAL INSPECTION

Section 105.15 of the *Standard Specifications* governs the provisions of final inspection and acceptance of all pay items in the Contract. See Section 110 for additional information.

105.16 CLAIMS FOR ADJUSTMENT AND DISPUTES

105.16.1 Architect-Engineer (A-E) Liability Claims

Upon discovery of an apparent design deficiency that may increase the Contract cost, the Resident Construction Engineer will immediately notify the District Engineering Administrator of the details of the problem. The District Engineering Administrator will then contact the Director of Preconstruction for disposition.

105.16.2 Contractor Claims Policy and Procedure

A claim is a request from the Prime Contractor for additional time or money, but does not include a situation where the additional work is initiated by SCDOT and/or the price or additional time requested is agreed upon between SCDOT and the Prime Contractor. Check the Special Provisions of the Contract to determine if the governing claims procedures use the standing Dispute Review Board or the Ad Hoc Dispute Review Board. Follow the procedures in the

Contract Specifications to process a Notice of Claim when received by the Contractor. The Contractor must furnish written notice prior to beginning additional work. The Contractor must also provide written notice when requesting additional time or money. Use SCDOT Form 100.04 – Contractor Notice of Claim for the written notice.

105.16.3 Change Orders

If a Claim has been resolved, as discussed in Section 105.16 of the *Standard Specifications*, the Resident Construction Engineer will be responsible for initiating and processing a Change Order in SiteManager as discussed in Section 101.6.3.

105.17 GENERAL DESIGN FEATURES

Section 105.17 of the *Standard Specifications* provides for the general design features of the project.

Section 106
Control of Material

106.1 SOURCE OF SUPPLY AND QUALITY OF MATERIALS

Many materials typically used on SCDOT construction projects must be supplied from SCDOT-approved sources. The Approval Policies and Approval Sheets corresponding to SCDOT-approved material sources are maintained by the Research and Materials Engineer on the SCDOT Internet Web Site. Approval Sheets are frequently updated, so ensure that the most current set is being used. The SCDOT Inspector will be responsible for ensuring that such materials come from a supplier listed on the appropriate Approval Sheet. The Research and Materials Engineer also is responsible for the sampling, testing and approval of structural members and similar items produced off the project site. The SCDOT Inspector will be responsible for ensuring that such materials have been approved by the Research and Materials Engineer for use on the project and that the materials are shipped to the job site in an acceptable condition. All other materials incorporated in the work must be sampled and tested in accordance with established SCDOT policy and procedures and comply with the requirements of the Contract.

106.2 LOCAL MATERIAL SOURCES

Section 106.02 of the *Standard Specifications* governs the contractual provisions of the use of local material sources.

106.3 SAMPLES AND TESTS

106.3.1 General

Accurate and representative sampling of the work and materials cannot be overemphasized. An improperly taken sample may not be truly representative and, if testing is performed on a non-representative sample, the test results will be meaningless with respect to assessing quality and adherence to specified requirements. Section 106.03 of the *Standard Specifications* governs the contractual provisions with respect to the samples and tests used for control of materials. Section 106.3 of this *Manual* presents the SCDOT policy and procedures for field sampling and testing most materials used in highway and bridge construction. Inspection guidance for materials used in pay items is presented in the sections of this *Manual* that correspond to the *Standard Specifications* (e.g., Section 703 for reinforcing steel). The Resident Construction Engineer and SCDOT Inspectors must become familiar with this information and the SCDOT Sampling and Testing Procedures presented in Appendix C. Contact the Research and Materials Laboratory for any needed assistance.

106.3.2 Personnel Certification

SCDOT and Contractor personnel must be certified in their area of responsibility. The following certifications apply to SCDOT work:

- Nuclear Gauge Safety Certification,
- Earthwork and Nuclear Gauge Technician Program,
- Foundations Certification,
- Asphalt HMA Technician Certifications,
- Portland Cement Concrete Certification,
- Coarse Aggregate Technician Certifications, and
- Field Welder Certification.

With the exception of the Nuclear Gauge Safety Certification and the Field Welder Certification, these are five-year certifications. The Nuclear Gauge Safety Certification is a three-year certification due to Federal regulations. The Field Welder Certification is a two-year certification. It is the responsibility of the Resident Construction Engineer to ensure that each Inspector on the project is properly certified for the type of sampling and testing being performed. Refer to the Technician Certification policy on the SCDOT Internet Web Site for additional information.

106.3.3 Sample Identification Cards

Each sample obtained in the field must be properly identified and shipped using Sample Identification Cards. See Appendix B for completion instructions and examples of completed Sample Identification Cards.

106.3.4 Priority Testing of Samples

When test results are needed quickly to continue a construction activity, indicate RUSH in large print on the Sample Identification Card. If test results are needed by the Resident Engineer immediately upon completion of testing, indicate on the Sample Identification Card the contact phone number or email address. The Research and Materials Laboratory will process samples as they are received. Samples identified as RUSH will be given priority and delivered to the appropriate unit immediately after assignment of a Laboratory Identification Number. Samples received after 1:00 PM on Friday, with the exception of Portland cement concrete test specimens, will be processed the following business day. Exceptions will be accommodated on a case-by-case basis.

106.3.5 Shipping of Samples

Samples must be shipped to SCDOT laboratories using the quickest and most readily available means. Under normal circumstances, samples should remain in the possession of SCDOT personnel until delivered to the appropriate laboratory. If circumstances require that Contractor or other non-SCDOT personnel deliver the samples, the samples must be secured using an approved tamper-proof seal. Samples delivered by non-SCDOT personnel without this seal will not be accepted. Samples that are tested in the field, such as asphalt cores for density

determination, will also be secured with a tamper-proof seal if they are to be delivered to a field laboratory by non-SCDOT personnel. Approved tamper-proof seals and instructions for their use are available from the Quality Assurance Section of the Research and Materials Laboratory.

106.3.6 Reporting of Test Results

Test results for samples submitted to the Research and Materials Laboratory will be posted electronically on the SCDOT Intranet Web Site via MatLab. The Research and Materials Laboratory will maintain hard copies of material Test Reports. The test results will be promptly posted to MatLab upon completion of testing. It is the responsibility of the Resident Engineer to obtain copies of Test Reports from MatLab, because hard copies will not be distributed. If a failing sample Test Report is posted to MatLab, a computer-generated email will be sent to the District Construction Engineer and the Resident Construction Engineer with notification of the failing Test Report as shown in Figure 106A. In certain instances, pre-approved materials and previously tested batches of material will be reported without being tested and referenced as such on the Test Report.

A report with a lab number of M45180 has been uploaded with a result of Fail.

Go to http://iwww.dot.state.sc.us/matlab/filegrab.asp?result=M45180.pdf to view the report.

FAILING TEST REPORT EMAIL NOTIFICATION EXAMPLE
Figure 106A

106.3.7 Check Samples

In general, when a sample fails to meet specified requirements, a minimum of two check samples representing the material originally sampled must be obtained and submitted. Additional check samples will be taken as deemed necessary by the Resident Construction Engineer. Use engineering judgment. Complete and submit SCDOT Form 100.09 – Report of Disposition of Material Failing to Meet Specifications. Sample Identification Cards must show the Test Report number of the original report and be marked Check Sample. Consider the following:

1. PG Binder/Liquid Asphalts. Only one check sample is required for failing samples of PG binder and liquid asphalts.

2. Subbase/Base Materials. In securing check samples of subbase, base or similar materials, obtain one check sample approximately 50 feet behind the original point of sampling and another approximately 50 feet ahead.

3. Reinforcing Steel. Check samples of reinforcing steel are to be obtained from different bars of the same size, heat number and manufacturer, with neither check sample being taken from the original bar.

106.3.8 Quality Control Samples and Tests

Quality Control Samples and Tests are used to ascertain on a day-to-day basis whether the quality of the material being incorporated or proposed for incorporation in the work and the quality of the work performed are in compliance with the requirements of the Contract Specifications. They constitute the principal means of determining, prior to or at the time of performing the construction operation, whether the materials and workmanship are satisfactory or whether corrective action must be taken before proceeding with the work. They also serve as the principal basis for determining acceptability of the completed work. Quality Control Sampling and Testing must be performed in accordance with the schedule presented in Figure 106B and in accordance with the inspection guidelines presented in the corresponding sections of this *Manual*. Except as otherwise noted, a minimum of one sample of each material must be taken from each Contract. The initial sample should be taken prior to use, where practical. After the initial sample, the minimum frequency requirements presented in Figure 106B govern for the duration of the project. The frequency requirements are minimum criteria. Additional sampling and testing should be performed as needed to properly control the work. Samples that are not tested by the Resident Construction Engineer will be submitted to the Research and Materials Laboratory. Occasionally, there will be materials or items of work in the Contract for which sampling and testing instructions have not been issued. In such cases, the Resident Construction Engineer should contact the Research and Materials Laboratory for sampling and testing guidance.

106.3.9 Acceptance of Small Quantities

Required minimum Quality Control Sampling and Testing of certain materials may be waived by the Resident Construction Engineer when total project quantities are small and the material is supplied from a recognized source. The materials may be accepted on the basis of one of the following methods:

- acceptance on the basis of visual examination to verify that the general condition and quality of the material appears to be acceptable; or

- acceptance on the basis of a manufacturer's certification to verify that the material furnished conforms to the specified requirements for the material.

The acceptance of materials under either of the above methods will be documented by the Resident Construction Engineer on SCDOT Form 100.25 – Report of Acceptance of Small Quantity Materials. The types and maximum small quantities of materials per Contract that may be accepted by the Resident Construction Engineer are shown in Figure 106C.

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Admixtures, Concrete	—	—	Approval Sheet 5 and/or Approval Sheet 53	See Section 501 and Section 701.
Aggregates, Coarse Non-HMA	See SC-T-1, SC-T-3, and SC-T-4.	Each 500 tons.	Gradation and Approval Sheet 2	Submit one sample of each type, each Contract. See Section 501, Section 701, and Section 802.
Aggregates, Fine Non-HMA	10 pounds See SC-T-2, SC-T-3, and SC-T-4.	Each 500 tons.	Gradation and Approval Sheet 1	Submit one sample of each type, each Contract. See Section 501, Section 701, and Section 802.
Aggregates, Coarse HMA	—	—	Approval Sheet 2	See Section 401 and current HMA specifications.
Aggregates, Fine HMA	—	—	Approval Sheet 1	See Section 401 and current HMA specifications.
Asphalt, Liquid PG binder	1 quart	Each 10,000 tons of mix produced.	Approval Sheet 37	See Section 401.
Blocks, Concrete	5 blocks	Each source.	—	—
Bolts, High Strength	3 assemblies of bolt, nut and washer.	Each possible combination of bolt lot, nut lot and washer lot.	—	See Section 709.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Brick	10 bricks each source.	Each 50,000 bricks.	—	—
Cable Strand	One (1) 40 inch and One (1) 12 inch	Each 5 reels per heat number.	—	Sample at prestress yard.
Castings, Catch Basins Drop Inlets	—	—	Dimension	Inspect all castings for workmanship. See Section 719. Manufacturer's Certification Required.
Cement Stabilized Earth Base	—	Each 1000 feet per 2 lanes.	Compaction	—
	—	Each 250 feet per 2 lanes.	Depth	—
Cement, Fly Ash	1 gallon	Each 50 tons	—	See Section 501 and Section 701. Mill Test Report Required.
Cement, Portland & Slag	1 gallon	Each 100 tons. On large paving and modified base projects, rate determined by the Research and Materials Engineer	—	See Section 701. Mill Test Report Required.
Cement, Masonry	—	—	—	Verify Type in Field. See Section 718.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Concrete, Structural, Prestressed, Lean & Other	—	As needed to control consistency.	Slump	Test when consistency is questionable and when cylinders are made.
	—	As needed to control % entrained air.	Air Content	Test when air content is questionable and when cylinders are made.
Concrete, Structural	Three (3) 6-inch cylinders.	See Section 701.	Make specimens for compressive strength.	AASHTO T-23 (ASTM C 31)
Concrete, Prestressed	Six (6) 4-inch cylinders.	See Section 704.	Make specimens for compressive strength.	AASHTO T-23 (ASTM C 31)
Concrete, Lean	Four (4) 6-inch cylinders.	One (1) set each one-half day's production.	Make specimens for compressive strength.	Contact Laboratory.
Concrete Pavement	—	Four (4) each day's run and each time test specimens are made.	Slump	AASHTO T-19 (ASTM C143)
	—	Four (4) each day's run and each time test specimens are made.	Air content	AASHTO T-196 (ASTM C 231) or (ASTM C 173)
	Four (4) flexural beams	One (1) set each 1500 cubic yards, or part thereof. Minimum one (1) set per day.	Make specimens for flexural strength.	See SC-T-46.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Coquina Shell Base	25 pounds	Each 1000 feet per 2 lanes, each layer	—	Submit to Laboratory. See Section 304.
	—	Each 250 feet per depth 2 lanes.	Depth	—
	—	Each 1000 feet per 2 lanes, each layer	Compaction	See Section 304.
Curing Compound, Spray-On/ Brush-On Concrete Coatings	—	No samples required.	Approval Sheet 7 or Approval Sheet 33	Not necessary to sample pre-approved material. See Section 702. Manufacturer's Certification Required.
Embankments	—	Each 2000 cubic yards, minimum 1 per lift.	Compaction	See Section 205.
Embankment Material	—	One (1) each day of work from each source used.	—	See Section 205.
Emulsions	0.5 gallon	Each 2500 gallon.	Approval Sheet 38	See Section 401. Manufacturer's Certification Required.
Fence, Barbed Wire	One (1) 3-foot length.	Each 16,000 feet, each source.	—	—
Fence, Chain Link	One (1) 2-foot length.	Each 50 rolls, each source	—	—
Fence, Woven Wire	One (1) 4-foot length.	Each 50 rolls, each source.	—	—

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Fence, Hardware	Three (3) each type.	Each 50 rolls, each source.	—	—
Fertilizer	—	—	—	See Section 810.
Guardrail, Beams, Steel Posts & Hardware	See Section 805.	See Section 805.	Visual defects and Approval Sheet 29.	See Section 805. Manufacturer's Certification Required.
Guardrail, Wood Posts & Blocks	—	—	Visual defects.	Must bear Inspection Agency's hammer mark. See Section 805.
Guardrail, Composite Blocks	—	—	Visual defects and Approval Sheet 49.	See Section 805.
Guardrail, Cable Barrier	—	—	Visual defects.	See Section 805. Manufacturer's Certification Required for Cable.
Handrailing, Steel Pipe	—	—	—	See Section 709. Manufacturer's Certification Required.
Handrailing, Aluminum	—	—	—	See Section 709. Manufacturer's Certification Required.
HMA Mixes	See SC-T-62.	See current HMA specifications.	See current HMA specifications.	See Section 401 and current HMA specifications.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
HMA Mixes Sand-asphalt (roadmix)	See SC-T-62.	Each 750 feet per 2 lanes.	Asphalt Content and Stability	Submit each fifth sample. See Section 309.
	—	Each 250 feet Per 2 lanes.	Depth	See Section 309.
Joint Material, Structural and Pavement	See Section 702.	See Section 702.	—	See Section 702.
Lime, Agricultural and Hydrated	—	—	Approval Sheet 39 for hydrated lime.	See Section 401 and Section 810.
Graded Aggregate Base	SC-T-1	Each 1000 feet per 2 lanes, each layer	—	See Section 305.
	—	Each 250 feet per 2 lanes	Depth	—
	—	Each 1000 feet Per 2 lanes, each layer	Compaction	See Section 305.
Mineral Filler, HMA	1 quart	Each source Per project.	—	See Section 401.
Paint, Structural Steel	—	—	—	See Section 710. Manufacturer's Certification Required.
Piles, Steel	—	—	Visual Flaws	Mill Test Report required. See Section 711.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Piles, Treated Timber	—	—	Visual Flaws	Must bear Inspection Agency's hammer mark. See Section 711.
Piles, Prestressed	—	—	Visual Flaws and SCDOT Stamp	See Section 711.
Pipe Culverts, Concrete	—	—	Visual Flaws	Must be pre-tested and stenciled. See Section 714.
Pipe Culverts, Corrugated Metal	—	—	Visual Flaws	Mill Test Report required. See Section 714.
Pipe Culverts, Corrugated Aluminum	—	—	Visual Flaws	Mill Test Report required. See Section 714.
Pipe Culverts, High Density Polyethylene Pipe	If ID ≤ 10 inches One (1) 3-foot piece. If ID > 10 inches One (1) 1-foot piece.	Each size, each shipment.	Visual Flaws and Manufacturer's Stamp	Manufacturer's Certification required. See Section 714.
Rip Rap	—	—	Visual Check for Size and Quality	Contact the R&M Engineer, as needed, for assistance. See Section 804.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Sand Clay Base, Roadway	10 pounds	Each 1000 feet per 2 lanes, each layer.	—	See Section 303.
	—	Each 250 feet per 2 lanes.	Depth	—
	—	Each 1000 feet per 2 lanes, each layer.	Compaction	When minimum percent compaction is specified. See Section 303.
Seed	—	See Section 810.	—	See Section 810.
Steel, Structural	—	—	Visual Defects and Inspection Agency Marks	Mill Test Report required for components not pre-approved. See Section 709 and Section 711.
Steel, Reinforcing	40 inches (30 inches Charleston Lab.)	Each size, each shipment.	—	See Section 703.
Subbase, Cement-Modified	As required.	Once daily.	% Passing 2 inch and #4 sieves.	Contact Laboratory.
	Two (2) 4-inch diameter cores	Once daily.	—	Contact Laboratory.
	—	Each 1000 feet per 2 lanes, each layer.	Compaction	—
	—	Each 500 feet per 2 lanes.	Depth	—

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Subgrade, Untreated	—	Each 1000 feet per 2 lanes.	Compaction	See Section 208.
	10 pounds	Each 1000 feet per 2 lanes.	—	See Section 208.
Timber, Treated	—	—	Visual Defects	Must be pre-tested and bear Inspection Agency's hammer mark.
Timber, Untreated	—	—	Visual Flaws, Knots, etc.	Not pre-tested Or pre-approved.
Traffic Marking, Paint Waterborne or Solventborne	—	Paint is pre-tested by Research and Materials Laboratory.	Check batch numbers at job site and match certification documents.	Manufacturer Certification must include SCDOT laboratory test number indicating pre-testing. See Section 601 and Section 604.
Traffic Marking, Thermoplastic or Epoxy	—	No field samples required.	Check batch numbers at job site and match certification documents.	Accepted based on Manufacturer Certification. See Section 601 and Section 604.
Traffic Marking, Pavement Markers	20 markers per lot. Randomly selected.	See Section 601 and Section 605.	—	See Section 601 and Section 605 Manufacturer's Certification Required.
Traffic Marking, Reflective Beads Spray-on/ Drop-on	One (1) 50 or 55-pound bag when bagged. No sample in bulk pack.	One bag per each batch (44,000 pounds)	—	See Section 601.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Underdrains & Sectional Drains, Corrugated Polyethylene	If ID ≤ 10 inches One (1) 3-foot piece. If ID > 10 inches One (1) 1-foot piece	Each size, each shipment.	—	See Section 802. Manufacturer's Certification Required.
Underdrains & Sectional Drains, Concrete Perforated.	2 joints	Each source.	—	See Section 802.
Underdrains & Sectional Drains, Corrugated Metal Perforated	—	—	—	Mill Test Report required. See Section 802.
Underdrains & Sectional Drains, Asphalt Fiber	One (1) 2-foot length and One(1) 1-foot length.	Each size, each shipment.	—	See Section 802. Manufacturer's Certification Required.
Underdrains & Sectional Drains, Corrugated Aluminum	—	—	—	Mill Test Report required. See Section 802.
Underdrains & Sectional Drains, Class PS 46 PVC	One (1) 3-foot piece.	Each size, each shipment.	—	See Section 802.
Water	1 gallon	Each source.	—	See Section 701.
Waterproofing, Asphalt or Tar	—	—	—	See Section 702.
Waterproofing, Fabric	—	—	—	See Section 702.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL OR PRODUCT	MINIMUM SIZE OF EACH SAMPLE	MINIMUM FREQUENCY OF SAMPLING	RESIDENT CONSTRUCTION ENGINEER TO TEST FOR	REMARKS
Wire, Reinforcement	One (1) 40-inch length.	Each size, each shipment.	—	See Section 703.
Wire Mesh Reinforcement	One (1) 24 inch x 24 inch sample.	Each size, each shipment.	—	See Section 703.

