



Macon-Bibb County,

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SPECIFICATIONS

2023 General Fund Paving

General Requirements

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SPECIAL CONDITIONS

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(Section SC. 01) ABBREVIATIONS:

ANSI	-	American National Standards Institute
AREA	-	American Railway Engineering Association
ASTM	-	American Society of Testing Materials
ACI	-	American Concrete Institute
AWWA	-	American Water Works Association
AWS	-	American Welding Society
AISI	-	American Iron and Steel Institute
AISC	-	American Institute of Steel Construction
UL	-	Underwriter's Laboratories, Inc.
AASHTO	-	American Association of State Highway & Transportation Official
NEMA	-	National Electrical Manufacturers Association
IEEE	-	Institute of Electrical and Electronic Engineers
ASME	-	American Society of Mechanical Engineers
OSHA	-	Occupational Safety and Health Administration

(Section SC. 02) WORKMEN'S COMPENSATION INSURANCE:

This Contract shall be null and void and of no effect unless the Contractor shall, before entering upon the performance thereof, secure Workmen's Compensation Insurance for the benefit of and keep insured, during the life of said Contract, all employees engaged thereon who are required to be insured by the laws of the State of Georgia. In case the Contractor shall subcontract any portion of the Work, he shall require that all employees of the subcontractor are properly covered by such Workmen's Compensation Insurance.

(Section SC. 03) PUBLIC LIABILITY, PROPERTY DAMAGE, AND AUTOMOBILE INSURANCE:

The Contractor shall take out and maintain during the life of this Contract the various types and amounts of insurance as required to protect the Contractor, the Owner, officials and representatives of the Owner, the

Highway Departments, the Consulting Engineers, and their representatives and any subcontractor performing work covered by this Contract from claims for damages for property damages which may arise from operations under this Contract, whether such operations be by himself or by any subcontractor or by anyone directly employed by either of them.

Without restricting the obligations and liabilities assumed under the Contract Documents, the Contractor shall, at his own cost and expense, purchase and maintain in force until final acceptance of this Work, the below listed forms of insurance coverage.

Certificates in triplicate from the insurance carrier stating the limits of liability and expiration date shall be filed with the Owner before operations are begun. Such certificates shall not merely name the types of policy provided but shall specifically refer to this Contract and shall contain a separate express statement of compliance with each of the requirements as set forth in this Section. However, the original policies for Owner's Protective Liability Insurance (Item C) shall at this time be delivered to the Owner for its possession.

All policies as hereinafter required shall be so written that the Owner will be notified of cancellation or restrictive amendment at least 30 days prior to the effective date of such cancellation or amendment.

- Item A - Workmen's Compensation and Employer's Liability Insurance as required or specified by State Law.
- Item B - Comprehensive General Liability Insurance including coverage for:
 1. Property Damage to existing structures and equipment;
 2. Direct Operations - including coverage for underground, explosion and collapse hazards;
 3. Independent Contractors;
 4. Completed Operations;
 5. Contractual Liability - Blanket or specific coverage for the indemnification agreement as set forth in the Section titled INDEMNIFICATION.
- Item C - Owner's Protection Liability Insurance - in the name of the Owner including the interest of the Consulting Engineers as additional insureds.
- Item D - Comprehensive Automotive Liability Insurance, including non-ownership and hired car coverage.
- Item E - Builder's Risk and Installation Floater

Builder's Risk: This insurance shall be written in completed value form and shall protect the Contractor, the Owner and the Consulting Engineer, the representatives of the consulting Engineer and the officials and representatives of the Owner against risks of damage to buildings, structures, and materials and equipment, excluding excavation, paving, and related work, not otherwise covered under Installation Floater Insurance, from the perils of fire and lightning, the perils included in the standard extended coverage endorsement, and the perils of vandalism and malicious mischief. The amount of such insurance shall be not less than the insurance value of the Work at completion less the value of materials and equipment insured under Installation Floater Insurance.

Equipment such as pumps, heat exchangers, compressors, tanks, motors, switchgear, transformers, panel boards, control equipment, and other similar equipment shall be insured

under Installation Floater Insurance when the aggregate value of this equipment exceeds \$10,000.

Builder's Risk Insurance shall provide for losses to be payable to the Contractor and the Owner, as their interests may appear.

Installation Floater: This insurance shall protect the Contractor, the Owner, officials and representatives of the Consulting Engineer from all insurable risks to physical loss or damage to materials and equipment not otherwise covered under Builder's Risk Insurance, while in warehouses or storage areas, during installation, during testing, and after the Work is completed. It shall be of the "all risks" type. The coverage shall be for an amount not less than the value of the materials and equipment insured under Builder's Risk Insurance.

Installation Floater Insurance shall provide for losses to be payable to the Contractor and the Owner as their interests may appear.

If the aggregate value of the equipment furnished under the Contract is less than \$10,000, such equipment may be covered under Builder's Risk Insurance and if so covered, this Installation Floater Insurance may be omitted.

Certificates of Insurance covering Installation Floater Insurance shall quote the insuring agreement and all exclusions as they appear in the policy; or in lieu of certificate, copies of the complete policy may be submitted.

Item F - Insurance Required by Others: Such Protective and Contractual Bodily Injury Liabilities Insurance and such Protective and Contractual Property Damage Liability Insurance as shall be required by any public bodies or utility companies whose property, facilities, or right-of-way may be affected by the Work to be done under this Contract.

If any part of the Work is sublet, insurance of the same types and limits as required by above Items A, B, D, and F, shall be provided by or on behalf of the Subcontractor(s) to cover that part of the Work they have contracted to perform.

The minimum limits of liability which will be acceptable for the types of insurance required from the Contractor for this Contract are as follows:

- (a) Bodily Injury \$1,000,000/\$2,000,000
Property Damage \$500,000/\$1,000,000
- (b) Protective and Contractual Bodily Injury Liability Insurance required by Item F shall be in an amount and form as each utility company may require.
- (c) The Contractor shall take out before the work is commenced within the City's right-of-way and keep in effect until said work is completed and accepted, liability and property damage insurance holding Macon-Bibb County harmless from any damages arising out of the operation performed within limits stated above. The insurance policy shall be with an insurance company with a rating of "A" or better and authorized and licensed to do business in the State of Georgia.

A copy of the policy or certificate evidencing same shall be submitted to the Macon-Bibb County Engineer and approved by him before any work is commenced.

(Section SC. 04) INDEMNIFICATION:

The Contractor shall indemnify and hold harmless the Owner, officials and representatives of the Owner, the Georgia Department of Transportation and the Consulting Engineers, and their officers, representatives, agents and employees from and against all claims, damages, losses and expenses, including attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss, or expense is caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

In any and all claims against the Owner, the officials and representatives of the Owner, or the Georgia Department of Transportation or the Consulting Engineer, or any of their officers, representatives, agents or employees by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them be liable, the indemnification obligation of the Contractor under this Section SC.04 shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any subcontractor under Workmen's Compensation Acts, disability benefit acts, or other employee benefit acts.

(Section SC. 05) ASSIGNMENTS:

The Contractor shall not assign, in whole or in part, this contract or any moneys due or to become due thereunder without the written consent of the Owner.

(Section SC. 06) BORING:

Subsurface exploration borings have not been made, unless indicated elsewhere in the contract. If the bidder wishes to make borings for his own use, the Owner will make available the site of the work for such exploratory work. Cost of such work shall be at the bidder's expense.