QUALITY CONTROL SAMPLING AND TESTING
Figure 106B
(continued)

MATERIAL	MAXIMUM SMALL QUANTITY
Aggregates Other than in critical Portland Cement Concrete work or asphalt mixes.	500 tons each type
Portland Cement Concrete Including component materials for use in structural non-critical items such as sidewalks, curb and gutter, catch basins, signs, fence posts and guardrail anchoring.	50 cubic yards (See Section 701.3.2)
Fence Including barbed wire, woven wire, chain link fabric and hardware.	500 linear feet
Underdrains and Sectional Drain Pipe Concrete or clay only.	100 linear feet
PG Binder	2500 tons of HMA produced
Emulsions and Cut Back Asphalts	5000 gallons

MAXIMUM SMALL QUANTITIES FOR MATERIALS
Figure 106C

106.3.10 Maintaining Records of Sampling and Testing

At the beginning of each Contract, the Resident Construction Engineer should prepare a list of the number of tests that are required for each item of work or material, whichever is applicable. A similar list will be furnished to the Resident Construction Engineer by the Research and Materials Laboratory, but the Resident Construction Engineer should check this list for correctness. The Resident Construction Engineer should also maintain for each Contract a file of the test results obtained by SCDOT personnel with the test results for each material being filed together, as practical. Also, a record is to be maintained of samples that are sent to the Laboratory for testing. The record should show the date the sample is submitted to the Laboratory, the date the test results were received from the Laboratory, whether the sample failed or passed and any other information desired by the Resident Construction Engineer. Use SCDOT Form 100.11 – Materials Sampling and Testing Log to record this information. Materials that require manufacturer certification will be recorded on SCDOT Form 100.10 – Materials Certification Log. A copy of all certifications should be retained by the Resident Construction Engineer and a copy should be forwarded to the Research and Materials Engineer.

106.3.11 Independent Assurance (IA) Sampling and Testing

106.3.11.1 Purpose and Application

The Department's Independent Assurance (IA) Program serves as an independent evaluation of the sampling and testing procedures used for materials acceptance. IA test results are not used as a basis for material acceptance. The IA Program applies to all Federal-aid projects and may also be applied to any State-funded project selected by the Research and Materials Engineer. This Program requires a high degree of cooperation and coordination between the Resident Construction Engineer and Laboratory personnel.

106.3.11.2 Sampling Responsibilities

IA sampling will be performed by certified personnel from either the Research and Materials Laboratory or District Laboratory, or by certified project personnel in the presence of certified Laboratory personnel. All IA samples, except concrete cylinders and beams, must remain in the custody of the Laboratory personnel until testing can be performed. The Resident Construction Engineer will be responsible for notifying the Quality Assurance Manager of the Research and Materials Laboratory or the District Testing Engineer when IA samples and measurements are needed. Notification may be given by telephone, radio or e-mail.

Certified Laboratory personnel will perform IA testing. An IA test will not be performed with the same equipment used for the Quality Control test. Personnel may not perform both Quality Control and IA tests on the same material for any project.

106.3.11.3 Maintenance of Records

For each applicable Contract, the Resident Construction Engineer will maintain an IA Sampling and Testing File containing reports, measurements and other relevant information. The IA Sampling and Testing File must contain separate folders of chronologically ordered Test Reports of each material sampled.

106.3.11.4 Progress IA Samples and Tests

Progress IA Samples are samples taken at approximately the same location and time in the construction process as Quality Control Samples. This usually occurs when the materials are delivered and before they are incorporated in the work while construction work is in progress.

Progress IA Samples are taken and tested to provide an independent check on the reliability of the results obtained in Quality Control Sampling and Testing. It is therefore essential that the numerical results obtained from testing Progress IA Samples be promptly compared with those obtained from testing Quality Control Samples of the material. Comparisons will be made in accordance with the criteria presented in Figure 106D.

When the results from Quality Control Sampling and Testing are compared to the results from IA Sampling and Testing, the comparison will be made by either the Research and Materials Laboratory, District Laboratory or SCDOT project personnel. SCDOT prefers that the comparison be made by Research and Materials Laboratory or District Laboratory personnel associated with the IA Sampling and Testing Program. When the comparison is made by the Research and Materials Laboratory or District Laboratory, the Test Reports and comments regarding the results of the comparison will be promptly forwarded to the Resident Construction Engineer.

Do not use the results of testing Progress IA Samples for the basis of assessing acceptability, which is the purpose of Quality Control Sampling and Testing.

106.3.11.5 Final Samples and Tests

Final IA Samples are samples taken at random from completed construction work or completed portions thereof under the same requirements and procedures as for Progress IA Samples.

106.3.11.6 Comparing Quality Control with IA Test Results

Figure 106D presents the allowable deviation when comparing the results of Quality Control Sampling and Testing with the results of IA Sampling and Testing. If the results for a particular comparison vary in excess of the criteria presented in Figure 106D, additional samples will be taken to determine if the variation was caused by the sampling procedure, the testing method or faulty equipment. Corrective action needed to resolve the problem will be documented.

INDEPENDENT ASSURANCE SAMPLE	ALLOWABLE DEVIATION FROM QUALITY CONTROL SAMPLE TEST RESULT
General	
All test results in general, percent of numerical value, except as provided for below.	±10%
Asphalt Mix	
Gradation:	
1″	±7%
¾″	±7%
½″	±7%
$^{3}/_{8}$″	±6%
No. 4	±6%
No. 8	±5%
No. 30	±4%
No. 100	±3%
No. 200	±2%
Asphalt Binder Content	±0.6%
Percent Compaction (All Items)	
All items	±2%
Sieve Analysis (All Items)	
No. 4 sieve and larger.	±7%
Smaller than No. 4 sieve.	±3%

DEVIATION GUIDE FOR COMPARING QUALITY CONTROL TEST RESULTS TO INDEPENDENT ASSURANCE SAMPLE TEST RESULTS
Figure 106D

106.3.11.7 Sampling and Testing Schedule

Figure 106E presents the schedule of IA Sampling and Testing that will be used for all Federal-aid projects and on State-funded projects, as deemed necessary by the Research and Materials Engineer. The requirements for IA Sampling and Testing will be determined by the Quality Assurance Section of the Research and Materials Laboratory based on the criteria presented in Figure 106E and reported to the Resident Construction Engineer on SCDOT Form LAB-R-2 – Independent Assurance Sampling and Measurement Requirements. Figure 106E will be used as a guide, and additional sampling, testing and dimensional checks will be made as deemed necessary to control work and materials. Note that the frequency schedule shown in Figure 106E is based on a 20 foot to 24 foot width of pavement. The actual number of samples to be taken will be based on the quantities presented in the schedule, as adjusted for the actual width of pavement. The following exceptions apply:

1. Portland Cement/Reinforcing Steel. IA Sampling and Testing of Portland cement and reinforcing steel will be performed annually by the Research and Materials Laboratory. Therefore, no further IA Sampling and Testing is required for the project.

2. Asphalt Plant Mixes/Component Aggregates. Asphalt plant mixes and component aggregate in quantities less than 1000 tons are not subject to the IA Sampling and Testing Program.

3. Emulsions/Cutback Asphalts. An IA Sample of emulsions and cutback asphalts will be taken for each 100,000 gallons. Quantities less than 100,000 gallons and fractions beyond a given multiple of 100,000 gallons are not subject to the IA Sampling and Testing Program.

4. PG Binder. An IA Sample of PG Binder will be taken for each 50,000 tons of HMA mix produced. Quantities less than 50,000 tons of HMA mix produced and fractions beyond a given multiple of 50,000 tons of mix produced are not subject to the IA Sampling and Testing Program.

5. Small Quantities. The requirements of the IA Sampling and Testing Program are waived for materials, other than those listed above, where the quantity of the material is considered small, as discussed in Section 106.3.9.

6. Final Width Measurements. Final width measurements under the IA Sampling and Testing Program will be waived for projects where the traffic will remain open during construction and the safety of the IA Inspector would be placed in jeopardy.

MATERIAL OR PRODUCT	TYPE OF SAMPLE	SAMPLE AND/OR FREQUENCY	TEST FOR
Aggregate Coarse Surface Treatment	Progress	One (1) Each 10,000 tons	Gradation
Aggregate Fine Surface Treatment	Progress	One (1) Each 10,000 tons	Gradation
Aggregate Fine Asphalt Mixes	Progress	One (1) Each 15,000 tons	Gradation
Aggregate Coarse PCC	Progress	One (1) Each 3500 tons	Gradation
Aggregate Fine PCC	Progress	One (1) Each 3000 tons	Gradation
Aggregate Coarse PCC Pavement	Progress	One (1) Each 3 miles	Gradation
Aggregate Fine PCC Pavement	Progress	One (1) Each 3 miles	Gradation
Aggregate Stabilization of Subbase or Subgrade	Progress	One (1) Each 10,000 tons	Gradation
Asphalt Plant Mixes (See Note 1)	Progress	One (1) Each 15,000 tons	Gradation, Asphalt Content and Stability Test. (where applicable)
Asphalt Plant Mixes (See Note 1)	Progress	One (1) Each 3 miles	Density (where applicable).
Asphalt Plant Mixes	Final	One (1) Each mile	Width and Thickness (when bid on SY basis).
Asphalt Liquid PG Binder	Progress	One (1) Each 50,000 tons of mix produced.	Applicable Specifications
Asphalt Liquid Emulsions and Cutbacks	Progress	One (1) Each 100,000 gals.	Applicable Specifications (except for emulsion). Other Tests (as deemed necessary).

SCHEDULE OF INDEPENDENT ASSURANCE SAMPLING AND TESTING
Figure 106E

MATERIAL OR PRODUCT	TYPE OF SAMPLE	SAMPLE AND/OR FREQUENCY	TEST FOR
Cement Modified Subbase	Progress	One (1) Each 3 miles	Compaction
Cement Modified Subbase (See Note 1) (See Note 7)	Progress	One (1) Each 3 miles	Width and Thickness
Cement, Portland	Progress	One (1) Each source per year.	Specified Material Requirements.
Cement Stabilized Earth Base Course	Progress	One (1) Each 3 miles	Compaction
Cement Stabilized Earth Base Course	Final	One (1) Each 3 miles	Width and Thickness.
Concrete PCC Pavement (See Note 1)	Progress	One (1) Set of Three (3) Beams Each 3 miles	Beam Strength, % Air and Slump.
Concrete PCC Pavement (See Note 2)	Final	One (1) Each mile	Width and Thickness.
Concrete Structures (See Note 1) (See Note 3)	Progress	One (1) Set of cylinders Each 1000 cubic yards Each Contract	Compressive Strength, % Air and Slump.
Coquina Shell Base	Progress	One (1) Each 2 miles	Gradation, Liquid Limit and Plasticity Index. (Density, where applicable)
Coquina Shell Base	Final	One (1) Each 2 miles	Width and Thickness.
Embankment	Progress	One (1) Each 3 miles	Compaction

SCHEDULE OF INDEPENDENT ASSURANCE SAMPLING AND TESTING
Figure 106E
(Continued)

MATERIAL OR PRODUCT	TYPE OF SAMPLE	SAMPLE AND/OR FREQUENCY	TEST FOR
Graded Aggregate Base	Progress	One (1) Each 3 miles	Gradation and Compaction (where applicable).
Graded Aggregate Base (See Note 5)	Final	One (1) Each 3 miles	Width and Thickness
Sand Clay Base (See Note 4)	Final	One (1) Each 2 miles	Gradation, Liquid Limit, Plasticity Index and Density (where applicable).
Sand Clay Base	Final	One (1) Each 2 miles	Width and Thickness.
Reinforcing Steel	Progress	One (1) Each source per year.	Weight, Yield Point, Elongation and Tensile Strength.
Shoulders (See Note 1)	Progress	One (1) Each 3 miles of roadbed.	Applicable Testing
Shoulders (See Note 6)	Final	One (1) Each 3 miles of roadbed.	Width and Thickness.
Subgrade	Final	One (1) Each 5 miles	Compaction
Surface Treatment	Progress	(See Note 1)	(See Note 1)
Surface Treatment	Final	One (1) Each mile	Width and Visual Inspection of Workmanship.

SCHEDULE OF INDEPENDENT ASSURANCE SAMPLING AND TESTING
Figure 106E
(Continued)

Notes:

1. *Each material entering into this processed mixture is to be sampled and tested in accordance with the schedule for each material.*

2. *In lieu of making the beams, the Laboratory representative may observe the beam making. The beams will be so marked that the identification will match that shown on the Sample Identification Cards. The percent air and slump will also be determined and the results shown on the Sample Identification Card. The station number where the concrete under testing is placed will be recorded.*

3. *In lieu of making the cylinders, the Laboratory representative may observe the making. The cylinders will be so marked that the identification will match that shown on the Sample Identification Cards. The percent air and slump shall also be determined and the results shown on the Sample Identification Card. The location and part of the structure where the concrete under testing is placed will be recorded.*

4. *Final Independent Assurance Samples will be taken from the compacted base before priming. Where the shoulder material and the base material are alike, no width measurement will be necessary; however, this fact must be noted and reported for Independent Assurance documentation purposes.*

5. *Progress Independent Assurance Samples should be taken after the material is thoroughly mixed but before compaction. Final Independent Assurance Samples and depth measurements must be taken after final shaping and rolling.*

6. *Where paved shoulders are constructed with processed materials such as graded aggregate base, soil-cement, etc., Progress Independent Assurance Samples will be taken from each 5 miles of completed shoulder pavement, alternating from left shoulder to right shoulder on two-lane highways, and from inside shoulder to outside shoulder on divided-lane highways.*

7. *Mix uniformity will be observed after mixing and shaping and prior to compaction. The Laboratory representative will observe the rate of cement application and will make a spot check of the project records to compare the amount of cement to that being reported. A statement of the findings both as to uniformity of mixing and cement used will be included in the report for Independent Assurance documentation purposes.*

SCHEDULE OF INDEPENDENT ASSURANCE SAMPLING AND TESTING
Figure 106E
(Continued)

106.3.12 Final Materials Certification

SCDOT requires the preparation of a Materials Certification for each State and Federal-aid construction project upon completion of the work. The purpose of the Materials Certification is to document that the materials incorporated into the construction work and the construction operations controlled by sampling and testing are in reasonably close conformity with the Contract Plans and Specifications, and such results compare favorably with the results of Independent Assurance Sampling and Testing, if performed. Any exceptions, failures or discrepancies will be documented and explained in the Certification. The following establishes uniform procedures for the timely preparation and submission of Materials Certifications for all State-funded and Federal-aid construction projects.

The Research and Materials Engineer will prepare SCDOT Form LAB-29 – Minimum Sample Requirements for each SC File Number project and furnish it to the Resident Construction Engineer shortly after the project is awarded. Form LAB-29 will show the minimum number of samples necessary during construction and other required materials documentation.

The Resident Construction Engineer will be responsible for obtaining and submitting all required Quality Control Samples and Tests (see Section 106.3.8), manufacturer's certifications and Mill Test Reports as required by SCDOT policy and the governing provisions of the Contract Plans and Specifications. The following procedures will be used to prepare, review and approve the final materials certification:

- Upon completion of the project, the Resident Engineer will forward to the Research and Materials Engineer, through the District Engineering Administrator, SCDOT Form 100.02 – Preliminary Letter of Certification indicating that all required samples and tests have been performed, listing all material failures, deletions and variations from Contract Specifications and noting the actions taken to correct failing materials by referencing the applicable SCDOT Form 100.09 – Report of Disposition of Material Failing to Meet Specifications.

- The Research and Materials Engineer will review the preliminary Letter of Certification and all project test results that are not in compliance with the Contract Specifications. Special attention will be placed on reviewing actions taken at the project level to correct materials found to be out of compliance. Further action may be warranted.

- The Research and Materials Engineer will review the comparison of results from Independent Assurance Samples and Tests and Quality Control Samples and Tests to certify that the results compared favorably. Any deviations falling outside the acceptable ranges presented in Figure 106D will be noted along with the corrective action taken.

- The Research and Materials Engineer will prepare a Letter of Certification based on the above analyses stating that all materials were found to be in reasonably close conformity with the Contract Plans and Specifications, except for variations as noted.

106.3.13 Central and District Laboratory Inspection Program

106.3.13.1 Central Laboratory

The Research and Materials Laboratory regularly participates in on-site inspections and proficiency sample testing through the AASHTO Materials Reference Laboratory (AMRL) and the Cement and Concrete Reference Laboratory (CCRL) accreditation programs, which are sponsored by AASHTO and ASTM, respectively. Laboratory test equipment, standard test procedures and SCDOT Technician proficiency are reviewed for materials including soil, liquid asphalt, HMA and aggregates through the AMRL program and cement, concrete and steel through the CCRL program. Discrepancies found during inspections or proficiency sample testing will be resolved through a review of test procedures used, equipment checks and re-testing of materials.

106.3.13.2 District Laboratory

The Department has three satellite laboratories – District 3 in Greenville, District 5 in Florence and District 6 in Charleston. Each laboratory participates in proficiency sample testing of soils and HMA through the AMRL program. Research and Materials Laboratory Unit Supervisors complete annual inspections for compliance with AASHTO requirements for equipment and familiarity with procedures. The Quality System Manager of the Research and Materials Laboratory completes semi-annual inspections for documentation on equipment calibration and SCDOT Technician qualifications, training and competency.

106.4 INSPECTION OF ASPHALT MATERIALS

Section 106.04 of the *Standard Specifications* defines SCDOT policy for the inspection and use of liquid asphalt materials, including performance graded binders. The required samples and tests are discussed in Section 106.3. See Section 401.4 for additional information.

106.5 PLANT INSPECTION

106.5.1 HMA Plants

HMA plants mechanically blend aggregate and asphalt binder materials together to produce a hot, homogeneous paving mixture. The HMA Quality Manager, District Asphalt Manager and Research and Materials Laboratory are responsible for verifying plant conditions and operations (e.g., certification, scales and weights, materials, mix proportions, mix temperatures). For additional information on plant operations, refer to the *HMA Quality Control Technician's Manual*.