(Section SC. 07) LINE AND GRADE:

The Owner shall establish as shown on the Contract Drawings, benchmarks adjacent to the Work. Based upon the information provided by the Owner, the Contractor shall develop and make all detail surveys necessary for construction, including construction stakes, batter boards, stakes for pile locations and other working points, lines and elevations. The Contractor shall have the responsibility to carefully preserve benchmarks, reference points, and stakes, and, in the case of destruction thereof by the Contractor or resulting from his negligence, the Contractor shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such bench marks, reference points, and stakes.

As location of sewers may change to avoid interference with existing or proposed structures, existing surface profiles may be different than shown on the drawings.

(Section SC. 08) ENVIRONMENTAL REQUIREMENTS:

- A. Air Pollution
 - (1) Do not burn any material in a manner which violates legal restrictions on such operations.

- (2) Trees, stumps, brush, etc. which must be removed shall become the property of the Contractor including any merchantable timber. Neatly stacked logs may be left of the project site at locations designated by the Engineer. Stumps and brush may be buried outside all structure limits at locations designated by the Engineer.

B. Stream Pollution

Conduct all work in such a manner as to prevent stream siltation.

(Section SC. 09)

Omitted.

(Section SC. 10) TRAFFIC SAFETY:

The Contractor shall provide temporary work signals, signs, warning signs, etc. in accordance with the applicable governing authority. As a minimum the Contractor shall comply with the "Manual on Traffic Control Devices used for Street and Highway Construction and Maintenance Operations", prepared by the Georgia Department of Transportation.

(Section SC. 11) SHOP DRAWINGS:

The Contractor, at his own expense, shall submit for the approval of the Engineer four (4) complete copies of all shop and setting drawings and schedules required for the Work, and no work shall be fabricated by the Contractor, except at his own risk, until such approval has been given. Three sets of drawings furnished by the Contractor will be returned after approval, the other set being retained by the Engineer.

The Contractor shall submit all drawings and schedules sufficiently in advance of construction requirements to allow ample time for checking, correcting, resubmitting, and rechecking; and no claim by the Contractor for delays arising from his failure in this respect will be allowed.

All shop drawings submitted, if not prepared by the Contractor, must bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for resubmission. If the shop drawings have variations from the requirements of the Contract Documents because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action will be taken for proper adjustment; otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract Documents even though such shop drawings have been approved.

Where the shop drawings as submitted by the Contractor indicate a departure from the Contract which the Engineer deems to be a minor adjustment in the interest of the Owner not involving a change in the Contract Price or extension of time, the Engineer will approve the drawing but the approval will be based on the following understanding:

The modification shown on the attached drawings is approved in the interest of the Owner to effect an improvement for the Project and is accepted with the understanding that it does not involve any change in the Contract Price or time; that it is subject generally to all Contract stipulations and covenants; and that it is without prejudice to any and all rights of the Owner under the Contract and Bond or Bonds.

The approval by the Engineer of shop drawings will be general and shall not relieve the Contractor from the responsibility for adherence to the Contract, nor shall it relieve him of the responsibility for any error which may exist.

(Section SC. 12) WORKING FACILITIES AND EASEMENTS:

The Contractor will be allowed the use of as much of the site designated for the Work as is necessary for his operations, but he must, however, provide all necessary access to any other public or private property, and the cost involved thereby shall be included in the Unit or Lump Sum Prices bid for the various Sections of the Work to be done under this Contract.

Whenever it is required as a part of this Contract to perform work within the limits of private property, easements or in rights-of-way, such work shall be done in conformity with all permits and agreements between the Owner and the owners of such, and whether or not such a condition be part of the agreement, care shall be taken to avoid injury to the premises entered, which premises shall be left in a neat and orderly condition by the removal of rubbish and the grading of surplus materials and the restoration of said private property to the same general conditions as existed at the time of entry for work to be performed under this Contract.

The contractor shall not (except after consent from the proper parties) enter or occupy with men, tools, or equipment, any land outside the rights-of-way or property of the owner.

(Section SC. 13) PROGRAM AND METHOD OF CONSTRUCTION:

The order of sequence of execution of the Work, the methods of construction, the general conduct of the work, and the general arrangement of the Work to be installed shall be, at all times, subject to the approval and direction of the Engineer. If any time before the commencement of, or during the progress of the Work, or any part of it, such methods, features, and appliances used or to be used appear to the Engineer as unsafe, insufficient, or improper, he may order the Contractor to increase their safety or sufficiency, or to improve their character, and the Contractor shall conform to such orders; but the failure of the Engineer to demand any increase of such safety, sufficiency, adequacy, or any improvement shall not release the Contractor from his obligation to secure the safe conduct and quality of the work specified.

(Section SC. 14) OVERTIME WORK:

No night work or work on Saturdays, Sundays, and legal holidays requiring the presence of an Engineer or Inspector will be permitted except in case of emergency and then only to such an extent as is absolutely necessary and with the written permission of the Engineer. Should it be desired to operate an organization for regular and continuous night work, lighting, safety, and other facilities which are necessary for performing such work at night must be provided by the Contractor at his own cost and expense. This shall not excuse the Contractor from having constant attendance at the Work to be in readiness in time of emergency even to nights, Saturdays, Sundays and holidays. Should the Contractor desire to perform overtime work on this Contract, such shall be done only after approval of the Engineer, and all Resident Engineer and inspection costs must be reimbursed to the Owner by the Contractor as particularized herein.

(Section SC. 15) WORK IN INCLEMENT WEATHER:

The Contractor is presumed to have taken all difficulties due to weather conditions into consideration in preparing his Proposal and in establishing his time for completion of the Work of this Contract. He must be prepared and must take all precautions to protect all work from unfavorable weather and extremes of

temperature, whether hot or cold. He shall provide approved facilities for protecting the work finished or in progress to the entire satisfaction of the Engineer. Weather will not be accepted as a justifiable reason for extension of time unless such should be abnormal.

(Section SC. 16) INTOXICATING LIQUORS AND DRUGS:

The Contractor shall neither permit nor suffer the introduction or use of intoxicating liquor nor drugs upon or about the Work specified in this Contract or upon any of the grounds occupied by him or by his employees.

(Section SC. 17) SANITARY MEASURES:

Sanitary conveniences for the use of all persons employed on Work shall be constructed and maintained by the Contractor in sufficient number, in such manner and in such places as shall be required for the project and the placement of such conveniences shall receive prior approval of the Engineer.

All necessary precautions, including the care of employees, shall at all times, be satisfactory to the local Health Department and to that of the City and County. The Contractor shall promptly and fully comply with all orders and regulations in regard to these matters.

(Section SC. 18) WATER SUPPLY:

All water for construction purposes, as well as the expense of having the water conveyed about the Work, shall be provided by the Contractor and the cost of this work shall be included in the Unit or Lump Sum Price bid for the various Items of the Work to be done under this Contract. The source, quality, and quantity of water furnished shall, at all times, be acceptable to all governing agencies and the Engineer.

(Section SC. 19) WATER-TIGHT STRUCTURES:

It is the intention of these Specifications to provide that all concrete work be mixed, deposited, and spaded carefully with the end result of obtaining concrete which is impervious to water. Leakage through concrete structures shall be sufficient reason for requiring the Contractor to uncover or to expose any portion of the Work for a thorough examination by the Engineer, after which said structure shall be repaired and again tested by the Contractor.