106.5.1.1 HMA Plant Certifications

The Research and Materials Laboratory will approve the laboratory and lime system of the HMA plant prior to use. Before production, verify that the laboratory and lime system have been properly certified. Check compliance as follows:

1. Scales and Weights. Plant scales used to weigh aggregate, binder materials and batches, including truck scales, must conform to the Contract Specifications. Check for proper certification. Note that the seal on the scale indicates only that it was accurate at the time it was certified. Periodically check for accuracy and the need for recalibration.

2. Temperature Sensing Devices. The temperature sensing device (e.g., pyrometer) at the discharge end of the aggregate dryer and all thermometers used at the plant should be checked and calibrated before the plant is approved. The pyrometer and thermometers should be recalibrated, as needed, during production.

106.5.1.2 HMA Plant Inspection – Materials

With respect to materials at the HMA plant, the District Asphalt Manager or SCDOT Plant Inspector, as assigned, will check to ensure that:

- there is an approved Job Mix Formula for the project;
- materials on the Job Mix Formula are being used in the mix;
- fine and coarse aggregates comply with Contract Specifications;
- aggregates in stockpiles and bins are not intermixing;
- aggregate stockpiles are constructed to avoid segregation and contamination;
- HMA mixture complies with the specified properties (e.g., gradation, binder content); and
- lime and RAP systems are calibrated by the Contractor and are feeding properly.

106.5.1.3 HMA Plant Inspection – Equipment

With respect to the equipment at the HMA plant, the District Asphalt Manager or SCDOT Plant Inspector, as assigned, will check to ensure that:

- the plant complies with the Contract Specifications (AASHTO M 156, etc.);
- equipment is in good mechanical condition;
- the hydrated lime system has been approved by the Research and Materials Laboratory;
- the baghouse is operating properly;
- fines are properly reintroduced into the mix;
- scales have been certified within the last 6 months;
- plant scale tickets are adequate and accurate;
- haul trucks and truck-bed covers are in compliance;
- an approved release agent is being used in truck beds;
- the field laboratory has been approved by Research and Materials Laboratory; and
- the loader operator is working the full face of aggregate stockpiles.

106.5.1.4 HMA Plant Inspection – Production

With respect to HMA production, the District Asphalt Manager or SCDOT Plant Inspector, as assigned, will check to ensure that:

- the Contractor's inspection, sampling and testing of mix production is adequate;
- the asphalt binder, aggregate and mix temperature are in compliance;
- the plant has been properly calibrated by the Contractor;
- cold-feed bins are feeding properly;
- the mix is uniformly coated with asphalt binder;
- segregated mix is not being introduced into truck beds;
- proper loading of trucks (i.e., front, back, middle) is being performed;
- hydrated lime is feeding and mixing properly;
- conveying devices are depositing mix into center of silo or batcher;
- no mix is stored overnight, unless approved in writing by the Asphalt Materials Engineer;
- a batcher is being used at top of the silo;
- the gates on batcher are closing properly; and
- the mix is not dribbled into truck beds to complete a load.

106.5.2 PCC Plants

See Section 701.2.5 for information on Portland cement concrete plants.

106.6 FIELD LABORATORY

The Contractor is responsible for ensuring that the HMA plant laboratory is provided in accordance with the Contract Specifications. The laboratory should be located so that production operations are readily visible. The laboratory should contain copies of all reference materials applicable to the project (e.g., Contract Plans, *Standard Specifications*, Supplemental Specifications, Special Provisions, sampling and testing procedures, Quality Control Plan, Job Mix Formula, SCDOT Construction Forms). See Section 401.2.5 for additional information on HMA plant laboratories. All equipment calibrations and verifications should be readily available and up to date.

106.7 STORAGE OF MATERIALS

Materials must be stored in such a manner as to prevent damage and defects. Non-compliance with the provisions of Section 106.07 of the *Standard Specifications* is grounds for rejection. Document all rejected materials on the appropriate SCDOT Construction Form.

106.8 HANDLING MATERIALS

Materials must be handled in such a manner as to prevent damage and defects. Non-compliance with the provisions of Section 106.08 of the *Standard Specifications* is grounds for rejection. Document all rejected materials on the appropriate SCDOT Construction Form.

106.9 UNACCEPTABLE MATERIAL

Section 106.09 of the *Standard Specifications* governs the contractual provisions for unacceptable materials. The Resident Construction Engineer is responsible for assessing the acceptability of all project materials based on the requirements of the Contract Specifications, including Special Provisions, before the material is incorporated in the work. Reject all unacceptable materials. Document all rejected materials on the appropriate SCDOT Construction Form. Contact the Research and Materials Engineer for any needed assistance.

106.10 MATERIAL GUARANTEE

Section 106.10 of the *Standard Specifications* governs the requirements of submitting a Material Guarantee at the completion of the project. If required by the Special Provisions of the Contract, the Contractor's Material Guarantee must be submitted with the final Materials Certification, as discussed in Section 106.3.12.

106.11 MATERIAL PIT ACQUISITION AND TESTING

106.11.1 Acquisition of Material Pits

Where materials are needed for the project but are unavailable on SCDOT right-of-way, in terms of either suitability or quantity, the acquisition of privately owned land may be necessary. This situation generally occurs when borrow or select materials and sand-clay are needed.

The permits needed for such land are the Contractor's responsibility. Unless the Special Provisions state otherwise, SCDOT will not furnish such material pits. The Contractor may forward material samples to the Research and Materials Laboratory or to an approved Independent Laboratory for testing prior to the material being used on the project. Test results of samples obtained from material pits will be provided to the Contractor for information only and for the Contractor's use in evaluating pits.

106.11.2 Reclamation of Material Pits

When a material pit has served its purpose, the Contractor is required to reclaim the land in accordance with the reclamation standards of the South Carolina Mining Act, enacted by the South Carolina General Assembly in 1973 and adopted by SCDOT (South Carolina Code Annotated Section 48-20-10 et. seq.). Review the Contract Special Provisions and pay particular attention to the requirements for side slopes, drainage, seeding and erosion control. The Resident Construction Engineer will make a final inspection of the reclaimed land, on behalf of the State Highway Engineer. Retain these records in the project file and make reference in the Daily Work Report.

Section 107
Legal Relations and Responsibility to Public

107.1 LAWS TO BE OBSERVED

107.1.1 General

Depending upon the nature and complexity of the construction project, the Contractor must comply with a wide range of Federal, State and local laws and regulations. These apply to the following broad areas:

- Occupational Safety;
- Health;
- Environmental (e.g., noise, air, water);
- Navigational; and
- Labor.

The Contractor is responsible for scrutinizing the Contract provisions and identifying all applicable laws and regulations for the specific project. The Resident Construction Engineer must ensure that the Contractor fulfills these legal obligations. The *Standard Specifications* and the *Construction Manual* address applicable legal requirements in various places throughout the two documents. For example, Section 107.26 discusses environmental laws that may apply to the project. Section 107.1.2 specifically discusses those labor regulations that apply to highway construction on Federal-aid projects.

107.1.2 Labor Regulations on Federal-Aid Projects

107.1.2.1 General

The Resident Construction Engineer must ensure that all provisions of the Special Provisions relating to the Federal Labor requirements and reports are properly implemented.

On each Contract in which there is Federal-aid participation, the Resident Construction Engineer should establish a check system as a means of assuring that all reports required of the Contractor and subcontractors are being submitted. The Contractor should be written and advised when reports are past due. The Resident Construction Engineer or a designated employee should review the reports submitted by the Contractor. Any reports that are improperly completed must be returned to the Contractor for correction.

Posting of wage rates at the job site by the Contractor is required on Federal-aid projects. The rates should be placed in a location so as to be readily available for viewing by interested employees or other persons.

The Resident Construction Engineer must investigate promptly any complaints of violation of minimum wage rate provisions referred to them by the employees of the Contractor or any

subcontractor, by the Federal Highway Administration in its own behalf or in behalf of any other Federal agency, or complaints received from any other source. A report of each such investigation and the action taken must be furnished to the Office of Compliance.

107.1.2.2 Interviewing of Contractor's Personnel on All Federal-Aid Projects

Systematic spot interviews of Contractor's or subcontractor's personnel must be made weekly by the Resident Construction Engineer or their designated representative on all Federal-aid projects. The interview should generally include employees of different classifications. Each interview should reflect the name of the employee, class of craft or power-equipment operator, and the description of the work being performed.

Check with the foreman or superintendent after interviewing the Contractor's employees to ensure that the employee's name and any other pertinent factors are shown correctly. Any irregularities with the labor requirements found during these interviews must be immediately investigated.

Interviews must be reported on SCDOT Form 100.07 – Wage Regulation Report, and must be submitted directly to the Resident Construction Engineer at the end of each week. Copies of this report will be retained by the Resident Construction Engineer in their file. This form should be submitted even though there has been no work performed by the Contractor. A statement should be made on the form stating the reason why no interviews were made.

The Wage Regulation Report must also contain a list of the Contractors and of each subcontractor who worked on the project during the week. Copies of the Wage Regulation Report that are retained in the Resident Construction Engineer's file must be compared with the payroll transcripts for the same period.

SCDOT Form 100.20 – Equal Employment Opportunity Stage Type Inspection should be completed in accordance with the current procedures from the Compliance Office. This inspection should be performed once during the duration of the project.

107.1.2.3 Payroll Transcripts

Payroll transcripts received from the Contractor should be carefully studied. Each transcript should contain the name of each employee, their correct classification, rate of pay, daily and weekly number of hours worked, deductions made and actual wages paid. When an employee's name first appears on the payroll transcript, their address and social security number should be shown. The listing of the addresses of all employees on each transcript is not discouraged, however. Except in unusual cases, the employee's classification must conform with a classification which is set up in the Wage Regulation Schedule for the project. Unusual job classifications must be explained by the Contractor or the Resident Construction Engineer.

The transcripts must be legible, suitable for reproduction, and should be identified by the File number, the Federal-aid Project number and by the name of the Contractor or subcontractor.

Each payroll transcript must bear a certification by a proper official of the Contractor's organization affirming that the payroll is correct and complete, that the wage rates contained therein are not less than those determined by the Secretary of Labor, and that the classification set forth for each laborer or mechanic conforms with the work being performed.

Supervisory employees such as superintendents, foremen and timekeepers, who are employed at hourly rates, must be paid overtime for work in accordance with the provisions of the Wage-Hour Law. The wage rate inserted on transcripts for supervisory employees who are employed on a straight-time weekly basis should be the actual weekly rate of employment and not an hourly rate prorated on the basis of the number of hours worked.

Payroll transcripts are considered past due after a period of four weeks has elapsed following the close of the payroll period. Failure to submit payroll transcripts in this time frame will result in construction estimates being withheld.

All payroll transcripts must be compared with the Wage Rate Schedule shown in the Contract to ensure compliance with the minimum wage rates that have been set for each classification of labor.

Attempts must be made to correct variances between the information listed on the payroll transcripts and on the wage regulation reports. If the Resident Construction Engineer or the District Engineering Administrator is unable to make such a correction, a full report of the circumstances involved should be submitted to the Office of Compliance.

The Resident Construction Engineer is expected to observe the type of work being performed by the various classifications of labor to determine whether employees are properly classified. If, in the opinion of the Resident Construction Engineer, an employee's classification does not conform to the work being performed, the issue should be directed to the Contractor's attention.

When revised payroll transcripts are submitted, the notation "Revised" should be written on the transcripts. The reason for the revision should also be stated. The Resident Construction Engineer or a designated employee should initial the transcripts as an indication that they have been reviewed and are properly completed.

107.1.2.4 EEO and OJT Procedures

The Specific Equal Employment Opportunity (EEO) Responsibilities Provision will appear in all Federal-aid Contracts. SCDOT Form 100.18 – Annual EEO Reports – Contractors should be completed for work performed in the month of July. The Special Training Provision, which covers the On-the-Job Training (OJT) Program, will be included in most Federal-aid Contracts on which it is determined that such training can be supported. Thus, the Specific EEO Responsibilities Provision may be present with or without the Special Training Special Provision; but the Special Training Provision will never appear in a Contract that does not have the Specific EEO Responsibilities Provision. The Contractor is responsible for complying with these provisions and submitting SCDOT Form 100.22 – Monthly Training Status Report and SCDOT Form 100.23 – Trainee Termination Report. The Office of DBE Program Development will provide the Resident Construction Engineer with a copy of *EEO and OJT Procedures*, which is

a detail checklist specifically developed to assist the Resident Construction Engineer in overseeing the activities of the Contractor regarding the EEO and OJT Provisions. These Provisions deserve no less emphasis than any other Contract provision.

107.1.2.5 DBE Quarterly Reports

Ensure that SCDOT Form 100.19 – DBE Quarterly Report is submitted within 15 days of the end of the quarter as specified in the Contract Supplemental Specifications titled "Disadvantaged Business Enterprises (DBE) – Federal Projects." Contractors should be reminded that these reports must be submitted within this time frame or payments will be withheld until they are received. Also, the report must be submitted to the Director of Construction and must be an original copy with the signature of the subcontractor. If any revisions are necessary, the individual making the revision must initial the change. If no payments are made to a DBE subcontractor, a signature is not required.

107.2 PERMITS, LICENSES AND TAXES

Section 107.02 of the *Standard Specifications* governs the Contractor's responsibilities with respect to permits, licenses and taxes.

107.3 PATENTED DEVICES, MATERIALS AND PROCESSES

Section 107.03 of the *Standard Specifications* governs the Contractor's responsibilities with respect to using patented devices, materials and processes.

107.4 RESTORATION OF ROADWAY SURFACES OPENED BY PERMIT

Section 107.04 of the *Standard Specifications* governs the provisions for opening and restoring roadway surfaces on the project under SCDOT permit.

107.5 FEDERAL PARTICIPATION

107.5.1 General

The Federal Highway Administration (FHWA) administers the Federal-aid program that funds eligible highway improvements nationwide. FHWA's basic responsibility is to ensure that the State DOTs comply with all applicable Federal laws, policies and procedures in their expenditure of Federal funds and to ensure that the State DOTs meet the applicable engineering, legal and administrative requirements for their Federally funded highway projects. FHWA maintains a Division Office within each State, and this is the primary point of contact for a State DOT.

SCDOT complies with all Federal laws, regulations and directives for the design, construction, operation and maintenance of all Federal-aid projects. FHWA may review or investigate any phase of the Federal-aid program on any Federal-aid project, especially those that contain

unique features or those with unusual circumstances. Furthermore, this does not preclude SCDOT from requesting FHWA involvement in projects.

107.5.2 FHWA Role in Construction

Figure 107A summarizes FHWA's oversight role in construction. The following also applies:

1. Interstate System. All new construction and reconstruction projects on the Interstate system will be constructed with full FHWA oversight and approval as shown in Figure 107A. Upon agreement by the FHWA and the Department, large or complex rehabilitation projects may also be considered for full FHWA oversight.

2. NHS. For new construction and reconstruction projects on the non-Interstate, National Highway System (NHS), FHWA oversight and approval will be required where the total project costs exceed $50 million. For 3R projects and new construction and reconstruction projects less than $50 million, SCDOT will assume all responsibilities.

3. All Other Projects with Federal Funding Participation. SCDOT will assume all construction responsibilities. This precludes the need for any FHWA approval or concurrence, except those actions that require FHWA approval for Title VI compliance.

The level of FHWA involvement in a project will typically be determined during the preconstruction phase and transfer to construction.

Project Level Actions	**Highway System**		
	Interstate or NHS > $50 million	**NHS ≤ $50 million**	**Non-NHS**
Approvals of the Award of the Contract	x		
Disadvantaged Business Enterprise (DBE) Program	x	x	x
All Construction Engineering	x		
Davis-Bacon Act Regarding Wages	x	x	x
Approval of Extra Work, Time Extensions and Claims	x		
Approval of Minor Construction Supplemental Agreements and Contract Modifications	x		
Final Acceptance	x		

Note: X = FHWA Involvement Required

FHWA PROJECT OVERSIGHT FOR CONSTRUCTION
Figure 107A

107.5.3 FHWA Relationships

The relationship between FHWA and SCDOT does not directly involve the Contractor. FHWA representatives inspect the project to review the Department's construction procedures. The FHWA representative is reviewing the State's performance and not the Contractor's. FHWA has neither the responsibility nor authority to interact directly with the Contractor relative to ensuring compliance with the plans and specifications. All Department employees are urged to cooperate with the FHWA during all phases of the Contract. Construction personnel must be courteous to FHWA representatives whenever they conduct their reviews. FHWA personnel have been delegated to review construction activities relating to progress, quality, Contractor's payrolls, etc. They may also take field measurements, review test procedures and results, or investigate requested Contract changes. Comments made by the FHWA representatives should be noted in the Daily Work Report, and issues that require action by the Department should be referred to the Resident Construction Engineer.

107.6 SANITARY HEALTH AND SAFETY PROVISIONS

107.6.1 Contractor Responsibilities

The Contractor is responsible for complying with the regulations of the Occupational Safety and Health Administration (OSHA), SCDHEC and other applicable Federal, State and local agencies regulating the health and safety of construction personnel and the general public. The Contractor must comply with the OSHA Federal Construction Safety Standards. It is good practice for the Contractor to hold weekly meetings to discuss health and safety issues on the project. On bridge structure projects, a Crane Safety Plan will be required. Check the Special Provisions of the Contract.

107.6.2 SCDOT Responsibility and Authority

107.6.2.1 Safety Meetings

SCDOT will not permit any employee to work in or around unsanitary or unsafe conditions. It is important to remain alert during construction activities to avoid mishaps and injury. Because many hazards exist on construction projects, it is good practice for the Resident Construction Engineer to include safety as a topic of discussion during the weekly progress meetings.

107.6.2.2 Inspection Duties

All SCDOT personnel should continually monitor Contractor and subcontractor activities for non-compliance with respect to the health and safety provisions of the Contract, including the minimum safety requirements of the OSHA and SCDHEC. SCDOT personnel should instruct the Contractor to verify safety requirements if non-compliance is suspected.

107.6.2.3 Imminent Danger

If imminent danger is obvious or suspected, immediately issue a verbal stop-work order to suspend all work in the vicinity of the hazard. In this context, imminent danger is any condition on the project that could result in serious injury or death. Immediately contact the Resident Construction Engineer for any needed assistance.

107.6.3 Tall Timbered Regions

Clearing and grubbing operations, particularly in dense, tall timbered regions, can be very hazardous. The Contractor will generally use specialized methods and equipment to fell tall timber. All project personnel should be especially careful in the vicinity of clearing such areas. Immediately inform the Contractor if clearing tall timber endangers personnel, poses a potential hazard to the general public or damages existing facilities in or adjacent to the right-of-way.

107.6.4 Poisonous Plants

All project personnel should use caution when working in areas known to have poison oak and poison ivy. The oils from these common poisonous plants cause an irritable rash when contact is made with the skin. In addition, the smoke from burning these poisonous plants can cause an equally serious condition, both internal and external. Those individuals with severe allergic reactions to such exposure will require immediate medical attention.

107.6.5 HMA Activities

Construction personnel must be safety and health conscious and monitor HMA plant and paving operations. Consider the following:

1. Dust and Plant Emissions. Dust and plant emissions are particularly hazardous. It is not only a threat to the lungs and eyes, but it also may contribute to poor visibility, especially when trucks, front-end loaders and other equipment are working around stockpiles and cold bins. Reduced visibility in work traffic is a prime cause of accidents.

2. Noise. Noise is harmful to hearing and can distract workers' awareness of moving equipment and other dangers at the HMA plant and project site. As appropriate, wear hearing protection.

3. Stockpiles. HMA plant personnel should not work on stockpiles while the plant is in operation. No one should walk or stand on stockpiles or the bunkers over the feeder gate openings. It is possible in these areas to be pulled down into the material and buried without warning.

4. Moving Machinery. Moving belts that transport HMA materials should be a constant concern, as should belts to motors, sprockets and chain drives. All pulley, belt and chain drive mechanisms should be covered or otherwise protected. Loose clothing that can

get caught in machinery should never be worn at the HMA plant or near the paver. Similar safety precautions should also be observed in the laboratory.

5. Fire and Burn Hazards. Burning flames and high temperatures around ovens, dryers, silos, haul trucks and pavers are obvious hazards. Control valves that can be operated from a safe distance should be installed on all fuel lines. Flame safety devices also should be installed on all fuel lines. Smoking should not be permitted near binder or fuel storage tanks. Check frequently for leaks in oil heating lines, steam lines and the jacketing on binder distribution lines. Be sure safety valves are installed in all steam lines and that they are in working order. Make use of screens, barrier guards and shields for protection. Ensure that the HMA plant and project site are equipped to handle emergency fire and hazardous material spill situations. When handling heated asphalt material, use chemical goggles and a face shield. All shirt collars should be worn closed and cuffs buttoned at the wrist. Gloves with gauntlets that extend up the arm should be worn loosely so that they can be flipped off easily if covered with hot asphalt material. Pants without cuffs should extend over boot tops. Closely monitor the temperature of liquid asphalt binder and do not allow the temperature to approach the flash point of the material.

6. Screen Deck. Exercise extreme caution at the HMA plant when climbing around the screen deck, inspecting screens and hot bins and collecting hot bin samples. Use covered or protected ladders or stairways to access these parts of the plant. All stairs and platforms should be equipped with secure handrails.

7. Traffic. Truck traffic patterns at the HMA plant should be planned for both safety and convenience. Trucks entering the plant to pick up loads should not have to cross the path of trucks leaving the plant. Also trucks should not have to back up. At the project site, continually be alert to paver movement, haul truck traffic and vehicular traffic, where it is being maintained and operational during construction.

8. Site Maintenance. The HMA plant and project site should be kept free of loose wire, lines, pipes, hoses and obstacles. High voltage lines, field connections and wet ground surfaces are hazards that should be continually monitored. Immediately report for repair any loose fittings or connections, frayed insulation and improperly grounded equipment.

107.6.6 Safety Considerations for Burning Operations

Where permitted, the Contractor may elect to burn combustible waste materials on the project right-of-way. The Contractor is solely responsible for the safe control of such operations. Left unattended or performed improperly, open-air burning of combustible materials can quickly develop into wildfires outside the project right-of-way. Consider the following guidelines:

1. Legal Issues. Check to ensure that the Contractor's burning operation is performed in accordance with the provisions of the Contract and the applicable laws, ordinances, regulations and provisions of SCDHEC. Ensure that the South Carolina Forestry Commission has been notified prior to the burning operation.

2. Preparation of Area. Inspect the burning operation to ensure the Contractor properly prepares and cleans the surrounding area of combustible debris.

3. Fire Fighting Equipment. Check to ensure the Contractor has fire fighting equipment readily available.

4. Watchmen. Verify that the Contractor provides watchmen to control the spread of fire.

5. Location. Visually inspect to ensure that the debris is being burned on right-of-way, unless a landowner agreement permits otherwise, and in a location that will prevent the spread of fire to adjacent forested areas.

6. Utilities. Do not allow the Contractor to burn materials anywhere near overhead utility lines. Also, give consideration to the type and depth of existing underground utility facilities (e.g., gas lines).

7. Pile Size. Where advisable for better burn control, inform the Contractor to use chippers to reduce the size of burn piles.

8. Unfavorable Conditions. In high winds or very dry conditions, halt burning operations in lieu of more favorable weather and ground moisture conditions. Verify that the Contractor douses smoldering embers to prevent rekindling by high winds.

See Section 107.7.2 for air quality considerations with respect to burning operations.

107.6.7 Reporting Injuries and Fatalities

The Contractor must notify OSHA of project injuries and fatalities using the following procedures from 29 CFR 1904.8 – Reporting of Fatality or Multiple Hospitalization Incidents (Item (c) relates to Resident Construction Engineers):

(a) Within 8 hours after the death of any employee from a work-related incident or the in-patient hospitalization of three or more employees as a result of a work-related incident, the employer of any employees so affected must verbally report the fatality/multiple hospitalization by telephone or in person to the Area Office of the Occupational Safety and Health Administration, Department of Labor, that is nearest to the site of the incident, or by using the Occupational Safety and Health Administration toll-free central telephone number 1-800-321-6742.

(b) This requirement applies to each such fatality or hospitalization of three or more employees which occurs within thirty (30) days of an incident.

(c) Exception: If the employer does not learn of a reportable incident at the time it occurs and the incident would otherwise be reportable under paragraphs (a) and (b) of this section, the employer will make the report within 8 hours of the time the incident is reported to any agent or employee of the employer.

(d) Each report required by this section must relate the following information: Establishment name, location of incident, time of the incident, number of fatalities or hospitalized employees, contact person, phone number, and a brief description of the incident.

107.7 AIR POLLUTION CONTROL

107.7.1 Air Quality

The Contractor will be responsible for complying with all Federal, State and local laws and regulations with respect to preventing pollution of the atmosphere from particulate and gaseous matter. Construction activities generate a number of products that can contribute to air pollution. These include emissions from plant and equipment operations, chemicals from bridge cleaning and plant operations and particulate matter (e.g., smoke from burning debris, dust from earthwork operations). During periods of limited dispersion, construction operations may be temporarily suspended if those operations are producing the specific air pollution elements of concern. Water may be used as a dust reducer, as directed by the Resident Construction Engineer, to prevent a public nuisance. Other options for controlling dust include dust suppressants (i.e., cement-based products that form a protective shell once sprayed) and, for open stockpiles, the use of barriers, screens and covers. In addition, it may be appropriate to restrict or suspend dust-producing operations during periods of dry and windy conditions.

107.7.2 Air Quality Considerations for Burning Operations

Non-merchantable trees, limbs, stumps and brush may be disposed of by burning, unless prohibited by ordinances or regulations. Sometimes, complete combustion of the larger pieces is not possible, and the remains are disposed of by other suitable means. During the burning operation, the Contractor must take all reasonable precautions to not endanger adjacent properties. When fire damages some portion of their property, owners tend to place the blame upon the Department, rather than the Contractor. The Contractor is responsible for all damages. Check to ensure that the Contractor burns the materials within the right-of-way limits under the constant care of competent watchmen and that the action does not jeopardize items to remain in place or the surrounding timber and grasslands of adjacent properties. Consider the following:

1. Legal Issues. Prior to burning, verify that the Contractor has obtained the required Burn Number from the South Carolina Forestry Commission. Monitor compliance and notify the Contractor of any obvious infractions of the regulations promulgated by SCDHEC.

2. Urban Areas. Local ordinances generally prohibit burning of combustible waste materials in urban areas. Unless the Resident Construction Engineer approves otherwise, do not allow the Contractor to burn materials in urban areas.

3. Fire and Smoke Hazards. The Resident Construction Engineer may prohibit the Contractor from burning materials in areas where it is apparent or obvious that fire and smoke will present a hazard to the health, safety, comfort and property of citizens in the vicinity of the project.

4. Incinerators. Incinerators, including air curtain burners, may be used provided that SCDHEC approves their use.

5. Damages. The Contractor is solely responsible for damages. Visually inspect any damage to trees, shrubs, fences or other objects to remain in place and make sure that

the Contractor adequately repairs or replaces the damaged items. Note damages and directives in the Daily Work Report.

6. Cleanup and Restoration. Check to make certain that the Contractor removes and disposes of burned materials and seeds the burned areas in an acceptable manner.

See Section 107.6.6 for safety considerations with respect to burning operations.

107.8 QUARANTINE REGULATIONS

The Contractor must comply with the quarantine regulations of the Clemson University Division of Regulatory and Public Service Programs and the US Department of Agriculture for noxious plant and insect pest control. Noxious plants and insects (e.g., witchweed, fire ants) are detrimental to the health and well being of other living organisms within South Carolina. Discuss and reiterate this policy at the Preconstruction Conference and prior to operations such as earthwork, seeding, sodding, planting and mulching. Project materials such as soil, mulch, seed, sod, plants and shrubs must be free of noxious plants and insects to minimize their propagation within the State. Where required, obtain and retain proper certification from the Contractor before the materials are used on the project. Soil moving equipment, in particular, is subject to these provisions and may need to be cleaned and inspected before they are moved into regulated areas. Because these provisions will vary from county to county, check the Special Provisions of the Contract for specific requirements.

107.9 PUBLIC CONVENIENCE AND SAFETY

Public and private roadways and intersections may be affected by the Contractor's construction activities. The Contractor is responsible for maintaining these facilities in a safe and passable condition. It is critical that the Resident Construction Engineer and all Inspectors continually monitor operations for potential hazards to the public. Perform daily visual checks to ensure that the Contractor is adequately cleaning and sweeping mud, oil, debris and other objectionable materials from the traveled way. Do not allow the Contractor to place any equipment or materials that would become an obvious hazard to vehicular or pedestrian traffic. Notify the Contractor in writing of any obvious safety hazards to the public that require immediate correction. Note these activities in the Daily Work Report.

107.10 CONSTRUCTION OVER OR ADJACENT TO NAVIGABLE WATERS

Section 107.10 of the *Standard Specifications* governs the provisions for construction over or adjacent to navigable waters.

107.11 TRAFFIC CONTROL

Section 107.11 of the *Standard Specifications* governs the provisions for traffic control on the project. See Section 601, 602 and 603 for additional information.

107.12 PAYMENT FOR TRAFFIC CONTROL

Section 107.12 of the *Standard Specifications* governs the provisions for payment for traffic control used on the project. See Section 601, 602 and 603 for additional information.

107.13 CORRECTING LOW SHOULDER CONDITIONS

Section 107.13 of the *Standard Specifications* governs the provisions for correcting low shoulder and lane drop-offs during construction. See 601.3.12 for additional information.

107.14 RAILWAY-HIGHWAY PROVISIONS

107.14.1 General

For railroad-highway crossings, the Contractor's key point of contact will be the Road Master of the railroad company. If construction operations are performed adjacent to or within railroad right-of-way, the Contractor must notify the railroad company and comply with Contract provisions with respect to insurance requirements, grade crossing adjustments, mitigation, coordination of schedules, track clearances and use of railroad flaggers.

107.14.2 Railroad-Highway Crossing Improvements

107.14.2.1 General

When construction plans are available, the Railroad company is advised of its responsibility to improve the railroad-highway grade crossing, which includes the installing or rearranging of crossbuck signs. The Utilities Office gives the notification to the Railroad company. The initial request for a Railroad company to improve a grade crossing is usually made as soon as construction plans are available for the road on which the crossing occurs. When it appears likely that delays will be encountered in the construction of a highway section adjacent to grade crossings, the Resident Construction Engineer should take prompt action to address this issue to the attention of the Utilities Office.

Upon receipt of the construction plans by the Resident Construction Engineer, the plans should be reviewed to ensure that they contain all information as outlined in Section 107.14.2.2. If sufficient information is not given on the plans, the Resident Construction Engineer should furnish this information to the Utilities Office because this information is usually necessary when advising the Railroad companies of the crossings to be improved.

Unless stated or shown otherwise in the plans, the finished grade of the roadway must fit the existing railroad rail elevations. Care must be exercised in fitting the roadway grades to the rails because, otherwise, a rough riding crossing will result. On resurfacing contracts, the added surfacing will usually be feather-edged at the crossing.

The Resident Construction Engineer should cooperate with the local Railroad company officials as practical to hasten the grade crossing improvement. This should be done by personally contacting the local Railroad officials.

107.14.2.2 Information to be furnished on Location Surveys

Resident Construction Engineers are often requested to make location surveys, and these surveys frequently cross railroad tracks. When the survey crosses a railroad, the following should be provided in the survey notes:

- the survey station and elevation of rails on mainline tracks, side tracks, storage tracks, and pass tracks;
- the angle of intersection between the survey line and the centerline of the railroad;
- the alignment of the tracks (on tangent or degree of curvature);
- right-of-way lines must be ascertained and indicated;
- distances to and identification numbers of nearest railroad milepost. For spur lines, where there are no railroad mileposts, switch points must be referenced to mainline mileposts. When ascertainable, the National Grade Crossing Inventory Number should be indicated for existing crossings;
- survey station at which the highway centerline and railroad intersect;
- name of Railroad;
- identification of line (e.g., Columbia-Rock Hill mainline tracks);
- survey station number and the elevation of lowest wire on all utility wire lines that cross the survey line near the railroad;
- the relocation of the proposed railroad-highway grade crossing must be referenced to the existing grade crossing by showing the distance between crossings, the distance being measured along the centerline of the track. The inventory number for the existing crossing should be given; and
- where proposed grade crossing relocations are within reasonable distances of existing grade crossing locations, the survey notes should accurately show the location of the old highway roadbed.

107.14.2.3 Pipeline Construction on Railroad Property

Frequently, the plans call for pipelines to be placed under a railroad or upon the Railroad company's right-of-way. When the Resident Construction Engineer receives the construction plans, they should be examined to determine if pipelines will be installed at such locations. If pipes will be placed within the Railroad's right-of-way, the Resident Construction Engineer should examine the project correspondence file to determine if the Railroad company has been advised of this proposed pipeline construction. If no such notice is found in the file, the Utilities Office should be advised so that the Railroad company can be notified. Often, extra-strength pipe and other installation requirements are made by the Railroad company.

107.14.2.4 Railroad Crossing Signs

1. Railroad Advance Warning Signs. As stipulated for in the *MUTCD*, the Department must install and maintain railroad advance warning signs at railroad grade crossings. This applies to roads under construction and those under maintenance. The Resident Construction Engineer shall advise the proper highway official of any roads where it is necessary to install the above signs. The Contractor should not be permitted to damage or destroy the signs while performing its work. Should it be necessary to move the signs during construction, the Contractor shall relocate them to a suitable place.

2. Railroad Crossbuck Signs. Under Section 56-5-100 of the 1976 Code of Laws of South Carolina, Railroad companies are required to place and maintain at grade crossings standard crossbuck signs in accordance with the requirements of the *MUTCD*. Reference must be made to Section 107.14.2.1 for instructions regarding the notifying of the Railroad companies of their responsibility to install or relocate crossbuck signs.

107.14.2.5 Flashing Lights and Barrier Gates

Flashing lights and barrier gate installations or modifications are made by Railroad personnel under agreement with the Department. The cost of the installation or modification is usually shared by the Department and the Railroad company, except for new crossings.

When an agreement between the Department and the Railroad has been reached and the plans for the installation prepared, the Resident Construction Engineer will receive copies of the plans for conflicts that may occur with utilities such as overhead wires in the case of barrier gates.

The completion of plans and agreements for the installation of flashing lights and barrier gates is often delayed. It is, therefore, important that any rearrangement of utilities be done so that the utilities will not be placed in the way of future railroad grade crossing installations. Flashing light signals with short-arm gates are required on Federal-aid projects at railroad grade crossings with (a) multiple mainline tracks, (b) multiple track crossings with or without main tracks on which more that one train may occupy the crossings at the time, or (c) single or multiple track crossings when train operating speeds are 70 miles per hour or greater and sight distances are restricted.

107.14.2.6 Railroad Flashing Light Signal Installation

The following procedures are established for the processing of railroad flashing light signal installations:

1. The Railroad will notify the District Engineering Administrator of the date it intends to commence work and the Resident Construction Engineer (or other designee of the DEA) will monitor the signal installation.

2. Upon completion, the District Engineering Administrator will furnish SCDOT Form 100.24 – Final Inspection Acceptance Report Railroad Grade Crossing Signal Project to the State Highway Engineer indicating the following:

- Date work was started and completed.
- All work has been completed in accordance with agreement and plans.
- All signs and pavement markings are in compliance with the authorization sketch and MUTCD.
- Any situations that occurred during construction that could lead to a project cost overrun or underrun.
- Status of any force account work by the Department that may be charged to the project.
- To their knowledge, there are no other charges to be made against this file except railroad invoices and, once they have been paid, this file can be closed.

107.15 USE OF EXPLOSIVES

The Contractor may need to use explosives during construction of the project. Prior to blasting, the Contractor must obtain approval from the Resident Construction Engineer. Transport, storage, handling and detonation of explosives pose extremely hazardous conditions to workers and the public. Where blasting is performed, adequate protection and coordination must be provided, including cordoning areas, establishing clear areas from roads and structures, coordinating utilities and railroads and erecting warning signs to prohibit radio and cell phone transmissions. Such operations must be conducted under the careful, competent supervision of licensed personnel. The Contractor will be responsible for any injury and property damage claims. Inform the Contractor of any obvious safety violations. Where blasting in or near a stream, verify that the South Carolina Department of Natural Resources has been notified prior to the blasting operation, as provided for in the Contract Specifications. Ensure that the SCDOT Information Office has been properly notified prior to any blasting. The Contractor must submit SCDOT Form 200.06 – Blasting Notice.

107.16 PRESERVATION & RESTORATION OF PROPERTY, TREES, ETC.

107.16.1 <u>Typical Uses of Off Right-of-Way Property</u>

The need for access to privately owned or publicly held land off SCDOT right-of-way will be assessed on a project-by-project basis. This assessment will generally occur during project development, such as during the Constructability Review. Such land will typically be adjacent to the project and may be used for:

- NPDES and BCA areas,
- additional points of access to the project,
- waste and debris disposal sites,
- equipment staging areas,

- material storage and stockpile areas, and
- construction offices.

See Section 106.11 for information on the acquisition and reclamation of land needed for material pits.

107.16.2 Landowner Agreements

The provisions of the Contract specify that the Contractor will not enter property off SCDOT right-of-way without the consent of the landowner. Permission will be obtained through a written agreement between the landowner and the Contractor, which must be executed on SCDOT Form 200.04 – Agreement for Placing Debris on Private Property. SCDOT is generally not a legal party to this agreement. The agreement provides written consent from the owner to the Contractor to use the land for an intended purpose. The agreement will explicitly define the limits of access, acceptable and unacceptable uses and restoration requirements, including evidence that the landowner is satisfied with restoration and cleanup. The Resident Construction Engineer will obtain from the Contractor copies of all such agreements. The Resident Construction Engineer and all Inspectors should review these agreements to understand the Contractor's limits of operations.