(Section SC. 20) MEASURES AND WEIGHTS:

To aid the Engineer in determining all quantities, the Contractor shall, whenever so requested, provide scales, equipment, and assistance for weighing or for measuring any of the materials.

It is understood and agreed that a "ton" shall mean the short ton of two thousand (2,000) pounds.

Weights and measures of quantity for payment shall be the actual weight or actual measure, and no special or trade or so-termed customary allowances will be made, nor will any material which is lost or misplaced be included for payment.

(Section SC. 21) PLANIMETER:

For estimating quantities in which computation of areas by geometric methods would be comparatively laborious, it is agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.

(Section SC. 22) DIMENSIONS AND ELEVATIONS:

Figured dimensions on drawings shall take precedence over measurement by scale, and detailed working drawings are to take precedence over general drawings and shall be considered as explanatory of them and not as indicating extra work.

The figures given in the Contract and Specifications or upon the Contract Drawings after the word “elevation” or an abbreviation of it, shall mean distances in feet above or below Mean Sea Level.

(Section SC. 23) LIGHTS AND PROTECTION:

The Contractor shall employ watchmen on the Work as necessary and shall, erect and maintain such strong and suitable barriers and such lights as will effectually prevent the happening of any accident to health, limb, or property. Lights shall be maintained between the hours of one-half hour before sunset and one-half hour after sunrise.

(Section SC. 24) SEWAGE AND WATER FLOWS:

The Contractor shall furnish all the necessary equipment, shall take all necessary precautions and shall assume the entire cost of handling and properly disposing of any water, sewage, seepage, storm, surface, and flood flows which may be encountered at any time during the construction of the Work and in such manner as to not endanger or damage property. The manner of providing for these flows shall meet with the approval of the Engineer and the entire cost of said work shall be included in the Unit or Lump Sum Prices bid for the various Sections of the Work to be done under this Contract.

(Section SC. 25) USE OF STREETS:

During the progress of the Work, the Contractor shall make ample provision for both vehicular and foot traffic on any public road except for the section of road to be closed, and shall indemnify and save harmless the Owner from any expense whatsoever due to his operations over said road ways. The Contractor shall also provide free access to all driveways, fire hydrants, water and gas valves, etc., located along the line of his Work. Gutters and waterways must be kept open or other provisions made for the removal of storm water. Street intersections may be blocked but one-half at a time, and the Contractor shall lay and maintain temporary driveways, bridges, and crossings, such as in the opinion of the Engineer are necessary to reasonably accommodate the public. In the event of the Contractor’s failure to comply with these provisions, the Owner may cause the same to be done, and will deduct the cost of such work from any moneys due or to become due the Contractor under this agreement, but the performance of such work by the Owner or at its instance, shall serve in no wise to release the Contractor from his general or particular liability for the safety of the public or of the Work.

No pavement cuts are to be left unfilled overnight, except in emergencies, and in such cases, adequate precautions must be exercised to protect traffic.

(Section SC. 26) OBSTRUCTIONS ENCOUNTERED:

In addition to showing the structures to be built under this Contract, the Drawings show certain information obtained by the Engineer regarding the pipes, pole lines, conduits, and other structures which exist along the lines of the Work, both at and below the surface of the ground. The Engineer and the Owner expressly disclaim any responsibility for the accuracy or completeness of the information given on the Drawings with regard to existing structures, and the Contractor will not be entitled to any extra compensation

on account of inaccuracy or incompleteness of such information, said structures being indicated only for the convenience of the Contractor, who must verify the information to his own satisfaction. The giving of this information upon the Contract Drawings will not relieve the Contractor of his obligation to support and protect all pipes, conduits, and other structures which may be encountered during the construction of the Work, and to make good all damages done to such pipes, conduits, and other structures, as provided in these Specifications. The Contractor shall locate all underground obstructions prior to excavation so as to prevent any damage to those services or other utilities. Any such damages must be repaired without delay and the cost of such repairs must be borne by the Contractor.

(Section SC. 27) CLEANING AND ROUNDING OF STREETS:

As work progresses and before the Work herein specified is accepted, the Contractor shall, upon Notice from the Engineer, thoroughly clean all streets, roads, sidewalks, and lawns free from all debris and dirt accumulating from the construction, shall open all gutters so that free drainage may be had, and on unpaved streets and roads, shall completely round up the entire roadway within the limits of the herein specified Work.

(Section SC. 28) EXISTING CONDUITS, SEWERS, PIPES, AND DRAINS:

The Contractor will be required, at his own expense, to do everything necessary to protect, support, and sustain all sewers, culverts, water, or gas pipes, service pipes, electric lights, power, telephone, or telegraph poles or conduits, and other fixtures laid across or along the site of the Work, even to the extent of using hand labor in making trench openings under or over these. The Owner as well as the company or corporation owning said pipes, poles, or conduits must be notified of the same by the Contractor, before any such fixtures are removed or modified. In case any of the said sewer, gas, or water pipes, service pipes, electric lights, power, telephone, or telegraph poles or conduits, or other fixtures be damaged, they shall be repaired by the authorities have control of the same, and the expense of said repairs shall be paid by the Contractor or deducted from moneys which are due or to become due said Contractor under this Contract. No underground or overhead facilities encountered shall be disturbed without proper authority from the owner, and then only in such manner as the owner may prescribe and approve.

Should it become necessary to change the position, or permanently or temporarily remove any electric conduits, telephone conduits, water pipes, gas pipes, or other pipes, conduits, or wires in order to clear the structure being built or to permit the Contractor to use a particular method of construction, the Contractor shall cease work if necessary, until satisfactory arrangements shall have been made by the owners of the said pipes, wires, or conduits, to properly care for or relocate the same as necessary to permit the construction work to proceed as required for the proper completion of the Contract. No claims for damages will be allowed the Contractor on account of any delay occasioned thereby. The entire cost of the changes or temporary or permanent removal of such gas, water, electric, telephone or telegraph wires, pipes, or conduits, the cost of moving, removing and/or relocating shall be borne by the Contractor and the cost thereof will be included in the Unit or Lump Sum Prices bid for the various Sections of the Proposal.

Nothing contained herein, shall, however, relieve the Contractor of doing such work at his cost and expense as is specifically included in the Contract Drawings or Specifications as a part of this Contract, such as the supporting and maintaining of all utilities encountered, removing sections of sewers and replacing with cast iron or other pipe, removing, extending and connecting to existing sewers and making changes to water mains as indicated, called for, detailed on the Drawings, or necessary and the cost of repairing any damages caused by him to any of the utilities above enumerated.

(Section SC. 29) PROTECTING EXISTING BUILDINGS AND STRUCTURES:

The Contractor shall, at his own expense, shore up and protect any buildings, bridges, or other public or private structures which may be encountered or endangered in the execution of the Work, and that may not be otherwise provided for, and he shall repair and make good any damages caused to any such property by reason of his operations. No payment will be made for said work or material except that such lumber as the Engineer may order left in place as permanent supports for these structures, shall be paid for as provided in the Specifications.

(Section SC. 30) CONNECTIONS TO EXISTING STRUCTURES:

Where, in the execution of the Work, it is necessary to relocate existing pipes, or provide and install new pipes, the Contractor shall remove all bulkheads or masonry which have been left in place in connections and at other points about the Work, and shall make proper connections, as required, to existing pipe lines and structures at the locations indicated or as necessary for the proper completion of the Work of this Contract. Also, he shall make the necessary connections at the several points in order that, on completion of his Contract, sewage, water, or gas may flow to and through the several pipes and appurtenances. No extra payment will be made for this work, but the entire cost of the same shall be included in the Unit or Lump Sum Prices bid for the various Sections of the work to be done under this Contract.