107.16.3 SCDOT Responsibility

It is important to note that adhering to the requirements of landowner agreements is the Contractor's responsibility, not the Department's. However, SCDOT construction personnel, in good faith to owners of adjacent property, should notify the Contractor immediately of any known infractions or damage. This will enhance the Department's relationship with the public, which will benefit future SCDOT projects. Once the project has started, monitor construction activity to ensure that the Contractor operates within the limits of landowner agreements. Once the land has served its intended purpose, verify that the Contractor has reclaimed the land as defined in the agreement and that the Contractor has obtained the owner's signatory release. Reference these activities in the Daily Work Report, noting any directives and progress with respect to reclamation and any needed repairs.

107.16.4 Preservation of Property

The Contractor is responsible for preserving all items and areas within the right-of-way that are marked for protection. The Contractor is also responsible for preserving public and private properties along, adjacent, above and below SCDOT right-of-way. These provisions apply to trees, forests, crops, survey monumentation, environmentally sensitive areas, above and below ground utilities, railroads and highway infrastructure. The Contractor will determine the method in which property is to be protected. Do not direct the Contractor on how to accomplish this task, unless specifically covered in the Contract, and as long as the method is reasonable and consistent with good construction practice.

107.16.5 Restoration of Damaged Property

The Contractor is responsible for property damage that may occur within or outside SCDOT right-of-way due to the Contractor's or subcontractor's operations. If damage is found, notify the Contractor immediately and note the details of such directives in the Daily Work Report.

107.17 FOREST PROTECTION

The Contractor will be responsible for protecting forested land in and adjacent to the project and for preserving trees that are designated to remain in place. This includes compliance with all Federal and State laws and any landowner agreements with respect to cutting of timber, refuse disposal, burning operations and the location and reclamation of areas used for construction purposes. Pay particular attention to any unauthorized debris burning operation or cutting of timber outside the right-of-way. In addition, trees are generally designated for protection for environmental and aesthetic purposes. Consider the following:

1. Marking of Trees. The Resident Construction Engineer is responsible for designating the trees and shrubs that are to be preserved. This should be performed by flagging or other means. Clearly indicate to the Contractor the trees or areas of trees to be preserved. Verify that marks on protected trees are at a location and height clearly visible to equipment operators.

2. Drip Line. The drip line is a circle around the tree trunk directly under the outermost edge of the canopy.

3. Clearing Limits. Where clearing occurs near protected trees, the clearing must not encroach the area around the tree bounded by the drip line. Verify that trees and areas marked for protection are not disturbed during the work.

4. Equipment Operation. Equipment must not encroach the drip line or otherwise cause damage to the trunk or canopy of a protected tree. Operators must never use protected trees to clean equipment (e.g., bucket slamming).

5. Fencing. As needed, fencing may be placed along the drip line to protect tree roots, trunks and canopies.

6. Trenching. Where trenches are constructed, they should be located as far away from protected trees as practical. Trenches must never encroach the drip line.

7. Injury. Check to ensure that any damage to protected trees is repaired as soon as practical. Diagnosis and repair should be prescribed by a forester or tree specialist.

107.18 RESPONSIBILITY FOR CLAIMS, ETC.

Section 107.18 of the *Standard Specifications* governs the contractual responsibilities for claims due to injury and damage that may occur during the project.

107.19 THIRD PARTY LIABILITY

Section 107.19 of the *Standard Specifications* governs the contractual provisions for third party liability.

107.20 OPENING OF SECTION OF HIGHWAY TO TRAFFIC

Section 107.20 of the *Standard Specifications* defines the provisions for opening of a section of highway to traffic.

107.21 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

Section 107.21 of the *Standard Specifications* defines the Contractor's responsibility for the work as defined by the Contract.

107.22 CONTRACTOR'S RESPONSIBILITY FOR UTILITIES

To minimize project delays and mishaps, utility adjustments and relocations should be carefully reviewed and clearly understood by all affected parties. Ensure that representatives of all affected utility and railroad companies are invited to the Preconstruction Conference. Verify that all underground utilities have been clearly marked. Visually check for and report in the Daily Work Report any evidence of damage to utility and railroad facilities.

107.23 FURNISHING RIGHT-OF-WAY

107.23.1 General

For each Contract the Right-of-Way Special Provisions will be posted on the Intranet website. Before work begins on the project, the Resident Construction Engineer should carefully study the list so that any of the Special Provisions agreed upon by the property owner and the Department will be implemented. If the work to implement a right-of-way Special Provision will be performed by the Contractor and is not included in the Contract, it will be necessary to negotiate a supplemental agreement. Any right-of-way Special Provision not implemented during the Contract should be brought to the attention of the Maintenance Department prior to or at the time of acceptance so that the Maintenance Department can perform any work necessary to fulfill the agreement.

Occasionally, the Special Provisions will stipulate that the property owner be paid for certain work to be performed. After such work has been done, the Resident Construction Engineer should initiate payment for this work.

107.23.2 Encroachment

The Resident Construction Engineer should be familiar with the right-of-way limits. It is the Resident Construction Engineer's responsibility to ensure that there are no right-of-way

encroachments during construction. After the project is accepted for maintenance, this responsibility then transfers to the Resident Maintenance Engineer.

107.24 PERSONAL LIABILITY OF PUBLIC OFFICIALS

Section 107.24 of the *Standard Specifications* governs the personal liability of public officials.

107.25 NO WAIVER OF LEGAL RIGHTS

Section 107.25 of the *Standard Specifications* governs the contractual provisions once the work under Contract has been inspected and accepted by the Department.

107.26 ENVIRONMENTAL PROTECTION AND WATER POLLUTION CONTROL

The Resident Construction Engineer will be responsible for ensuring that the Contractor complies with the provisions of all Federal, State and local environmental laws and permits throughout the life of the project. This Section provides a brief discussion to assist in fulfilling this task.

107.26.1 Impact Assessment, Coordination and Permits

During project development on Federal-aid projects, the Environmental Section will prepare an environmental evaluation of project impacts. The impacts typically having the greatest impact on construction include the requirements for environmental and navigational permits, wetlands mitigation, archaeological and historical sites, hazardous waste disposal and assessment and recovery of underground storage tanks.

The Environmental Section is responsible for securing all environmental and navigational permits for highway and bridge projects during Preconstruction. The Contract Special Provisions will document permit requirements that impact construction. The following identifies permits that may be applicable to a particular project:

1. US Army Corps of Engineers. The provisions of Section 404 Permits will govern projects that require fill in tidal or freshwater wetlands and mechanized clearing in wetlands.

2. US Coast Guard. Section 9 Permits will govern the construction of bridge crossings over navigable waterways.

3. Federal Aviation Administration. FAA Permits will govern projects, including equipment, encroaching navigable airspace.

4. State Budget and Control Board. These are administered by the Water Resources Commission for navigable waters of the State, exclusive of Critical Areas in coastal areas.

5. South Carolina Coastal Council. Regulations of the South Carolina Coastal Council will govern the construction of bridges and wetland fill in Critical Areas (e.g., tidal waters) and freshwater wetland fill in the Coastal Zone, which includes the counties of Jasper, Beaufort, Colleton, Charleston, Dorchester, Berkeley, Georgetown and Horry.

6. SCDHEC. The Water Quality Certificate issued by SCDHEC will be required for projects having other related permits, except a USACE Nationwide Permit. The Department also issues NPDES Permits; see Section 107.26.2. Compliance with the provisions of the Water Quality Certificate (e.g., erosion and sediment control, waste management and disposal, wetland encroachment) must be closely monitored. The regulations of SCDHEC will also apply to air quality; testing, removal, transport and disposal of hazardous materials and underground storage tanks; licensing use, transport and storage of radioactive materials; and responses to environmental emergencies.

7. Federal Energy Regulatory Commission. FERC regulations will apply to construction activity in lakes under the Commission's jurisdiction.

8. County Agencies. Some counties may require a wetland permit.

107.26.2 NPDES Construction Permit (Section 402)

107.26.2.1 General

Much attention has been directed to controlling erosion and sedimentation. Numerous Federal and State regulations have been promulgated governing the disturbance of land, including the National Pollutant Discharge Elimination System (NPDES) Construction Permit (Section 402), which addresses stormwater discharge from construction sites. SCDHEC administers the NPDES Program in South Carolina on behalf of the US Environmental Protection Agency. SCDOT has a General Permit with SCDHEC for NPDES applications. See Section 815 for detailed information on the NPDES Permit.

107.26.2.2 Chipping for Erosion Control

The Special Provisions of the Contract may specify that material generated during clearing and grubbing be chipped or ground to use the material as mulch in erosion control applications. In such cases, the Contractor will reduce the material to chips and then place the chips, as a substitute for straw mulch, in areas where erosion control is required. Inspect the Contractor's operations to make certain chipping operations conform to the governing Contract provisions and that the use of the chips complies with the Erosion and Sediment Control Plan (see Section 815). As approved in areas designated by the Resident Construction Engineer, the Contractor also may dispose of chips between the construction lines and the right-of-way lines.

107.26.3 US Army Corps of Engineers Permit (Section 404)

The Resident Construction Engineer must monitor the Contractor's compliance with the provisions of the Section 404 Permit and any Mitigation Plan included in the Contract. The

Special Provision will set forth the conditions that must be met by the Contractor. A continued violation of any of these conditions will be cause for the US Army Corps of Engineers to:

- halt work on the project,
- suspend or revoke the Permit, or
- take other action as appropriate.

If the Contract makes no reference to US Army Corps of Engineers permits and the Contractor intends to perform any dredging or discharge of fill material into freshwater or tidal wetlands, advise the Contractor not to proceed without the appropriate permit. Contact the Resident Construction Engineer, who will contact the Environmental Section.

107.26.4 Wetlands and Animal Habitats

Protected wetland areas and habitats of threatened and endangered species will be designated in the permit application package. During project development, the Environmental Section will evaluate the project, which may include examination of National Wetland Inventory Maps and field investigations, to assess the impact on wetland areas and the need for any Federal, State and local permits. Where impacts can be avoided, the Contract Plans and Specifications will designate areas for protection and specify activities required to preserve these areas. Where impacts are unavoidable, the Environmental Section will obtain the necessary permits. The Contract Plans and Specifications will incorporate governing Special Provisions related to permits, plans for mitigation (e.g., removal of abandoned fill sections from wetlands, lowering high ground to wetland elevation, restoring and enhancing degraded wetland areas), and profiles and cross-sections of impacted wetland areas. Ensure that protected wetland areas and animal habitats within the limits of construction are clearly staked or otherwise delineated. Make absolutely certain that all Contractor personnel have been informed of the sensitivity of these areas and the importance of their preservation. As needed, contact the Environmental Section for assistance.

107.26.5 Spill Prevention and Containment

Where chemicals and hazardous substances will be used on the project, best management practices typically will be specified in the Stormwater Pollution Prevention Plan to ensure safe storage, contain spillage and mitigate pollution. Consider the following guidelines:

1. Storage Area. Unless otherwise specified, the storage area should be:

    - located at least 50 feet from any receiving body of water;
    - surrounded by a berm to contain at least 1.5 times the total stored volume;
    - lined with an impermeable liner and covered; and
    - designated with signs indicating material type and cleanup procedures.

2. Storage Containers. Verify that all containers are appropriately labeled, tightly sealed and free of leaks.

3. Cleanup Material. Ensure that the proper absorbent cleanup material is readily available on the project to clean up any spills that may occur.

4. Spills. If a leak is evident or a spill occurs, notify the Contractor and verify that it is mitigated as soon as practical by authorized personnel (e.g., absorbent material).

5. Disposal. Ensure that unused or contaminated material is disposed of in accordance with Federal, State and local laws. If applicable, retain receipts of disposal in the project records.

See Section 107.27 for a detailed discussion on hazardous substances.

107.26.6 Disposal of Non-Hazardous Waste

107.26.6.1 Legal Considerations

The Contractor is responsible for complying with all applicable Federal and State laws and safety regulations and any applicable local ordinances with respect to waste disposal and burning of debris, as governed by the provisions of the Contract. The Contractor must dispose of non-hazardous materials consistent with SCDOT policy and the regulations promulgated by SCDHEC and the South Carolina Forestry Commission. The Contractor is responsible for obtaining all necessary permits and, where applicable, landowner agreements. Check the Special Provisions of the Contract for additional disposal requirements.

107.26.6.2 Burying on Right-of-Way

In general, do not allow the Contractor to bury combustible materials within the right-of-way, unless such disposal areas are clearly marked on the Contract Plans or otherwise approved by the Resident Construction Engineer. Under no circumstances allow the Contractor to bury timber or other combustible materials in embankment areas. If burying combustible clearing debris on the right-of-way is permitted, constantly monitor the Contractor's operation for unacceptable practices and examine embankment areas (e.g., ravine bottoms) to ensure that they are kept clean and ready to receive embankment material. The Resident Construction Engineer may allow the Contractor to dispose on the right-of-way non-combustible construction and demolition waste materials such as concrete, crushed stone, bricks and blocks. Where permitted, check to make sure that the Contractor covers such waste materials with a minimum of 2 feet of soil and that the area is well drained and seeded. Contact the Resident Construction Engineer for the disposal of such waste materials in embankment areas.

107.26.6.3 Disposal off Right-of-Way

It is often necessary for the Contractor to dispose of construction and demolition waste off the right-of-way. Waste from construction and demolition operations includes, but is not limited to, clearing and grubbing waste, refuse, pavement materials, wood, plaster, metals, asphaltic substances, bricks, blocks, concrete, crushed stone and masonry materials. Construction and demolition waste does not include asbestos and other hazardous materials (e.g., lead-based paint, chemicals, fuel oil). See Section 107.27. Consider the following:

1. Land Disposal Permit. SCDHEC controls the disposal of construction and demolition waste material outside the right-of-way. The Contractor may dispose of construction and demolition waste provided that the waste is taken to a SCDHEC approved commercial landfill or the Contractor and owner of the disposal site applies for and obtains a SCDHEC Land Disposal Permit.

2. Landowner Agreement. The Contractor is required to make all necessary arrangements with SCDHEC and the property owner and furnish the Department with a written release covering the disposal of the material. The release will be obtained on SCDOT Form 200.04 – Agreement for Placing Debris on Private Property. This release from the property owner does not relieve the Contractor of the requirement to deposit the material off the right-of-way where it will not be visible from a public road. The Contractor also must have a written agreement with the owner of the proposed disposal site. Before the Contractor disposes of materials outside the right-of-way, check to ensure that the Contractor has a written agreement with the property owner and any required permits.

3. Temporary On-Site Storage and Containment. A suitable and properly prepared on-site location should be used to temporarily store waste and debris until it can be hauled to the disposal site. Factors that should be considered include location, number of containers, lids, coverings, drainage, etc. If the Contractor uses a site on private property, written permission from the landowner, in the form of a properly executed landowner agreement, is required.

4. Director Approval. The Director of Construction must approve the use of a proposed disposal site adjacent to the right-of-way. Although the property owner may grant permission for waste disposal, SCDOT may disapprove the site because it could become a potential roadside nuisance, natural drainage obstruction or maintenance problem (e.g., debris sliding into the right-of-way).

107.26.7 Archeological and Historical Sites

107.26.7.1 Legal Reference

Section 106 of the National Historic Preservation Act of 1966, as amended, is intended to protect, rehabilitate, restore and reuse sites, buildings, structures and objects significant in American history, architecture, archeology, culture and engineering. The Special Provisions of the Contract will document the requirements for avoiding or mitigating the adverse impacts on these sites or properties. These contractual provisions are especially important during earthwork operations such as clearing and grubbing, building demolition, roadway excavation, borrow excavation and embankment construction. In particular, note that Section 106 of the Act is applicable to borrow sites on Federal-aid projects.

107.26.7.2 Assessment and Field Investigation

To comply with Federal and State statutes pertaining to archaeological, historical and paleontological resources, the SCDOT Archaeologist will review all proposed Federal-aid projects during the environmental planning process of project development. The sites that are

found to be eligible for, potentially eligible for or already listed on the National Register of Historic Places may have been intentionally avoided during design or designated for protection in the Contract Plans and Specifications. Avoidance of these sites may be part of agreements with the State Historic Preservation Officer and/or the Advisory Council for Historic Preservation. Protected sites should be clearly marked before construction begins. Contractors will avoid disturbances to these sites.

107.26.7.3 Late Discovery

Contractor personnel must continually watch for the presence of potential prehistoric or historic remains such as arrowheads, pottery, ceramics, flakes, bones, graves, gravestones or brick concentrations. If found, the Contractor is responsible for immediately notifying the Resident Construction Engineer and halting all work in the vicinity of the site until the SCDOT Archaeologist or the State Highway Engineer directs otherwise. This applies to all areas of ground disturbance, including road construction, borrow pits, and staging areas. Extra work associated with late discoveries will be paid as follows:

1. SCDOT Right-of-Way. With the exception of commercial operations, SCDOT-furnished sites (e.g., project right-of-way, SCDOT-furnished borrow pits, disposal sites, staging areas, haul roads, field offices) will be evaluated and cleared of potential issues by the SCDOT Archaeologist prior to letting. If the discovery occurs on such sites, compensation (i.e., time and money) will be paid the Contractor in accordance with Section 104.4 and Section 108.6. In such situations, maintain accurate records of work and delays in the Daily Work Report.

2. Contractor-Furnished Borrow Pits. If the discovery occurs in a Contractor-furnished borrow pit, no additional compensation (i.e., time or money) will be provided the Contractor for project delays or extra work. Emphasize this provision, which is especially important on Federal-aid projects, because the Contractor may want to retain professional services to clear the site of issues before opening the borrow pit.

107.26.8 Construction Noise

The primary legal references for noise impacts resulting from highway activities are the Federal Noise Control Act of 1972, 23 USC 109(i) and 23 CFR 772 “Procedures for Abatement of Highway Traffic Noise and Construction Noise.” Noise is any sound that has the potential to annoy or disturb humans or cause an adverse psychological or physiological effect on humans. The noise levels generated during highway construction vary depending on the type of equipment and the nature of the work being performed. Noise impacts can be severe, especially during nighttime activities and, in many cases, simple noise mitigation strategies may not suffice. Excessive construction noise may result from the following activities:

- equipment,
- blasting operations,
- pile driving,
- jackhammers, and
- plant operations.

During the project development phase, Preconstruction will have performed the following assessment with respect to construction noise:

- Identify land uses or activities that may be affected by noise from construction, especially sensitive receptors (e.g., schools, hospitals, neighborhoods, churches).
- Determine appropriate noise criteria limits for the identified receptors. These may be dictated by local regulations or ordinances.
- Document any measures required during construction to minimize or eliminate adverse construction noise impacts to the surrounding area.

The Special Provisions will document any restrictions or noise abatement measures required of the Contractor. For example, the Contractor may be required to provide sound-deadening devices, shields or physical barriers (e.g., plywood sheets, lead-vinyl curtains) or to provide noise abatement measures to restrict the transmission of noise in the immediate vicinity of schools, hospitals, rest homes, churches, libraries, museums, parks and other noise-sensitive sites specified in the Contract. These measures may include limiting working hours to minimize noises during school hours, for example, or may specify certain times for blasting. Other common-sense measures to reduce construction noise include ensuring that equipment is well maintained (e.g., mufflers), operating equipment at lower power or increasing the spacing of equipment.

107.26.9 Project Conformance Review

Consider the following guidelines when assessing compliance of the project with respect to water quality management:

1. Erosion and Sediment Control. Erosion, sedimentation and stormwater run-off control will be assessed based on the guidelines presented in Section 815.