(Section SC. 31) MONUMENTS AND LANDMARKS:

Monuments or landmarks shall not be harmed or removed by the Contractor or any of his employees without the written consent of the Engineer. Any monument or landmark so removed will be replaced by the Owner at the expense of the Contractor. The cost thereof shall be retained from the moneys due or to become due the Contractor under this Agreement.

(Section SC. 32) AID TO THE INJURED:

The Contractor shall keep in his office ready for immediate use, all articles necessary for giving first aid to the injured. He shall also have standing arrangements for the immediate removal and hospital treatment of any employee who may be injured on the work site.

(Section SC. 33) STORING OF MATERIALS:

All materials and equipment required in the Work may be stored in areas directed by the Engineer, but all such materials, tools, and machinery shall be neatly and compactly piled in such a manner as to cause the least inconvenience to the property owners and the traffic. All fire hydrants must, at all time, be kept free and unobstructed and water and gas shut-off boxes, underground power and telephone line manholes must be left uncovered by such materials.

Materials, tools, and machinery shall not be piled or placed against shade trees unless such trees shall be amply protected against injury. All materials, tools, machinery, etc. stored upon public thoroughfares must be provided with sufficient warning lights at nighttime to alert traffic of such obstruction.

(Section SC. 34) PROTECTION OF EQUIPMENT:

During and after installation, the Contractor shall furnish and maintain satisfactory protection to all water mains and appurtenances against injury by weather, flooding, or breakage, thereby permitting all work to be left in a perfect condition at the completion of the Contract.

(Section SC. 35) TEMPORARY LIGHT AND HEAT:

The Contractor shall supply all temporary heat and light at his own expense for such period of time and at such temperature as the Engineer may direct for the proper protection and execution of the Work.

(Section SC. 36) ELECTRIC POWER:

The Contractor shall make his own arrangements for electric current or power. No special compensation will be made for cost of obtaining or purchasing but such cost shall be considered as having been included in the Unit or Lump Sum Prices bid for the various Sections of the Work to be done under this Contract.

(Section SC. 37) UNNECESSARY NOISE:

The movement and use of machinery and equipment and the handling of materials and conduct of the Work shall be such as to avoid and eliminate unnecessary noise, dirt, and dust.

(Section SC. 38) EXISTING TREES, SHRUBBERY, AND LAWNS:

When ordered by the Engineer, the Contractor shall dig up, handle, protect, and properly reset hedges, small trees, and shrubbery along the line of, or adjacent to the Work and shall take all reasonable care in this work. If damaged, they shall be replaced.

Except as otherwise permitted by the Engineer, trees shall not be disturbed and shall be protected from damage. Tree roots shall not be mutilated, nor shall they be cut except by permission of the Engineer. When permitted to cut tree roots, the ends shall be cut off smooth, without splitting or shattering. The trunks of the trees shall be carefully protected from damage, and if unavoidable damage occurs, the injured portions shall be neatly trimmed and covered with an application of grafting wax. Excavating machinery, cranes, etc., shall be handled with care to prevent damage to shade trees, particularly to overhanging branches, and branches shall not be cut off except by special permission of the Engineer.

All lawns and flower beds contiguous to the Work and such as are damaged by the Contractor, shall be replaced or restored to a condition at least as good as at the time of the commencement of Work. This shall include the furnishing and placing of top soil, fertilizing, seeding, and rolling, all as required to properly replace such lawns and flower beds, and in accordance with the Specifications.

No special compensation will be made for the protecting, replacing, and resetting of existing trees and shrubbery, nor for the replacing of lawns and flower beds, but such cost shall be considered as having been included in the Unit or Lump Sum Prices bid for the various Sections of Work to be done under this Contract.

(Section SC. 39) CLEANING UP:

On or before the date of the final estimate for the Work, the Contractor shall tear down and remove all temporary structures built by him, shall remove all construction plants used by him, and shall repair and replace all parts of existing embankments, fences, or other structures which were removed or injured by the Contractor's operations or by the employees of the Contractor; shall thoroughly clean cut all sewers, drains, pipes, manholes, inlets and miscellaneous and appurtenant structures of debris from his operations; shall rough grade all spoil areas, and shall remove all rubbish and leave the grounds in a neat and satisfactory condition.

(Section SC. 40) MILL AND SHOP TESTS AND INSPECTION:

Where the Item Specifications call for mill or shop tests, the Contractor shall furnish in triplicate copies of attested manufacturer's certificates showing details of quality or performance sufficient to demonstrate conformity to Contract requirements. Inspection and tests of materials shall be made as required by these Specifications, and the cost thereof shall be considered as having been included in the Unit or Lump Sum Prices bid for the various Sections of Work to be done under this Contract.

(Section SC. 41) INSUFFICIENCY OF SAFETY PRECAUTIONS:

If at any time, in the opinion of the Engineer, the Work is not properly lighted, barricaded, and in all respects safe, both in respect to public travel or adjacent property, public or private, and if under such circumstances the Contractor does not or cannot immediately put the same into proper and approved condition, or if the Contractor or his representative is not upon the ground so that he can be immediately notified of the insufficiency of safety precautions, then the Owner, on recommendation of the Engineer, may put the Work into such a condition that it shall be, in his opinion, in all respects safe. The Contractor shall pay all expenses of such labor and materials as may have been used for this purpose by him or by the Owner. Such action of the Engineer or Owner, or their failure to take such action, shall in no way relieve the Contractor of the entire responsibility for any cost, loss or damage by any party sustained on account of the insufficiency of the safety precautions taken by him or by the Engineer or Owner acting under authority of this Section.

(Section SC. 42) USE OF SEWERS OR STRUCTURES:

The Owner shall have the right to connect any sewer, conduit, pipe line, or structure with the Work and its appurtenances herein described, or to grant permits to make connection therewith, at any time before the Work is finally accepted. The Contractor shall not interfere with the making of such connections, and no extra allowances shall be made to said Contractor on account thereof.

(Section SC. 43) ADMINISTRATION OF OVERTIME WORK BY RESIDENT ENGINEERING FORCE:

It is the intent of the Contract that the Contractor provide sufficient work force at all times during normal working hours and days of each week to complete the Work without resort to overtime work. The definition of normal working hours and days is an eight (8) hour day or ten (10) hour day as indicated in the General Requirements, Monday through Friday, trade recognized legal holidays excepted, during a consecutive period as agreed upon in the area of the Work, not counting the lunch period; and the definition of normal work week is the aggregate of the five (5) consecutive eight (8) or ten (10) hour days Monday through Friday inclusive, the same holidays excepted.

No overtime work on normal working days, or work on Saturdays, Sundays, or trade recognized legal holidays requiring the presence of the Engineer or an Inspector will be permitted except in case of emergency, then only to such extent as is absolutely necessary, and with the written permission of the Engineer.

Should the Contractor find it necessary to request permission to work more than the hours specified in the General Requirements in one day, or for a number of days, or to work on Saturdays, Sundays, or trade recognized legal holidays in the area of the Work, the Engineer shall have the right to deduct and retain sufficient sums, from the moneys due on any partial or conditional final payment estimate to cover the payment of additional salaries and overhead for the Engineer and such inspectors as are normally employed

on the Work to administer the work of the trade, or trades, actually performing such overtime work. The amount which the Engineer may retain shall be the overtime base pay cost incurred, without benefits, times a factor of 2.0 to include overhead expenses. A minimum of four (4) hour work shall be scheduled for each occurrence.

Such sums of money as are retained by reason of this provision: for payment of overtime base pay will be paid to the employees of the Engineer by the Owner as compensation for overtime work, and the balance of such retainage shall compensate the Engineer for overhead expenses.

The Engineer will furnish the Contractor upon request, the rate of overtime base pay for the Engineer and such inspectors as are normally employed to administer the Work.

(Section SC. 44) RIGHTS RESERVED:

The Owner reserves the right to reject any or all bids, to waive informalities and to decide for himself which bid or bids be deemed in the best interest of Macon-Bibb County.

On any contract, where unit prices are required, the right is reserved to increase or decrease the quantities specified, without changing the unit prices bid.

On any unit price contract, minor revisions in grades and alignment after award of the Contract resulting in an increase or decrease in the quantities as listed in the Proposal in no way is just cause for a change in the unit prices bid. Relocation of the lines as may be required for easement or other purposes in no way effects the unit prices provided the line serves the area and purpose for which it was originally intended.

(Section SC. 45) SOCIAL SECURITY TAX:

The Contractor assumes and is liable for all State and Federal payroll or social security taxes and shall guarantee to hold the Owner harm less in every respect against same.

(Section SC. 46) RESTORATION:

The Contractor shall restore all disturbed areas to original or better condition.

(Section SC. 47) PUBLIC CONVENIENCE AND SAFETY:

The Contractor shall, at all times, conduct the Work in such a manner as to insure the least practicable obstruction to public travel. The convenience of the general public and of the residents along and adjacent to the area of the Work shall be provided for in a satisfactory manner, consistent with the operation and local conditions. "Street Closed" signs shall be placed immediately adjacent to the Work, in a conspicuous position, at such locations as traffic demands. At any time that streets are required to be closed, the Contractor shall notify law enforcement agencies, fire departments, and parties operating emergency vehicles before the street is closed and again as soon as it is opened. Access to fire hydrants and other fire extinguishing equipment shall be provided and maintained at all times.

(Section SC. 48) SELLING OF TIMBER:

The rights to all existing timber will be specified on the contract drawings. However, unless specified otherwise, all timber on private property remains the property of the private property owner while all timber

on public property which must be removed to perform the contract will belong to the contractor.

(Section SC. 49) COOPERATION WITH GOVERNMENTAL DEPARTMENTS, PUBLIC UTILITIES, ETC:

The Contractor shall be responsible for making all necessary arrangements with the governmental departments, public utilities, public carriers, service companies and corporations owning or controlling roadways, railways, water, sewer, gas, electrical, telephone, and telegraph facilities such as pavements, tracks, piping, wires, cables, conduits, poles, guys, etc. including incidental structures connected therewith, that are encountered in the Work in order that such items may be properly shored, supported and protected, or the Contractor may relocate them if he so desires. The Contractor shall give all proper notices, shall comply with requirements of such parties in the performance of his work, shall permit entrance of such parties on the Project in order that they may perform their necessary work, and shall pay all charges and fees made by such parties for this work.

The Contractor's attention is called to the fact that there may be delays on the Project due to work to be done by governmental departments, public utilities, and others in repairing or moving poles, conduits, etc. The Contractor shall cooperate with the above parties, in every way possible, so that the construction can be completed in the least possible time.

The Contractor shall have made himself familiar with all codes, laws, ordinances, and regulations which in any manner affect those engaged or employed in the Work, or material and equipment used in or upon the Work, or in any way affect the conduct of the Work, and no plea of misunderstanding will be considered on account of his ignorance thereof.

END OF SECTION

01005 – STATEMENT OF WORK

PART 1 - GENERAL

1.01 STATEMENT OF WORK: This is a general overview of the project. Follow details shown by the specifications and drawings, interpreted in accordance with contract clauses.

- A. Provide all labor, material, plant, equipment, supplies, and coordination required to:
 - 1. Provide the necessary patching, milling, asphalt resurfacing and striping for the roads in Macon-Bibb County designated for resurfacing.
 - 2. See attached 2023 General Fund Quantity Worksheet for the detailed requirements on each road. The project includes various roadways throughout Macon-Bibb County.

- B. Price: Accomplish work shown for the original bid price. This includes special work times for utility outages and repair of damages. The words "at no additional cost to the Government" are implied whether stated or not.

1.02 CONTRACT SITE AND WORK RESTRICTIONS:

Work area is restricted to the area at the construction site. Provide a seven-day notification prior to a road closure so that the approved detour may be publicized in the local paper or other media outlets. Any traffic detours require the submittal of a traffic control plan to the Macon-Bibb County Traffic Engineering for approval 14 days before enacting said plan. All equipment must remain on public right of way during work hours and can be stored safely on the right of way while not in use provided it does not cause a traffic flow or sight distance problem. Any offsite parking/storage will require a written agreement between the owner of the private property and the contractor performing the work.

1.03 HOURS OF WORK:

A. Standard work hours for this project are normal work hours of 8:00 AM to 5:00 PM local time, Monday through Friday. Work must stop on official City-County holidays unless specifically approved in advance.

B. Alternate Work Hours

- 1. If the Contractor desires to work another set of standard hours submit written request five (5) workdays before the date desired to work the different standard.
- 2. To work special hours or days such as to continue paving until dark, request verbal approval from the Engineer at least four hours in advance.
- 3. The Government reserves the right to refuse these requests. In addition, work requiring inspector presence such as placing concrete may not be possible outside normal hours on short notice. Digging outside of normal hours will normally not be approved. Any work outside of the standard working hours performed without the permission of the engineer will be subject to analysis by a geotechnical engineering firm at the expense of the contractor.

C. All references to days mean calendar days unless otherwise noted.

1.04 SUBMITTALS:

A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items.

B. Material Submittals: Omitted.

PART 2 - PRODUCTS - OMITTED

PART 3 - EXECUTION

3.01 COORDINATION: The contractor shall coordinate work between different disciplines.

A. Locations shown are approximate and may be moved if approved by the Engineer.

B. Manufacturers' recommendations and/or requirements, if more stringent than the specifications and drawings, shall be followed at no additional cost to the Government.

Section 01005 Submittals

<u>Para #</u>	<u>Description</u>	<u>Date Required</u>	<u>Inspector Check Mark</u>
1.02	Closure Notice	7 days prior	_____
1.03 B.1	Alternate Work Hours	5 days prior	_____

<<<<< END OF SECTION >>>>>

01040 – SITE REQUIREMENTS

PART 1 - GENERAL

1.01 UTILITY OUTAGES: Request any necessary utility outages in writing to the appropriate utility with a copy to the Engineer, a minimum of 14 days before the proposed outage. These may have to be scheduled at other than normal working hours depending on the impact to the users served by the utilities. These are at no additional cost to the Government. The contractor is responsible for working with existing utility company to relocate existing utilities at the utilities' own expense except where indicated otherwise on the drawings. The contractor is responsible for notifying the public of any impending utility outages 7 days prior to the temporary loss of said utility.

1.02 SUBMITTALS: Omitted

A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items.