2. Fording of Streams. Frequent fording of live streams will not be permitted. Check to ensure that the Contractor provides temporary bridges where required. Operation of mechanized equipment, except equipment that is normally used in the construction of structures or channel changes, is not permitted in live streams. This will require written authorization from the Resident Construction Engineer.

3. Waste Disposal Areas. Verify that waste disposal areas are located and constructed in a manner that will keep sediment and foreign substances from entering streams or other adjacent bodies of water.

4. Man-Made Pollutants. Check the project for pollutants (e.g., fuels, lubricants, bitumens, raw sewage) that may be discharged into adjacent waterways or man-made channels leading to these waterways. This provision also applies to the wash water from concrete mixing operations. This is absolutely unacceptable. Notify the Superintendent of any such occurrence and require immediate correction.

5. Work in Waterways. Where work is permitted in waterways, verify that all falsework, piling, debris and other unacceptable materials are cleared as soon as practicable after construction.

6. Non-Compliance. Pay particular attention to any contamination or sedimentation of adjacent streams, watercourses, lakes, ponds or adjacent properties and to any on-site or off-site damage resulting from stormwater runoff. Immediately notify the Contractor in writing of any non-compliance and enforce the provisions of the Contract with respect to repairs and rework.

107.27 HAZARDOUS AND/OR TOXIC WASTE

107.27.1 Contractor Compliance

The Contractor is responsible for complying with all Federal and State regulations and permit requirements for hazardous material abatement and worker protection, including:

- removal and containment,
- sampling and testing,
- handling and on-site storage,
- transport and disposal, and
- medical surveillance tests.

The Contractor also is responsible for immediately notifying the Resident Construction Engineer and the appropriate State and Federal agencies of any release of hazardous materials into the environment and any exposure incidents involving construction personnel and the public. SCDOT will withhold payment to the Contractor associated with any fines issued by State and Federal agencies for non-compliance.

107.27.2 Types of Hazardous Materials

Many different types of materials have been tested and classified as hazardous. The following are hazardous materials that are commonly used, produced or encountered during construction:

- asbestos;
- lead-based paints;
- radioactive materials (e.g., nuclear density gauges);
- pesticides and petroleum products (e.g., fuel, oil);
- paints, solvents, enamels and epoxies;
- lead acid and heavy metals;
- above-ground storage containers and barrels; and
- underground storage tanks.

Materials that have been classified as hazardous are those that have been tested and found to have adverse health and environmental impacts at specific concentrations. Improper handling and disposal of such materials can expose workers to health hazards and contaminate surface water, groundwater and soil.

107.27.3 Assessment and Field Investigation

During project development, the Environmental Section, in cooperation with other SCDOT personnel, may review project right-of-way, perform field investigations and inspect structures, buildings and underground facilities, as appropriate, to determine if hazardous materials will be used, generated or encountered during construction. This preliminary investigation is routine, but critical, on projects that may require:

- on-site storage of hazardous materials needed to perform the work;
- demolition of building facilities;
- demolition, dismantling or repainting of structures; and
- removal and disposal of storage tanks, contents and contaminated soils.

For projects requiring abatement or mitigation of hazardous materials to protect workers and the environment in accordance with State and Federal regulations, the Contract Plans and Special Provisions will include detailed plans, directives and operational procedures that the Contractor must comply with during construction. Consider the following:

1. Building Demolition. Unless otherwise specified in the Contract, the Contractor will be responsible for having a licensed environmental firm inspect any buildings to be razed on the project for the presence of asbestos. A copy of the Inspection Report will be submitted to the Resident Construction Engineer.

2. Demolition or Renovation of Structures. If the project involves the demolition or renovation of an existing structure, SCDOT will inspect the structure for the presence of asbestos and lead-based paint. The Special Provisions of the Contract will include the results of the inspection. Copies of the report will be made available through the District Engineering Administrator's Office and the Bridge Construction Office.

3. Underground Storage Tanks. SCDOT will assess the disposition of underground storage tanks located on the project. Separate pay items will be developed and included in the Contract for:

   - removal and disposal of tank contents;

   - removal and disposal of low-level and high-level contaminated soil located around the underground storage tank, as classified by SCDHEC; and

   - removal and disposal of the underground storage tank, all piping associated with the connection to the underground storage tank system and the dispenser island.

   The Contract Plans and Special Provisions will delineate the station number and offset (i.e., left or right of centerline) and a detailed description of the work to be performed.

107.27.4 Permits and Submittals

Prior to beginning any operation involving hazardous materials, the Contractor will submit the following to the Resident Construction Engineer:

- evidence that the Contractor, or subcontractor, performing the work has been properly certified for the work;
- demolition, dismantling, removal or renovation plan (e.g., surface preparation, containment, ventilation), stamped by a Professional Engineer registered in the State of South Carolina, as appropriate;
- on-site storage, containment, enclosure and security plan, including emergency response and spill mitigation;
- transportation and disposal plan, including certificates and licenses required by the governing State and Federal agencies;
- worker protection program, including required training certificates for each employee on the project and the results of base-line medical surveillance tests, as appropriate;
- all permits required by SCDHEC and the South Carolina Occupational Safety and Health Administration; and
- EPA Identification Number, including contact information for the disposal facility and the transporter.

The Resident Construction Engineer will obtain the EPA Identification Number from the Environmental Section. Furnish the EPA Identification Number to the Contractor, because it must be placed on all project correspondence, shipping invoices, disposal affidavits and forms related to the work involving the hazardous materials. For work on existing structures, the Resident Construction Engineer and Contractor will jointly complete SCDOT Form 200.05 – Notification of Demolition required by SCDHEC. The Notice of Demolition will be signed by SCDOT and the Contractor. Verify that the Contractor has forwarded this Form to SCDHEC.

107.27.5 Field Marking of Site

Ensure that all buildings containing asbestos, structures containing asbestos or lead-based paint, underground storage tanks, hazardous material storage areas and other hazardous waste sites on the project have been cordoned off, marked and signed as specified in the Contract.

107.27.6 Emergency Response Contact Sheet

Prior to starting removal operations, the Resident Construction Engineer will prepare an Emergency Response Contact Sheet of contact names and telephone numbers to use in the event of a hazardous material/hazardous waste situation. It is recommended that the chart be a one-page flow chart illustrating the priority of calling both SCDOT personnel and non-SCDOT

agencies. Place the chart in an obvious location within the Resident Construction Engineer's office. In a catastrophic situation where an extremely hazardous or life-threatening substance is encountered, immediately notify 911 Emergency Response, the South Carolina highway patrol, local fire department and the SCDHEC Emergency Response Team.

107.27.7 Removal Operation

Where buildings, structures and underground storage tanks are either demolished, dismantled, removed or renovated, check to ensure that the removal and handling method, containment and ventilation system and the method used to protect the environment, workers and public comply with specified requirements. Continually monitor the operation for obvious signs of non-compliance and notify the Contractor, in writing, of any needed corrections. Maintain accurate records of infractions and any directives to the Contractor in the Daily Work Report and appropriate SCDOT Construction Forms.

107.27.8 On-Site Containment and Storage

The waste generated by the removal operation must be held in containers (e.g., drums, roll-off boxes, gondolas) and kept covered at all times, except during the actual addition or removal of the material. Verify that waste, having been classified as hazardous, is stored and labeled as required by the South Carolina Hazardous Waste Management Regulations. The containers must be stored on-site in a locked fenced area and labeled as a hazardous waste storage area. Verify that the on-site storage area is secure, not subject to accidental spills or vandalism and not located near traffic, water courses or drainage facilities.

107.27.9 Transport and Disposal

Observe the transport and disposal operation for compliance. Transport vehicles must be signed as a carrier of hazardous material of the type being carried. This is a Federal requirement. Ensure that the hazardous waste generated by the removal operation is shipped by a licensed transporter to an approved disposal facility, as determined by SCDHEC. The Contractor is responsible for informing the facility to dispose of the waste as a hazardous material.

107.27.10 Late Discovery

107.27.10.1 General

Where a suspected hazardous waste or material is discovered during construction, pay particular attention to the encounter and treat each situation uniquely. Use common sense, remain calm and stay alert. Use the guidelines in the following Sections to mitigate and contain the situation and obtain needed assistance.

107.27.10.2 Potential Discovery Situations

Upon discovery of a potential hazardous substance, do not open any closed container or otherwise attempt to identify the substance. Halt work in the immediate vicinity of the site and immediately notify the proper authorities, which will depend on the nature and severity of the situation. Consider the following:

1. Excavation. Hazardous substances could be encountered during excavation. Treat all underground storage tanks, buried containers and suspect soil and groundwater as potential hazards. Obnoxious fumes, unusual odors, discolored soils, water surface sheen and visible fumes and smoke are key indicators of a hazardous substance.

2. Illegal Dumping. Be aware that hazardous materials could be illegally dumped within the right-of-way during off-shift hours. Use common sense and collaborative judgment to assess the nature of the encounter.

3. Construction Mishaps. Construction personnel and equipment operations could inadvertently rupture a natural gas or petroleum pipeline or cause a large fuel or chemical spill. Treat such incidents as a hazardous-material situation.

107.27.10.3 Halt Work in the Vicinity of the Site

Upon discovery of a suspect substance, immediately notify the Resident Construction Engineer. All construction personnel must treat such conditions with extraordinary caution. A written directive to stop work in the vicinity of the suspect substance will be issued to the Contractor. This action is necessary to avoid health risks to all personnel at the site and the general public. Health and safety take precedence over construction costs and delays. Individuals who have come into direct contact with suspect substances (e.g., skin contact, inhalation) or exhibit adverse reactions should receive immediate attention by authorized medical personnel. People who have been exposed to suspect substances also should be monitored for adverse, delayed reactions based on the recommendations of authorized medical personnel.

107.27.10.4 Secure the Area

After work has been stopped, the area surrounding the suspect substance must be secured to prevent inadvertent or unauthorized access by personnel or the general public. Treatments generally consist of cordoning the area, installing temporary fencing and/or rerouting traffic patterns. Specific actions will depend on the scale, severity and nature of each situation. In addition, each situation will require appropriate administration of the Contract. After the area has been properly secured, the Resident Construction Engineer should consider practical alternatives for the Contractor to continue work on the project. If unavailable, document work delays in the Daily Work Report, because Contractor negotiations will be necessary.

107.27.10.5 Notify Personnel of the Incident

Use the Emergency Response Contact Sheet posted in the Resident Construction Engineer's office to initiate contacts of the incident. A coordinated effort is necessary to properly address

each hazardous material/hazardous waste situation. To provide continuity within the project, the Resident Construction Engineer always should be kept informed. Maintain complete and accurate records in the Daily Work Report (e.g., contacts made, recommendations, decisions, planned and completed activities, schedules). Key contacts are as follows:

1. Resident Construction Engineer. After the Resident Construction Engineer has been notified, the Resident Construction Engineer will contact the District Construction Engineer and the District Engineering Administrator. The District Construction Engineer will provide initial guidance regarding the handling of suspect hazardous materials. Do not permit suspect soils that have been excavated to be rehandled unless otherwise recommended by the District Construction Engineer.

2. District Construction Engineer. The District Construction Engineer will contact the Research and Materials Engineer and the Environmental Section for additional guidance regarding the handling of suspect hazardous materials. This guidance should immediately be passed on to the Resident Construction Engineer. As needed, the District Construction Engineer then will notify the:

   - Director of Construction,
   - Road Construction Engineer,
   - Bridge Construction Engineer,
   - Resident Maintenance Engineer,
   - Federal Highway Administration (if project is under Federal Oversight), and
   - SCDHEC.

3. Director of Construction. The Director of Construction will contact the Environmental Section and the Right-of-Way Section to assess the need for immediate public relations; to investigate encroachment on private property, source of origination and ownership; and to assess the need for an emergency procurement of a qualified hazardous material Contractor.

4. Right-of-Way Section. The Right-of-Way Section will coordinate with the Environmental Section to determine if it is necessary to contact the South Carolina Office of the Attorney General with regard to liability, cost recovery and documentation issues.

107.27.10.6 Considerations of Avoidance Alternatives

Alternatives to completely or partially avoid the hazardous materials are preferred. The Resident Construction Engineer, District Construction Engineer, Road Construction Engineer, Bridge Construction Engineer and Director of Construction will initially assess the feasibility of complete avoidance. As needed, SCDOT personnel from Preconstruction will assess the feasibility of design revisions, partial deletions of work and construction alternatives. SCDOT will also consider the feasibility of terminating the Contract based on the scope of the situation, the costs of other alternatives, the magnitude of claim settlements and the project's significance to public safety and other planned improvements. If complete avoidance is not feasible, alternatives for partial avoidance will be considered to minimize health risks. If complete avoidance is selected, the Resident Construction Engineer will issue the Contractor a written

directive addressing changes to the project and revisions to the Contract. As needed, forward one copy of the written directive to the following:

- District Construction Engineer,
- Contract Administration,
- Bridge Construction Engineer,
- Road Construction Engineer,
- Director of Construction,
- Right-of-Way Section, and
- Environmental Section.

Cost and delay issues will probably necessitate Contractor negotiations and may require a Change Order. Therefore, maintain complete and accurate records in the Daily Work Report. As needed, request a revised progress schedule from the Contractor to address the changes to the project.

107.27.10.7 Documentation and Payment Considerations

Where the removal and disposal of known hazardous materials on the project have been scheduled, measure, document and pay for the work based on the pay items provided for in the Special Provisions of the Contract. Where late discovery of hazardous substances occurs, the work for investigating, testing, removing and disposing of the hazardous material will be measured and paid for as extra work or force account work (see Section 104.5 and Section 109.4), unless a specialty firm is contracted to perform the work under separate Contract. Therefore, maintain complete and accurate records in the Daily Work Report and supplemental SCDOT Construction Forms through the course of processing a hazardous material or hazardous waste discovery. Written notes, reports, detailed cost records, photographs and videos all should be considered. Such records will assist SCDOT in cost recovery and possible litigation.

Section 108
Prosecution and Progress

108.1 SUBLETTING OF CONTRACT

Section 108.01 of the *Standard Specifications* governs the provisions for subletting the Contract. A subcontractor is a person or firm who performs under Contract with the Prime Contractor the work on a Contract item or items or portion of an item for the Contractor. The Resident Construction Engineer should not allow any subcontractor to perform work on a project unless written approval from the Director of Construction has been given. Subcontractors will comply with all Contract requirements and will only work on such Contract items that have been sublet to them.

108.2 PRECONSTRUCTION CONFERENCE AND PARTNERING

108.2.1 Preconstruction Conference

108.2.1.1 Purpose of the Conference

In accordance with the Section 108.02 of the *Standard Specifications*, a Preconstruction Conference will be held prior to starting each SCDOT construction project. The purpose of the Preconstruction Conference is to ensure that a working understanding is established among all parties involved in the project, thus enhancing coordination and reducing miscommunication and delays. Discussion topics will be determined on a project-to-project basis, but may include:

- intent of the Contract and its provisions;
- authority of SCDOT administrative and inspection personnel;
- responsibilities of Contractor and subcontractor personnel;
- partnering relationship and requirements, whether formal or informal;
- value engineering proposals, when appropriate;
- Contract Plans, including alterations, schedules and phasing of work;
- right-of-way agreements, outstanding or otherwise;
- landowner agreements affecting construction;
- utilities and railroads, including coordination, abandonment, relocation and adjustment;
- health and safety requirements of construction personnel and the public;
- maintenance and protection of traffic during construction;
- environmental protection and water pollution control;
- compliance with environmental, navigational and other permits (e.g., NPDES);
- non-hazardous and hazardous waste handling and disposal;
- procedures for mishaps and discovery during construction (e.g., skeletal remains, UST);
- unusual conditions and areas requiring special attention;
- allowable time extensions and payment for extra work;
- change orders, extensions and responsibilities for delay and damages;
- subletting and claim processing procedures;

- subletting criteria and responsibilities;
- special requirements of Federal-aid projects;
- repercussions for contractual non-compliance;
- criteria for halting work, withholding or deducting payment;
- material requirements, including approved sources and pit acquisition and reclamation;
- specialized equipment requirements;
- proposed construction methods;
- requirements for project acceptance and closure; and
- other issues to better progress and efficiency.

Pay items in the Contract may be discussed so that all affected parties will understand the schedule, materials, construction methods, sampling and testing responsibilities, acceptance criteria and method of measurement and payment. Stress to the Contractor the importance of compliance with all requirements of permits contained in the Contract (e.g., NPDES).

108.2.1.2 Attendees of the Preconstruction Conference

Attendees of the Preconstruction Conference may include:

- Superintendent and any other Contractor representatives deemed necessary;
- representatives of all subcontractors employed on the project;
- material suppliers, as appropriate;
- Resident Construction Engineer;
- Inspectors assigned to the project;
- District Construction Engineer;
- District Engineering Administrator;
- Road or Bridge Construction Engineer, as appropriate;
- Director of Construction;
- representatives of all affected utility and railroad companies;
- local county and municipal government officials, as appropriate;
- FHWA representatives, on Federal-aid projects; and
- representatives of other affected Federal, State, local or private concerns.

Pay particular attention to affected utility and railroad companies. Relocation and adjustments can greatly delay the project if not carefully scheduled and executed. See Section 105.6, Section 107.14 and the Special Provisions for additional information.

108.2.1.3 Meeting Coordination and Scheduling

The Resident Construction Engineer will schedule and facilitate the meeting. The meeting will be held after the Notice of Award but prior to the Notice to Proceed. Telephone and electronic mail service may be used to coordinate schedules; however, once a mutually agreeable date and location have been established, prepare and forward a formal invitation, including agenda, to each desired attendee.

108.2.1.4 Minutes of Meeting

The Resident Construction Engineer will forward the minutes of the meeting to each attendee and invitee and retain a copy of the minutes and attendance log in the project files. Ensure that a copy is forwarded to each Inspector assigned to the project.

SCDOT Form 100.01 – RCE Checklist should be completed after the Pre-Construction Conference.

108.2.2 Partnering

108.2.2.1 Overview

Project-level partnering will be utilized on all State highway construction contracts as of June 2003. Known as the South Carolina Partnering Program (SCPP), this initiative has been jointly embraced and supported by both the Department and other members of the highway construction industry in our State.

Partnering is a proven project management technique that has saved millions of dollars and countless amounts of time on projects across the United States. It is a tool that owners, engineers and Contractors have used for many years in both the public and private sectors to successfully deliver projects of all types and sizes.

The SCPP sets the stage for SCDOT and the State highway industry to be more successful in the delivery of their highway construction projects to the people of South Carolina. As a result, SCDOT can better manage its overall project costs, contractors are more profitable, projects are built to higher quality levels, and work is completed faster. The overall impact to the program is significant, if all of the steps and elements of the SCPP are implemented faithfully by individuals at all levels in all organizations.

108.2.2.2 South Carolina Partnering Program Oversight

Oversight and management of the SCPP will be accomplished using the organizational structure of SCDOT. Duties and responsibilities will be as follows:

1. Executive Director/State Highway Engineer. Provide overall vision, leadership and support for the development, implementation and continued use of the partnering process on SCDOT highway construction projects.