B. Material Submittals: None required under this section.

1.03 SAFEGUARDING COMMUNICATION FACILITIES: For work that will interfere with buried fiber optics cable, aerial cable, house cable, underground cable, or other communication facilities, notify the utility and the Engineer in writing 14 days before the scheduled construction. Do no work until receiving approval.

PART 2 – PUBLIC NOTIFICATION:

The contractor will be responsible for notifying all affected parties of the construction activity a minimum of 48 hrs prior to work beginning. The notification will include the duration of any potential inconvenience such as construction activity that will reduce the affected right of way to one lane of traffic or if the roadway will remain in a state of disrepair for some duration without construction. The contractor is responsible for the removal of any non-compliant or abandoned vehicle that may be obstructing the work site. Coordination must be made with the Macon-Bibb County Sheriff's office for said removal during the 48 hr public notification period.

PART 3 - EXECUTION

3.01 DIGGING/EXCAVATION REQUIREMENTS: Any utility location information provided for this project is for general bidding purposes only. The contractor shall determine actual locations and quantities at the site by calling the Georgia Utilities Protection Center prior to accomplishing any digging. .

A. Damage: The contractor is responsible for any damage to underground structures and utility lines identified on the drawings and any identified and marked in the field as a result of obtaining the utility location. If any underground utility is damaged, notify the utility and the Engineer immediately.

B. Cutting of Roads, Streets, and Paved Parking Areas:

1. Mark, barricade, and illuminate construction work on or near roads or streets which may present a traffic hazard in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Closures of streets, parking lots, and other traffic areas will not be permitted unless approved by the Engineer after written request 14 days before the scheduled closure & a detailed traffic control plan has been approved by the Macon-Bibb County Traffic Engineer's Office.

2. Road cuts shall be backfilled immediately after completion of associated utility work. When the road is reopened, the cut shall be filled with temporary or permanent materials to a smooth condition, or metal plates or other approved methods shall be employed to prevent discomfort or damage to vehicular traffic. Road cuts shall be permanently closed within 5 working days unless approved otherwise by the Engineer. Provide advance signage warning motorists of the condition in accordance with the MUTCD. Repair streets as shown on the drawings.

3.02 STORAGE AREA: The contractor shall obtain permission for all storage on private property. Materials stored on the county or state right of way must be obtained from the appropriate agency. Any damage to the Contractor's equipment or loss of materials or property will not incur any additional costs to the Government

3.03 LOCATING AND IDENTIFYING UNDERGROUND LINES AND STRUCTURES:

- A. Regardless of statements in other Specification sections, provide warning tapes over new buried underground utilities and structures. Follow these requirements if the other Specification sections are less detailed and stringent.
- B. These include all underground items such as utility lines, storm drainage lines, water and sewer lines, traffic signal loops and utility pits and manholes with tops below grade. Do not proceed with any work if the proper locates have not been acquired. Positive identification of actual location and depth of the utility facilities is the sole responsibility of the contractor.
- C. Provide a warning tape of standard industrial width and thickness with imprinted words identifying the type of utility line or structure below it. Place along the length (and width if not a utility line) of the protected item at one-foot depth below grade.

3.04 SITE MAINTENANCE, CLEAN UP, AND RESTORATION:

- A. Maintain the work site in a neat, orderly, and safe manner. Cut grass regularly to maintain site to community standards.
- B. Remove scrap, waste, and excess materials promptly. Provide signs, barricades, and lights as required to protect personnel.
- C. Do not allow trash and debris to accumulate and become unsightly. Sweep up and collect in contractor-maintained disposal containers daily. Dispose of collected debris weekly as a minimum.
- D. Store materials on site in a neat and orderly manner.
- E. Restore the project site to its final condition as required by the contract as soon as possible.

F. Do not open trenches or excavations until material is on-hand or scheduled to arrive within three days. Close excavations or ditches as soon as the work has been placed, inspected, and accepted by the government.

Section 1040 Submittals

Para #	Description	Date Required	Inspector Checklist
1.01	Utility Outage Requests	14 days prior to outage	_____
3.01 B	Road/Parking Closure Request	14 days prior	_____
3.03 C	Warning Tape	21 days afterward	_____

<<<<< END OF SECTION >>>>>

01300 – SUBMITTALS AND CONTRACTOR FURNISHED ITEMS

PART 1 - GENERAL

1.01 GENERAL:

A. Basic: Provide items requiring drawings, diagrams, certifications, manufacturers' literature, data brochures, technical data, sample requests, forms, and other data as noted under each specification section.

B. Contractor Responsibility: Review, Corrections, or Comments made on the Submittals do not relieve the contractor from compliance with the requirements of the Drawings, Specifications, Addendums, and Contract Documents. By entering into this contract, the contractor agrees that the purpose of submittals is to demonstrate to the Engineer that the contractor understands the design concept and that he demonstrates his understanding by indicating which equipment and material he intends to furnish, install, and use. Review of shop drawing will be general only for basic conformance with the design concept. The Government's review of such drawings, schedules, or cuts shall not relieve the contractor from the responsibility for correcting all errors of any sort contained in the submittals. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting proper fabrication processes, construction methods and installation techniques; coordinating this work with that of all other trades; and performing all work in a safe, workmanlike and satisfactory manner.

1.02 OMITTED:

1.03 SUBMITTAL INSTRUCTIONS: Submittal requirements for each specification section are listed in those respective sections. The following apply to all sections.

A. Material Submittals:

1. Complete Submissions: All items requiring submittals prior to construction activities for each section should be provided at one time unless noted otherwise or logically required. In some instances the specifications may require certain items from one or more specifications sections to be submitted at one time.

2. Submittal Checklist: The contractor shall complete a copy of the checklist provided in the submittals paragraph of each specification section. This checklist shall be provided with each submittal. Submittal information shall be arranged in order to correspond with each checklist.

3. Time: The Contractor shall have approved submittals before ordering any equipment under this contract. If equipment is ordered prior to receiving approval, it will be solely at the Contractor's risk. Under no circumstances will material be installed prior to approval of submittals. There will be no time schedule for providing material submittals unless noted elsewhere in the specifications. The Contractor will be required to manage his materials/equipment lead times and obtain approval in sufficient time to complete the work on schedule. Disapproval of incomplete or unsatisfactory submittals shall not be grounds for contract extensions. Other submittals such as as-builts, test reports, etc., shall be provided as indicated. When the word "prior" is used, it shall generally mean prior to the

delivery or installation of the product at the work site or prior to the time in question of the item addressed in the specification.

4. Exceptions: If any material proposed for use on this contract deviates from the specifications, the Contractor shall submit those proposed deviations for approval along with detailed justification. All exceptions and deviations shall be described in detail with each product submittal. Cost will not be considered a justification for taking exceptions unless a credit is offered to the Government.

5. Substitutions: Products provided by manufacturers other than those specified as the “design basis” shall be considered substitutions.

a. All features of items submitted as substitutions are implied to be in full compliance with Specifications and Drawings if not specifically noted as "Exceptions."

b. Where a design basis is referenced in Specifications and Drawings, substitutions must meet or exceed the salient features of the design basis as determined by the Engineer. Exceptions to design basis characteristics must be clearly noted as "Exceptions." The contractor must demonstrate that the product substituted is clearly equal or superior to the specified product, or else the request for substitution will be denied.

c. Changes required to accommodate approved substitution shall be made at no additional cost to the Government.

B. Other Submittals: Other submittals such as samples, test results, spare parts, and etc. shall be provided as required by each specifications section. Provide 2 copies of each or an electronic copy unless directed otherwise.