2. Director of Construction. Responsible for Statewide support and implementation of partnering on all construction projects. Establishes and provides the list of facilitators to be used on the projects. Monitors and reviews the progress of partnering implementation throughout the State. Reviews project evaluations and identifies trends and issues that need to be addressed to improve the overall implementation of partnering. Provides initial training and any needed follow-up training in the principles of partnering.

3. District Engineering Administrator. Responsible for the proper and effective implementation of partnering on all highway construction projects in their District. Offers proper support to the Resident Construction Engineers so that partnering implementation is not encumbered either by policy or due to resource allocation. The District Engineering Administrator will attend approximately 50% of the partnering workshops. Attendance in some cases may be delegated to a representative designated by the District Engineering Administrator.

4. Resident Construction Engineer. Responsible for the implementation of partnering on each of their projects. Works with the Contractor's Project Manager to select the facilitator, scheduling and participating in the Initial and Follow-Up Workshops, utilization of the Team Evaluation Process and all other activities associated with the implementation of partnering on their projects. The Resident Construction Engineer is also responsible for any additional training required to assist SCDOT Inspectors and SCDOT Technicians on understanding and implementing the partnering process.

The process of partnering consists of a number of elements that work together to successfully impact overall performance on a highway construction Contract. These elements are:

- Leadership and Management,
- Partner all Projects,
- Partnering costs,
- Facilitation,
- Initial Workshop,
- Follow-up Workshop,
- Team Charter,
- Issue Escalation Process, and
- Team Evaluation Process.

Each of these elements will be described in detail in the following sections.

108.2.2.3 Leadership and Management

Leadership is a major element of every successful partnering program. There are several layers of leadership and management that will be required to yield an effective partnering program. Further details are provided in the sections that follow.

108.2.2.3.1 Executive Director/State Highway Engineer

The Executive Director / State Highway Engineer is the first management level. There is a clear message to the agency that partnering is the new paradigm for doing business and that it is the preferred means for administering construction projects throughout the State. A strong and unequivocal message is essential for everyone to accept partnering and its implementation.

108.2.2.3.2 Director of Construction

The second management level in partnering is the Director of Construction. The Director of Construction is the key person designated within SCDOT who will be the leader of the partnering effort on a day-to-day basis, who speaks with the authority of the Executive Director on all matters relating to the implementation of this effort and who has the resources necessary to handle the administrative elements for the partnering effort. The Director of Construction not only has oversight for the SCPP activity within SCDOT but also functions as the direct liaison with the construction industry on all matters pertaining to partnering. The staff of the Construction Office will assist the Director of Construction in the administration of the partnering program.

108.2.2.3.3 District Engineering Administrator

The final level of leadership or management critical to the implementation of the SCPP is the District Engineering Administrator. This individual has responsibility for the day-to-day administration of the specific construction projects and the personnel who will provide the site inspection and interface with the Contractor. It is imperative they support, advance and otherwise set the tone in their Districts for the work that will be necessary to establish partnering on their projects.

108.2.2.4 Partner All Projects

The partnering process requires a different mindset for all project participants. Traditional approaches by Contractors and owners in their relationships must be set aside in exchange for the higher and more appropriate objectives of the partnering relationship. The Contractor transitions from an approach that focuses on meeting minimum Contract requirements to a higher quality and more profitable operation. The owner moves from a catch-and-punish approach in Contract administration to a collaborative relationship that results in better projects delivered faster than before.

This difference in approach is tangible. Experience across the country has shown that it is impractical for Contractors and owners who work together regularly to only partner some of their projects and not others. Therefore, it is the intent of SCDOT and the Carolinas AGC that every project built in South Carolina be partnered using the formal process outlined in the SCPP.

108.2.2.5 Partnering Costs

There are nominal expenses associated with the partnering process. The Initial Workshop costs include salaries and benefits for all of the participants, the cost of the facility, any meals and breaks, the outside facilitator and other incidental expenses. However, these expenses turn out to be modest when compared to the money saved on each partnered project.

The expenses for a typical Initial Workshop will be borne collectively by the participants. Each organization will bear the expense of having its staff present and any associated travel costs.

The owner and the Contractor will split facility costs, meals, breaks and audio-visual expenses. In addition, the cost of the facilitator and their travel expenses will be borne equally by the Contractor and the owner.

The Contractor will pay for the non-labor related expenses and the costs relating to the facilitator used in the partnering program. A Change Order to the Contract will be initiated to cover reimbursement for one half of the direct expenses associated with the partnering process. See Section 101.6.3 for additional information on processing Change Orders in SiteManager.

108.2.2.6 Facilitation

One of the factors that contributes to the success of a partnering process is the use of facilitators to assist the team through the Initial Workshop and also the Follow-Up Workshop if necessary. In general, facilitators will be independent of the Contractor or the State and selected from the pool of outside facilitators already under contract with SCDOT. While the expense of a facilitator may seem unnecessary to some, it is nominal compared to the cost of not resolving problems during the course of a project.

Project facilitators will develop an agenda with the Resident Construction Engineer and the Contractor's Project Manager for the specific project for which they will provide services. This agenda for the Initial Workshop will follow the basic format established for the SCPP but may be modified based on the unique issues relevant to the project and also the style and approach of the facilitator. Once selected, the Resident Construction Engineer and the Contractor's Project Manager will agree upon a date for the Initial Workshop with the facilitator.

Facilitators will be compensated at their established rate plus any additional expenses they may incur in support of the partnering workshop. If the project is of a long enough duration or of a high level of complexity, there may be a Follow-Up Partnering Workshop. In this case, it would be desirable to have the same facilitator provide services for that session as used for the Initial Workshop.

108.2.2.7 Initial Workshop

The Initial Workshop is the part of the process that most individuals associate with partnering. Unfortunately, on many projects, this is where the process begins and ends. In doing so, many project teams deny themselves of the many other benefits of partnering that are derived from using all of the tools available. It is the intent of the SCPP that the Initial Workshop be just the beginning of the partnering process on State highway projects.

The Initial Workshop is held before any construction begins on the project. It typically involves from 20-35 key members of the project team representing the Contractor, SCDOT, design engineer and any other key stakeholder or contributor who can impact the successful completion of the project. It is the responsibility of the Resident Construction Engineer and the Contractor's Project Manager to set a date for the Initial Workshop and make all necessary physical arrangements for a productive session.

The Resident Construction Engineer and Contractor's Project Manager are also responsible for identifying the individuals who should attend from their respective organizations as well as other potential participants. They will issue invitations as appropriate.

A partnering facilitator will be selected from the pre-qualified list and a pre-workshop conference call will occur between the Resident Construction Engineer, Contractor's Project Manager and the facilitator to review project issues and any other elements of the project that must be addressed during the Initial Workshop. The Initial Workshop has five objectives, as follows:

- Establish team relationships.
- Develop the listing of common goals for the project and capture these in writing in the form of a Team Charter.
- Develop an Issue Escalation Process to provide project team members a tool to resolve problems quickly and equitably.
- Develop a Team Evaluation process to assess team performance and make appropriate adjustments during the life of the project.
- Identify project issues that need immediate resolution.

The one-day Initial Workshop may be modified as necessary to complete the needed activities for launching the partnering process on a given project. On simple projects the Initial Workshop may be shortened to less than a day or combined with other projects. The partnering session will be coordinated with the traditional Preconstruction Conference held on SCDOT construction projects.

In other cases, such as very large projects or those that are extremely complex, it may be advisable to extend the Initial Workshop to one and a half or two days. The process and approach are flexible enough to accommodate any type of project condition that will present itself. On these types of projects the Resident Construction Engineer will work with the Contractor's Project Manager and the facilitator to create an agenda that meets the goals and objectives of this meeting.

A well-executed Initial Workshop will create the environment for partnering to succeed on any project. Careful planning, attendance of essential project personnel and professional facilitation will help to ensure this success.

108.2.2.8 Follow-Up Workshop

On longer or complex projects it will be advantageous to have one or more Follow-Up Workshops. These workshops differ from the Initial Workshops in that all of the partnering elements are already in place (i.e., Team Charter, Issue Escalation Process). The Follow-Up Workshop has four objectives, as follows:

1. Reaffirm the Original Project Goals Contained in the Team Charter. Are they still valid? Is everyone still committed to the goals? Do any of them need to be modified for whatever reason?

2. Evaluate Team Performance. Are the partnering tools being used? Is the Issue Escalation Process working? What can be done to improve team performance?

3. Issue Resolution. Are there outstanding issues that need to be resolved? Are there issues on the horizon that need to be addressed at this time so they do not become problems in the future?

4. Identify Project Completion Priorities. What are the critical elements left to complete on the project? How can the respective team members work together to address these priorities?

The agenda for a typical Follow-Up Workshop will be developed by the facilitator in consultation with the Resident Construction Engineer and the Contractor's Project Manager. It is advisable to use the same partnering facilitator for both the Initial Workshop and the Follow-Up Workshop. This will allow the team the opportunity to leverage their past relationship with the facilitator and the facilitator's knowledge of the project and team members for a more effective session. Attendance should include the same individuals who participated in the Initial Workshop or their replacements and any new stakeholders or team members who are critical to the success of the project. Follow-Up Workshops should be held on projects based upon the following criteria:

- Projects exceeding one year in duration – at least one Follow-Up Workshop at the mid-point of the project or before the second construction season begins.

- Projects exceeding $20 million – at least one Follow-Up Workshop at the mid-point of the project.

- Projects exceeding $50 million – Follow-Up Workshops held quarterly.

These criteria can be modified or adjusted based on specific project needs. Experience has shown there are too few Follow-Up Workshops being held on partnered projects. When in doubt, the team should invest the time, even if it is for just a half a day. Follow-Up Workshops are critical to the success of large or complex partnered projects and must be held.

108.2.2.9 Team Charter

One of the products of the Initial Workshop will be the development of the Project Partnering Charter or Team Charter. This will be an important document for the project team since it will list the collective objectives that will define success for the particular project. The Team Charter is developed through a variety of means used by the facilitator depending on the project and the experience of the team participants. For those with a great deal of partnering experience, the process is much simplified and the charter is developed more quickly. The Team Charter will contain goals and objectives that will assist the team in defining the ultimate success of the project. In addition, it will also provide them a tool to make project evaluations throughout the life of the project. Measuring team performance against these goals during the project helps to keep the team on track and leads to greater success in the partnering process. The Team

Charter consists of three basic parts: preamble, goals and objectives, and project commitment. Each of these is described in the following sections.

108.2.2.9.1 Preamble

The preamble is the introductory paragraph for the Team Charter and provides basic information on what the project is, who the team members are and introduces the goals and objectives that will follow. It need not be long; perhaps 3-5 sentences, but is important in framing the rest of the document.

108.2.2.9.2 Goals and Objectives

The second part of the Team Charter is the goals and objectives. As part of the Initial Workshop there will be time dedicated to developing the goals and objectives of the project team. These goals and objectives are not intended to replace the Contract documents but rather will enhance the team member's understanding of the issues they must collaborate on. For example, partnering is not a replacement for the quality control specifications contained in the Contract Specifications for a project. In fact, projects where there is a high level of commitment to the partnering process have fewer quality control problems or issues and ultimately result in a better product overall.

Sincerely committed team members will see the Team Charter as a document that speaks to a higher level of performance than is perhaps required of the Contract documents. Not higher in the sense of more stringent specifications but rather higher in that individuals and companies have made personal commitments to one another to do their very best to help each party achieve their respective goals and objectives. True partnering creates a synergy that does not exist on other projects and results in greater profitability for the Contractors and better projects for the owners.

These goals and objectives often include such items as safety, finishing the project in a specific amount of time, budget goals and quality goals often relating to not having any rework. In addition to these, there will be others that will be unique to the specific project but that will be important to this team in defining their collective success. Care must be taken so that all the Team Charters not be the same or become a fill-in-the-blank type of document. Rather, they must be developed by the team and result in a feeling of ownership on the part of all participants.

Once the project goals and objectives are developed, they should be reduced to simple statements generally one sentence in length. Where possible, they should reflect a measurable goal or objective to facilitate ease in assessing progress throughout the life of the project. For example, a project completion goal should be defined in terms of "completed in 180 working days," or "completed by November 1, 2004," or "two months ahead of schedule." In some cases it will not be possible to add this element of measurement to a goal or objective. Nevertheless, the goal should still be included in the Team Charter with an understanding on the part of the team as to how this particular goal will be evaluated over time.

108.2.2.9.3 Project Commitment

The last part of the Team Charter is the project commitment. It comes at the end of the charter and reflects the overall commitment of the team members to one another and the project. The project commitment statement need not be long, two to three sentences at the most, but helps to finalize the document and give the team an opportunity to summarize their collective commitment to the project and one another. Team Charters should be no more than a page long. It is often appropriate to put company and agency logos on the charter document. Many teams cho0se to print the charter on high-quality paper that adds a special touch to the overall document.

At the end of the Initial Workshop, it is customary that the team members all sign the Team Charter. Generally, the senior individual from the Contractor and owner's teams sign first and then all other participants are invited to do so also. While not a Contract document, there is something powerful about having individuals sign a Team Charter and make these personal commitments relating to their performance and the goals and objectives of the team. Copies of the Team Charter should be framed and posted in conspicuous places at the owner's and Contractor's project offices. A team picture often accompanies the charter wherever it is displayed.

Occasionally, there will be someone who doesn't want to sign the charter. Their hesitancy is often the result of their fear of foregoing some power or regulatory role. In fact, the Team Charter does neither but is a reflection of individual and collective commitment to acting in good faith, dealing honestly and fairly with one another and assisting each party in achieving their goals and objectives for the project. No one should be forced to sign. Even their presence at the Initial Workshop will derive benefits to the team in the long run.

108.2.2.10 Issue Escalation Process

Another product of the Initial Workshop is an Issue Escalation Process. One of the challenges of every construction project is getting problems resolved quickly before they become costly for the Contractor or the owner. Problems are going to occur and issues will arise on every project. It would be unrealistic to expect a problem-free project. The real measure of success on a partnered project is not how many issues arise but rather how the team handles the issues when they do develop. Partnering gives the project team the tools to resolve problems quickly and cost effectively for all team members.

The Issue Escalation Process must be developed as part of the Initial Workshop. It should define how the team will address issues that arise during the course of the project. There are four critical elements to any Issue Escalation Process:

- An understanding of the different levels of authority/management of the organizations involved in the project.
- A clear reflection of the authority that resides with each level.
- The time element that specifies how long a particular level of the escalation process has to resolve the problem before it is automatically elevated to the next level.

- While not a formal part of the Issue Escalation Process, it is often helpful to have examples of the types of issues that will be resolved at what level agreed upon at the Initial Workshop.

Each of these four elements are described in further detail in the following sections.

108.2.2.10.1 Understanding Levels of Authority / Management

One of the problems with resolving issues on a construction project is a lack of understanding on who the players are and how they fit into the other party's chain of command and authority structure. At the Initial Workshop, the project participants define what those relationships are and gain an understanding on how those relationships will work to resolve issues that arise. The facilitator will assist the team members in accurately describing their organizations and how they function in solving issues on their projects.

It is usually helpful in developing the Issue Escalation Process to document the levels of management. This will help the partnering participants in understanding who will work with whom, to whom the issues go on the project and who they go to once the issue leaves the project.

Sometimes partnering teams will find that one party or the other has a relatively flat management structure with few layers between the project field supervisor and the top manager. This is most often the case with small Contractors who have a limited management structure. Care must be taken to align management levels properly so that issues can receive a fresh set of eyes as they are escalated to successive levels in management. The facilitator will assist the team in this process.

108.2.2.10.2 Definition of Authority

The second important element of the Issue Escalation Process is the definition of authority that resides at each level. One of the most common complaints from owners and Contractors alike is that their counterparts do not have any authority or are limited by their management in the kinds of decisions they can make.

A properly developed Issue Escalation Process defines the authority that each individual has and all project participants have a clear understanding of who can make what decisions. For example, a Resident Construction Engineer for the owner may have $25,000.00 in Contract Change Order authority, whereas a Project Manager may have more or less than that. Knowing the authority levels of the individuals involved will help the team understand where the decision will be made on the issue and will make the overall process more efficient. The most effective Issue Escalation Processes have these authorities levels defined and well understood.

108.2.2.10.3 Definition of Time

The third element of an effective Issue Escalation Process is a definition of time. Time is the enemy of all parties when it comes to resolving issues on the project. Even good decisions, if not made in a timely manner, can have detrimental impacts on overall project success. Thus, the Issue Escalation Process must include a time element to ensure timely resolution of problems.

Many partnering teams actually assign timeframes to their Issue Escalation Process. These timeframes are generally longer for the first levels of escalation with shorter and shorter periods allocated the higher the issues go in the process. The theory is that, if an issue must be escalated through several layers of management then timely resolution is becoming even more critical as the project work moves ahead. No specified timeframes should be forced upon the partnering team. Rather, timeframes should be developed in cooperation between the owner and the Contractor in a way that makes sense for the given project.

108.2.2.10.4 Definition of Specific Issues

The final element of the Issue Escalation Process is the definition of specific types of issues that may need to be resolved and at what level. Basically, it is helpful to many project teams to select hypothetical issues that can then be applied to the Issue Escalation Process so that all participants can see how the process works. Sometimes the Issues Escalation Process seems a bit abstract to new participants, and a few examples of issues have proven valuable in communicating how the process works. This may or may not be reflected in the final version of the Issue Escalation Process depending on the preferences of the team members.

108.2.2.11 Team Evaluation Process

One of the essential elements of the partnering process is the Team Evaluation process. This is a tool that allows a project team to examine how they are performing, assess their progress towards the goals included in the Team Charter, elevate project issues that need to be resolved and identify areas where their relationship may need to improve to assure project success. The Team Evaluation is often overlooked on many partnering projects with a consequential diminishment in the returns gained from the partnering process. In the SCPP, a Team Evaluation process will be required for each partnered project. The process will be developed during the Initial Workshop and will be administered by the Resident Construction Engineer and the Contractor's Project Manager. The evaluation process will have the following attributes:

- Evaluation criteria will come from the goals and objectives in the Team Charter.
- The process will occur monthly.
- The Resident Construction Engineer and the Contractor's Project Manager will jointly review the results of the Team Evaluation and address any issues that come to the forefront out of that process.

- The results of all Team Evaluations will be reviewed by the District Engineering Administrator on a monthly basis.

- The results of all Team Evaluations will be reviewed by the Director of Construction at least quarterly.

- Team Evaluations will be developed by the project team using a format required by the Director of Construction.

It will be the responsibility of the Resident Construction Engineer and the Contractor's Project Manager to administer the functions of the Team Evaluation process. The District Engineering Administrator and the Director of Construction will have general oversight responsibility for the evaluation process and will offer assistance and counsel as necessary to the project team.

108.3 PROSECUTION OF THE WORK

The Resident Construction Engineer will be responsible for processing and forwarding the Notice to Proceed to the Contractor. The Contractor is not permitted to begin work on the project before receiving the Notice to Proceed and must complete the project by Contract completion, as adjusted by any approved Contract time extensions.

108.4 LIMITATION OF OPERATION

Section 108.04 of the *Standard Specifications* governs the Contractor's limitation of operations.