1.04 RETURN AND DISAPPROVAL OF SUBMITTALS: The Engineer will return submittals to the Contractor within 14 days after receipt indicating approval or disapproval. Resubmittal of disapproved submittals shall be accomplished within 14 days after receipt of disapproval. Disapproval shall not be cause for time extension.

1.05 SUPERINTENDENT or MANAGER: When requested, provide name and qualifications for review. Provide the name and contact information of the person who will be the primary contact with the Government on this project until project acceptance.

1.06 TURN-IN OF IDENTIFIED EQUIPMENT, SPARE PARTS, TOOLS, AND OTHER MATERIALS: Items indicated in the Submittals section of each specifications and elsewhere, for turn-in to the Government shall be delivered as directed or in the absence of direction, before prefinal inspection. Obtain receipts from Government employees receiving the materials and deliver them to the Engineer before prefinal inspection.

1.07 Omitted

1.08 Omitted

1.09 Omitted

1.10 PRE-AWARD SUBMITTALS: Submit the following items before award, if directed.

A. Experience: Provide documentation on contractor experience relative to this project. After bid opening, the Government may examine contractor experience. The Contractor and/or named subcontractors shall have been regularly engaged in the type work of this project for at least (2) years. Include for each subcontractor the name of the business and the individual responsible for this project.

B. References: Provide the names, addresses and telephone numbers of at least two customers for whom similar projects were performed in the last (two) years.

1.11 Omitted

END OF SECTION

01560 – ENVIRONMENTAL REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL:

A. General Scope: This Section provides the requirements necessary to ensure that all construction projects are in environmental compliance. Major environmental program areas which may be affected include natural resources, air quality, underground storage tanks, asbestos, lead-based paint, PCBs, cultural resources, water quality, solid and hazardous wastes, and pollution prevention.

B. Applicable Regulations and Publications: Comply with all applicable Federal, State of Georgia, any laws and regulations from other states where disposal might occur, and local laws and regulations concerning environmental compliance and pollution prevention.

C. Ensure all products produced or generated under contract shall meet all stated performance objectives and shall not violate in any manner the environmental requirements of any applicable local, state, or federal entity. Applicable environmental requirements shall include but are not limited to a substance's toxicity, biodegradability, and volatile organic/inorganic compound content.

D. Macon-Bibb County personnel will conduct no-notice inspections to ensure compliance with all environmental requirements.

E. Definitions:

1. Engineer-Macon-Bibb County Engineer or his or her designated representative.
2. Inspector-The individual from the Macon-Bibb County Engineering Department designated to perform daily inspection of the contractor's work.
3. Dust - Minute solid particles caused to be suspended by natural forces or by mechanical processes such as, but not limited to, crushing, grinding, milling, drilling, demolishing, shoveling, conveying, covering, bagging, mixing, and sweeping.
4. Open Burning - Any outdoor fire from which the products of combustion are emitted directly into the open air without passing through a stack, chimney or duct.
5. Solid Waste - Defined in CFR 261.2. Examples include garbage, refuse, and other discarded solid material including non-hazardous wastes resulting from industrial, commercial, and agricultural operations.
6. GA EPD - Georgia Environmental Protection Division of the Department of Natural Resources.

1.02 OMITTED

1.03 SUBMITTALS:

A. General: Provide the submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items.

B. Material Submittals: Not required under this section.

1.04 NOTIFICATIONS:

A. Provide to the Engineer all data specified herein to ensure compliance with applicable environmental requirements.

1. Permits: Omitted

2. Other Submittals, Notifications, and Approvals: The following submittals, notifications, and approvals are required to maintain compliance:

- a. Solid Waste Disposal: The Contractor shall provide a solid waste disposal plan stating how all materials leaving the site shall be disposed of.
- (1) The plan shall certify that the Contractor shall dispose of all materials in compliance with all Federal, State of Georgia, and local laws. A senior official of the company shall sign this letter. The plan shall address the disposal of each item addressed in Sections 3.01 and 3.02 as applicable. Non-hazardous solid waste shall be broken down into individual types, i.e., asphalt, concrete, wood, brick, etc.
- (2) The plan shall address each landfill to be used. A copy of all landfill permits shall be provided unless the Macon, Wolfe Creek, or Houston County landfill is to be used. The plan shall designate the employee who shall be responsible for verifying that all materials removed from the site are disposed of in accordance with the above referenced laws. The employee shall be an employee of the contractor and shall have authority to act for the contractor. Provide two copies of the Disposal Plan to the Engineer prior to the Pre-construction Conference or 14 calendar days prior to the start of disposal operations if no pre-construction conference is held.
- (3) Omitted
- (4) Keep on hand evidence of proper disposal of construction debris as well as providing this evidence to the Engineer. Examples of evidence include dump tickets from a licensed sanitary landfill and copies of a current landfill permits from the State of Georgia (unless Macon, Wolfe Creek, or Houston County landfill is used.), manifest, bill of sale, or other record for recycling.
- (5) After contract work is completed and prior to final payment, the Contractor shall submit a letter of certification signed by a senior official of the company certifying that all materials removed from the site have been disposed of in accordance with all applicable Federal, State, and local laws.
- b. Hazardous Waste: See Section 099702 for requirements.

PART 2 - PRODUCTS - OMITTED.

PART 3 - EXECUTION

3.01 DISPOSAL OF WASTE/EXCESS MATERIAL:

- A. Omitted.
- B. Non-hazardous Solid Waste or Excess Material, except topsoil and suitable fill material, shall be removed from the site daily unless permitted otherwise by the Engineer. Dispose in a manner approved by the US Environmental Protection Agency and the Georgia Department of Natural Resources, Environmental Protection Division (EPD). Also comply with applicable local codes and requirements. Equipment/material to be removed from the project but not turned in to the Government is the property of the contractor.
1. Disposal: Use one or more of the following methods to dispose of non-hazardous solid waste.
- a. Sanitary Landfill: All solid waste may be disposed of in a sanitary landfill properly licensed by the State of Georgia. If a landfill other than the Macon, Wolfe Creek, or Houston County sanitary landfill is used, provide a copy of the landfill license. Provide proof that any Georgia municipal solid waste disposal facility to which they propose to bring waste, except Macon, Wolfe Creek, or Houston County,

is operated by someone who has obtained the certification required by the Georgia Solid Waste Management Act, O.C.G.A. 12-8-24.1.

b. Inert Waste Landfill: Materials not likely to cause production of leachate of environmental concern may be disposed of in an inert waste landfill. Only earth and earth-like products, concrete, cured asphaltic concrete, rock, bricks, yard trimmings, and land clearing debris such as stumps, limbs, and leaves are acceptable for disposal in an inert waste landfill. This definition excludes industrial and demolition waste not specifically listed above. Provide a copy of the written notice of commencement of operation by the landfill as given to the Georgia EPD.

c. Construction/Demolition Disposal Site: Only wood, metal, wallboard, paper, cardboard, as well as materials that can go in an inert waste landfill may be disposed of in this facility. Provide a copy of the landfill license.

d. Recycling: Recycling of materials is strongly encouraged. Materials destined for recycling must meet the definition of non-hazardous wastes under federal/state solid waste regulations. Materials defined as "recovered materials" by GA EPD regulations are excluded from regulation as solid wastes.

e. All materials to be disposed of in other than a sanitary landfill must be kept segregated at the project site from those materials, which are allowed only in a sanitary landfill.