108.5 CHARACTER OF WORKERS, METHODS AND EQUIPMENT

Section 108.05 of the *Standard Specifications* governs the provisions of the Contractor's workers, methods and equipment. The Resident Construction Engineer is responsible for ensuring that the Contractor's personnel are properly trained and certified, as required by current SCDOT policy. SCDOT field personnel generally cannot require the Contractor to use specific construction methods or equipment, unless expressly stated in the Contract. Inspect construction equipment in terms of its ability to produce specified results in a continuous operation, with final approval from the Resident Construction Engineer. Consider the following:

1. Type. Verify that the Contractor has provided the type of equipment required for the project (e.g., mixing plants, haul trucks, pavers, rollers, graders, spray tankers, hand tools). If asked by the Contractor, the Resident Construction Engineer may suggest equipment that has been used successfully on similar projects.

2. Capacity and Number. Verify that the equipment provided on the project is sufficient, in terms of capacity and number, to prosecute the work in a continuous and timely manner.

3. Condition. Check to ensure that the Contractor maintains equipment in good working condition and has sufficient spare parts and backup equipment on-hand to minimize unnecessary delays due to mechanical breakdown.

4. Calibration. For construction equipment that requires calibration before use, ensure that the equipment is properly set to meet specified results and perform periodic inspections, as needed, to determine if recalibration is necessary.

5. Operators. Although the equipment may be acceptable, the use of inexperienced operators can often lead to unacceptable results. Where suspected, discuss this situation with the Resident Construction Engineer and, as needed, direct the Contractor Superintendent to provide an experienced operator.

Resident Construction Engineers and SCDOT Inspectors must never operate or adjust Contractor equipment. However, it is good practice to understand the operation of equipment to ensure it is being properly used. Ensure that obvious deficiencies are corrected before the operation begins. This will avoid delays and ensure that quality work is obtained.

108.6 DETERMINATION AND EXTENSION OF CONTRACT TIME

Calendar days, not working days, are used to administer Contract time for all SCDOT construction projects. Contract time will automatically be monitored in SiteManager based on progress entries and approval of Daily Work Reports, as discussed in Section 101.6. Consider the following:

1. Notice to Proceed. The Contract may provide that Contract time will be based on the date specified in the Notice to Proceed plus a specified number of calendar days, which will establish the Contract completion date.

2. Notice of Award. The Contract may provide that Contract time will be based on the date of the Notice of Award plus a specified number of calendar days, which will establish the Contract completion date.

3. Floating Start. The Contract may provide for a floating start period (e.g., year) from which a specified number of days will be added to the end of the period to establish the Contract completion date.

Section 108.06 of the *Standard Specifications* governs the provisions for assessing the acceptability of honoring a Contractor's request for extending Contract time beyond the Contract completion date. Approval of such requests is generally limited to circumstances beyond the Contractor's control. Otherwise, the schedule of liquidated damages will apply (see Section 108.9). Liquidated damages and Contract time extensions will require the initiation and proper execution of a Change Order, as discussed in Section 101.6.3. See Sections 104.2 and 104.4 for additional information.

108.7 TEMPORARY SUSPENSION OF WORK

If the Resident Construction Engineer provides written authorization of the suspension of a work item on the critical path for the convenience of the State, such time will not be counted against the allotted calendar days established in the Contract. In such cases, the Contract completion date must be extended an amount equal to the suspension period. The extension of time will require the initiation and proper execution of a Change Order, as discussed in Section 101.6.3.

108.8 FAILURE OF CONTRACTOR TO MAINTAIN SATISFACTORY PROGRESS

If the Contractor is found to be delinquent toward completing the project by the established Contract completion date, the Resident Construction Engineer will notify the Director of Construction who will be responsible for preparing and processing a Notice of Delinquency, which must be sent to the Contractor via certified mail, as provided for in Section 108.08 of the *Standard Specifications*.

108.9 FAILURE TO COMPLETE THE WORK ON TIME

Section 108.09 of the *Standard Specifications* provides the schedule of liquidated damages that will apply if the Contractor fails to complete the work by the specified completion date.

108.10 DEFAULT AND TERMINATION OF CONTRACT

If the Contractor is found to be in default of the Contract, the Resident Construction Engineer will notify the Director of Construction who will be responsible for preparing and processing a Notice of Default, which should be sent to the Contractor via certified mail, as provided for in Section 108.10 of the *Standard Specifications*.

Section 109
Measurement and Payment

109.1 MEASUREMENT OF QUANTITIES

Section 109.01 of the *Standard Specifications* governs the contractual provisions for measuring pay item quantities during the prosecution of the work. Figure 109A presents the rounding criteria that should be used to round pay item quantities entered in the Daily Work Report.

109.2 SCOPE OF PAYMENT

Section 109.02 of the *Standard Specifications* governs the contractual provisions for the scope of payment of each pay item, as defined in the provisions of the Contract under Basis of Payment. Pay particular attention to the type and rounding of measurements that must be documented in the Daily Work Report for each pay item. SiteManager will keep a running track of all quantities expended and remaining within the scope established in the Contract for each pay item.

109.3 COMPENSATION FOR ALTERED QUANTITIES

Compensation for altered quantities is governed under the provisions of Section 109.03 of the *Standard Specifications*, which will require the initiation and proper execution of a Change Order, as discussed in Section 104.2 and Section 101.6.3.

109.4 EXTRA AND FORCE ACCOUNT WORK

Desirably, extra work should be performed under a properly executed Change Order, rather than a Force Account Work Order. However, when the extent of the work cannot be defined, or when the actual cost cannot be estimated with reasonable accuracy, or a mutual agreement with the Contractor cannot be reached, then it will be necessary to perform the work under a Force Account Work Order, as governed under Section 109.04 of the *Standard Specifications*. When the Resident Construction Engineer directs the Contractor to proceed with disputed work, the provisions of a Force Account Work Order will apply. The Contractor may submit SCDOT Form 100.04 – Contractor Notice of Claim for the disputed work. When a Force Account Work Order is justified, the Resident Construction Engineer will be responsible for properly executing a Change Order, as discussed in Section 101.6.3, prior to beginning the Force Account Work. This Change Order will be used by SiteManager to monitor the labor, equipment and material used for the Force Account Work. An accurate record must be entered in the Daily Work Report of the number of hours each piece of equipment is actually in use on the Force Account Work. Also, the names, rates of pay, job classifications and number of hours worked for each laborer and foreman actually engaged in the Force Account Work must be entered on a daily basis.

PAY ITEM	ROUNDING CRITERIA	
Mobilization	LS	1
Value Engineering	LS	1
Construction Stakes, Lines and Grades	EACH	1
Traffic Control	LS	1
Clearing and Grubbing within Roadway	LS	1
Clearing and Grubbing Ditches	ACRE	0.1
Removal of Structures and Obstructions	LS	1
Removal & Disposal Items (pavement)	SY	0.1
Removal & Disposal Items (structures)	EACH	1
Excavation (unclassified)	CY	1
Excavation (classified)	CY	0.1
Geotextile	SY	0.1
Structure Excavation	CY	0.1
Cofferdam (all types)	EACH	1
Temporary Sheet Piling	LF	0.1
Permanent Sheet Piling	SY	0.1
Embankment In-Place	CY	0.1
Overhaul	CYHM	1
Flowable Fill	CY	0.1
Aggregate	TON	0.01
Aggregate Base	SY	0.1
Asphalt Plant Mix	TON	0.001
Asphalt Cement (liquid)	TON	0.001
Asphalt Surfacing	SY	0.1
Seal Joints	LF	0.1
Pavement Markings	LF	1
Pavement Markers	EACH	1
Impact Attenuators	EACH	1
Construction Signs	SF	1
Concrete (Structural)	CY	0.1
Reinforcing Steel	POUND	1
Prestressed Concrete Beam	LF	0.1
Bridge Parapet	LF	0.1
Handrail (all types)	LF	0.1
Handrail (all types)	LS	1
Structural Steel	POUND	1
Structural Steel	LS	1

PAY ITEM QUANTITY ROUNDING CRITERIA
Figure 109A

PAY ITEM	ROUNDING CRITERIA	
Piling (steel or concrete)	LF	0.01
Piling (timber)	LF	0.1
Drilled shaft Excavation	LF	0.01
Drilled shaft casing	LF	0.1
Mechanically Stabilized Earth Retaining Wall	SF	0.1
Pipe (all)	LF	1
Masonry (all)	CY	0.01
Catch Basin	EACH	1
Drop Inlet	EACH	1
Manhole	EACH	1
Precast Concrete Riser	LF	0.1
Curb and Curb and Gutter	LF	0.1
Concrete (pavements, driveways and sidewalks)	SY	0.01
Aggregate underdrain	CY	0.1
Riprap	TON	0.01
Riprap	CY	0.1
Riprap (Grouted)	SY	0.1
Slope Protection	SY	0.1
Steel Beam Guardrail	LF	0.1
Fencing	LF	1
Seeding	MSY	0.001
Lime	TON	0.01
Fertilizer	TON	0.01
Nitrogen (actual)	POUND	1
Topsoil	CY	0.1
Sodding	SY	1
Right-of-Way Markers	EA	1
Waterproofing	SY	0.1
Erosion Control Blanket	SY	0.1
Silt Fence	LF	1
Turbidity Barrier	LF	1
Silt Basins	CY	0.1
Sediment Dams	CY	0.1
Slope Drains	LF	1
Ditch Checks	EACH	1
Detention Pond	CY	0.1
Timber (untreated)	LF	0.1

PAY ITEM QUANTITY ROUNDING CRITERIA
Figure 109A
(Continued)

109.5 ELIMINATED ITEMS

Compensation for eliminated items is governed under the provisions of Section 109.05 of the *Standard Specifications*, which will require the initiation and proper execution of a Change Order, as discussed in Section 104.2 and Section 101.6.3.

109.6 PARTIAL PAYMENTS

Partial payments are governed by the provisions of Section 109.06 of the *Standard Specifications*. The following procedures apply:

- The SCDOT Inspector will enter pay item quantities in SiteManager's Daily Work Report (see Section 101.6.1).

- The Resident Construction Engineer will review and authorize pay items described in the Daily Work Reports (see 101.6.2) and, on the estimate day for the District defined in Section 109.06 of the *Standard Specifications*, will generate the Monthly Payment Estimate (see 101.6.4). Once generated, the Resident Construction Engineer will print one copy of the Monthly Payment Estimate for the Contractor to sign and return. The Resident Construction Engineer then will notify the District Construction Engineer that the Monthly Payment Estimate is ready for approval.

- The District Construction Engineer will review and approve the Monthly Payment Estimate in SiteManager.

- Upon receipt of the Contractor's signed copy, the Resident Construction Engineer will sign the copy and fax it to the Director of Accounting, send a copy to Contract Administration for payment to the Contractor and keep the original on file.

If retainage is authorized, it will be established in SiteManager as directed by the Director of Construction and will be automatically processed by SiteManager. Federal-aid participation, if applicable, will be established and automatically processed in a similar manner.

109.7 PAYMENT FOR MATERIAL-ON-HAND

Section 109.07 of the *Standard Specifications* governs compensation for material-on-hand, which will require the initiation and proper execution of a Change Order, as discussed in Section 104.2 and Section 101.6.3. Alterations in the Contract Plans and Specifications may result in leaving the Contractor, either on hand or in transit, with materials that were ordered prior to being notified of such changes. The Department may take over the surplus material and pay the Contractor the actual cost of the material, including transportation. The provisions of the Contract should be studied carefully to determine when it is necessary to pay for such material. If SCDOT is obligated to pay for materials left on hand, ensure that the cost of the material is transferred from the project account to the proper maintenance account or other account on which the material will be used. Note in the Daily Work Report the payment due the Contractor, the reason why it was necessary to pay for the material and that the internal SCDOT cost accounting transaction has been submitted. The Resident Construction Engineer should retain a copy of the Contractor's invoice prices. See Section 101.6.6 for additional information.

109.8 ACCEPTANCE AND FINAL PAYMENT

Upon completion and final inspection and acceptance of the work, as governed under the provisions of Section 105.15 of the *Standard Specifications*, the Resident Construction Engineer will close out the project, as discussed in Section 110, and prepare the Final Estimate of each pay item using SiteManager (see Section 109.6). SiteManager will automatically process any needed adjustments to Final Estimates. The Resident Construction Engineer will be responsible for obtaining all documentation the Contractor is obligated to provide under Section 109.08 of the *Standard Specifications*. This documentation should be attached to the Final Estimates when submitted for payment to the Contractor.

Section 110
Project Closure

110.1 FINAL INSPECTION AND ACCEPTANCE

110.1.1 General

Final inspection of the project will be made to ascertain if the work complies with all requirements of the *Standard Specifications*, Special Provisions, Contract Plans, supplemental agreements and/or Letters of Authorization. Figure 110A presents a project closure checklist that will be used to close SCDOT construction projects.

110.1.2 Federal-Aid Projects

Upon completion of all bid items of work and upon notification by the Resident Construction Engineer that a project, or section of project, is ready for a final inspection, the Resident Construction Engineer will arrange a suitable date for the final inspection. A representative of the FHWA will be invited to attend, if applicable. The Resident Construction Engineer should ensure that the date selected is suitable to the Contractor so that the Contractor may have a representative present. The final inspection party will inspect the completed work and determine if it has been satisfactorily completed in accordance with the Contract. If the work is not acceptable at the time of such inspection, the Contractor will be advised as to the corrective work to be performed. During the final inspection, the Resident Construction Engineer should keep notes on the corrective action needed to assure that such work will be rectified.

110.1.3 State-Funded Projects

The same procedure as outlined in Section 110.1.2 will be followed, except FHWA will not be involved, in the final inspection of major type road projects and for all bridges constructed by Contract. For C Projects, the District Engineering Administrator will normally make the final inspection.

110.1.4 Recommending Acceptance

If upon completion of the final inspection the completed work is found acceptable, the Resident Construction Engineer will recommend acceptance of the project by the use of SCDOT Form 100.03 – Report Recommending Roads for State Maintenance, which will be submitted through the District Office for District Engineering Administrator review and concurrence. The District Office will, in turn, forward the report to the Director of Construction. When the final inspection is made and there are certain deficiencies (not Contract bid items) identified, the Contractor will correct such deficiencies promptly. The Resident Construction Engineer will recommend acceptance after such corrections have been accomplished.

Project Closeout Checklist

SC File No._____ Proj. No._____

Route:_____ Contractor:_____

The following items must be addressed prior to a project being closed out:

- ❑ All major items of work have been completed.
- ❑ Final inspection has been performed and punch list has been compiled.
- ❑ Permanent construction signs have been removed from project after major items of work have been completed.
- ❑ DWR's have been stopped when the charging of time stops.
- ❑ Additional DWR's have been completed for additional work performed by Contractor (e.g., corrective work, correcting punch list items).
- ❑ The Request for SCDOT Form 100.21 – DBE Summary Report has been submitted to the Office of Contract Audit Services after all major items of work have been completed (Note: For Federal-aid projects only).
- ❑ The final DBE Certification Letter has been received from the Office of Compliance.
- ❑ The Memo to Pay has been received from the DBE Office of Program Development for projects with trainees only.
- ❑ SCDOT Form 100.02 – Preliminary Letter of Certification has been submitted to the Research and Materials Laboratory after all major items of work have been completed.
- ❑ Final Material Certification Letter has been received from the Research and Materials Engineer.
- ❑ SCDOT Form 100.17 – Notice of Termination has been submitted after permanent seeding requirements have been met.
- ❑ All Utility Agreements have been closed out.
- ❑ All claims have been settled.
- ❑ All borrow pits are in compliance with the South Carolina Mining Act.
- ❑ SCDOT Form 100.03 – Report Recommending Roads for State Maintenance has been submitted, with exceptions, after final inspection.
- ❑ The final SCDOT Form 100.03 – Report Recommending Roads for State Maintenance has been submitted, without exceptions.
- ❑ Final Plans have been submitted after all major items of work have been completed.
- ❑ A copy of the As-Built Plans has been delivered to the local Resident Maintenance Engineer.
- ❑ Final Estimate has been submitted to the Contracts Engineer after the final SCDOT Form 100.03 – Report Recommending Roads for State Maintenance has been submitted and approved.
- ❑ Project Closeout Letter has been received from the Director of Construction.

All project records will be kept on hand according to the SCDOT Retention Schedule.

_____
Resident Construction Engineer

PROJECT CLOSEOUT CHECKLIST
Figure 110A

Where it is considered not feasible due to weather or similar conditions to perform the corrections promptly, the Resident Construction Engineer should recommend acceptance of the project with exceptions. The exceptions should be listed on SCDOT Form 100.03 – Report Recommending Roads for State Maintenance.

110.1.5 Acceptance

The Contractor will be notified by letter from the State Highway Engineer of both partial and final acceptances of a project. A partial acceptance may relieve the Contractor of further maintenance of a portion of a project with or without exceptions. A final acceptance may relieve the Contractor of any further maintenance on the entire project without any exceptions, or it may relieve the Contractor of further maintenance with the understanding that final payment will not be made until certain exceptions are completed. Upon completion of these exceptions, a final letter of acceptance will be written to the Contractor acknowledging the fact so that the records regarding the acceptance of the project will be clear and complete.

110.2 AS-BUILT PLANS AND FINAL PROJECT RECORDS

The purpose of As-Built Plans and final project records is to document a permanent record of the actual work performed, the actual materials used and how the project was actually constructed in the field. Such information is a matter of public record and subject to review for compliance with the original Contract documents.

Throughout the project, the Resident Construction Engineer and SCDOT Inspectors assigned to the project will maintain an accurate and detailed record of all work performed and all materials used by the Contractor on the project, as adjusted by authorized deviations from the Contract Plans and Specifications (e.g., unit prices, quantities, costs, overruns, underruns, extensions, deletions). Starting the day of the Notice to Proceed and continuing through the completion of the Contract, this data will be continually collected by:

- entering field notes, computations and other project data in Daily Work Reports, Change Orders and similar data-entry features of SiteManager, including references to supporting electronic and hard-copy documents that contain information that cannot be entered into SiteManager;

- completing and filing the appropriate electronic and/or hard-copy SCDOT Construction Forms to collect supporting information that cannot be entered into SiteManager;

- retaining supporting documents provided by the Contractor, as needed, for each Contract pay item (e.g., invoices, automatic printout tickets); and

- preparing As-Built Plans by “red-lining” the CADD files of the original Contract Plans, documenting the lines, grades, dimensions and features that reflect how the project was actually constructed in the field.

The Resident Construction Engineer is responsible for ensuring that the above project records are documented accurately and in a timely manner and for archiving supporting electronic and hard-copy documents throughout the project until the SCDOT Retention Schedule allows them to be destroyed. It is important that project records be entered, prepared, checked, reviewed, approved and filed as the work progresses.

At the completion of the project, SiteManager files will be archived by the Construction Applications Manager. SCDOT Construction Forms and other supporting hard-copy information will be either retained by the Resident Construction Engineer as specified in the SCDOT Retention Schedule or submitted with the As-Built Plans, as appropriate. The As-Built Plans will be assembled in accordance with the index on the Cover Sheet FP-201. The Cover Sheet will be completed with the required information reflecting the as-constructed status of the project. The As-Built Plans will be submitted to the Final Plans Section of the Central Office.