C. Solid Waste Disposal Outside of Georgia: Dispose of no solid waste outside the state of Georgia without prior written approval of the Engineer. If the contractor desires this, he shall provide sufficient information as determined by the Engineer to allow verification

3.02 Omitted:

3.03 PROTECTION OF LAND RESOURCES:

A. General: Do not take any action which shall adversely affect the existing Water Quality Standards classification of any streams, rivers, lakes or reservoirs within or adjacent to the project site or which would otherwise contribute to pollution of these water resources. No fuel, oils, bituminous, calcium chloride, acids, construction waste or otherwise harmful materials shall be permitted to enter these water resources. Preserve the land resources in their present condition or restore to a condition that appears natural and does not detract from the appearance of the surrounding area. If restoration is to be accomplished, the Contractor must submit his restoration plan and receive approval from the County on his proposed procedures.

B. Omitted.

C. Omitted

D. Restoration of Landscape Damage:

1. Do not allow any trees or other debris to get into the storm drainage system.

2. Surface Drainage:

a. Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion. Temporary erosion and sediment control measures such as berms, dikes, drains, or sedimentation basins, if required to meet the above standards, shall be provided and maintained until permanent drainage and erosion control facilities are completed and operating. The area of bare soil exposed by construction

operations at any time shall be held to a minimum. Stream crossings by fording with equipment shall be limited to control turbidity. Fills and waste areas shall be constructed by select placement to eliminate pollution to adjacent streams.

b. Stabilization of permanent steep slopes shall be accomplished as soon as possible, using a 2-step procedure, if necessary, to establish vegetation. Apply mulch immediately after finished grading is completed, regardless of season, and delay permanent seeding and fertilizing, if necessary, until the season most favorable for germination.

- D. Spills: Prevent the spill of chemicals, fuels, oils, grease, bituminous materials, waste washings, herbicides, cement drainage or any other hazardous materials. Immediately report all spills to the Macon-Bibb County Fire Department, emergency number 911, giving name, telephone number, location of spill, and type and amount of material spilled. Notify the Engineer of the spill immediately following initial reporting to the Fire Department. Take containment action against any hazardous spills, which threaten storm drains and other environmental areas. Ensure cleanup of materials spilled as a result of contractor action, or lack thereof. The contractor is responsible for the cleanup of material(s) spilled. No spill residue shall be transported off site without specific approval from the Engineer. The contractor shall provide support, as appropriate, for containment and cleanup of spills. If the spill exceeds reportable quantity limits, coordinate notification to the National Response Center with the local office of the Environmental Protection Division (EPD) through the Engineer.

3.04 AIR QUALITY:

- A. Open burning operations must be approved by the Macon-Bibb County Fire Department and the Georgia Forestry Commission. Note that a burn ban is in effect from 1 May to 30 September of each year.

3.05 DUST CONTROL: Maintain all excavations, embankments, stockpiles, haul roads, permanent access roads, plant sites, waste areas, borrow areas, and all other work within or without the project boundaries free from dust which could cause a hazard or nuisance to others. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods are permitted to control dust. To be approved, sprinkling must be repeated at such intervals as to keep all parts of the disturbed area damp at all times. If sprinkling is used, keep sufficient equipment on the job site at all times. Perform dust control as the work proceeds and whenever a dust nuisance or hazard occurs.

3.06 USING HAZARDOUS MATERIALS IN PERFORMING THE WORK:

- A. Written Notification: Comply with all applicable federal, state, and local requirements concerning use of hazardous materials. Provide written notification to the Engineer when hazardous materials/chemicals are to be used or demolished. This must include the following information:

1. A list of each work activity/process required to use/demolish hazardous materials/chemicals.
2. A list of hazardous materials/chemicals used.
3. A Safety Data Sheet (SDS) for each hazardous material/chemical used.
4. Written procedures for disposing of hazardous waste generated.
5. Omitted.

6. For additional hazardous material brought on site during the performance of the contract, the contractor shall provide an updated list and SDS to the Engineer.

3.07 Omitted

3.08 Omitted

3.09 THREATENED AND ENDANGERED SPECIES:

A. The construction project is not anticipated to have any impact in this area since most plant and animal species of concern exist in wetlands. Any project activities believed to interface with threatened and endangered species shall be coordinated through the Engineer.

3.10 WETLANDS: Comply with water and land protection paragraphs of this Section to prevent construction site sediments and runoff from entering wetlands.

3.11 Omitted

Section 1560 Submittals

Para #	Description Date Required Check Mark	Inspector
1.04 A.2.a construction conf.	Solid Waste Disposal Plan	_____ at pre-
1.04 A.2.a. (5)	Disposal Certification Ltr.	_____ prior to final payment
3.01 B.1.c	_____ Landfill License prior to dumping	
3.06	_____ Use of Hazardous Chem Prior to Work	

END OF SECTION

01590 -UTILITY RELOCATION

PART 1 – GENERAL

1.01 Cooperation with Utilities: Macon-Bibb County will notify all utility companies, all pipeline owners, all railroad companies, or other parties affected by award of the Contract, giving the name and address of the Contractor, and will assist the Contractor in arranging for all necessary adjustments of the public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction. Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, railroad facilities, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense, except as otherwise provided for elsewhere in the Contract.

It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present location or relocated positions, and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him due to any interference from said utility appurtenances or the operation of moving them, with the exception that delays and interruptions to the work are covered in Subsection 1.02. It shall be the Contractor's responsibility to plan with each utility owner a schedule of operations which will clearly set forth at which stage of the Contractor's operations the utility owner will be required to perform his removal and relocation work.

1.02 Contractor's Responsibility for Utility Property and Services

A. Overhead or Underground Utility Facilities

At points where the Contractor's operations are adjacent to or conflict with overhead or underground utility facilities, or are adjacent to other property, damage to which might result in considerable expense, loss, or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

B. Utility Facility Owners

The names of known utility owners and the location of known utility facilities will be shown on the Plans or located at the work site, and the Contractor shall give 24-hour notice to such utility owners before commencing work adjacent to said utility facilities which may result in damage thereto. Contractor shall further notify utility owners of any changes in his work schedules affecting required action by the utility owners to protect or adjust their facilities. Notice to the utility companies by Macon-Bibb of the award of contract, under Subsection 1.01, shall not be deemed to satisfy the notice required by this paragraph.

C. Cooperation with Facility Owners

The Contractor shall cooperate with the owners of any underground or overhead utility facilities in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

D. Interruption of Services

In the event of interruption to water or other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the said authority in the restoration of service. If utility service is interrupted, repair work

shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

E. Facilities Supported on Bridges

If the utility facilities are to be supported on bridges, the following provisions shall apply:

1. The Plans will show the location of the facility and the auxiliary items necessary to support the facility.
2. The Contractor who constructs the bridge shall install anchor bolts, thimbles, inserts, or other auxiliary items that are attached to the bridge as a part of the support for the utility facility. The Utility owner, at his or her expense, shall furnish these auxiliary items, unless the Contract indicates that these items are to be furnished by the Contractor as a part of the bridge.
3. The Agency constructing the utility facility shall install hanger rods, pipe rolls, and other attachments necessary for the support of the utility facility as indicated on the Plans. The Utility owner, at his expense, shall furnish these attachments unless otherwise specified. This work shall also include:
 - a. Caulking the openings around the utility where it passes through endwalls to prevent the passage of undesirable materials.
 - b. Painting the exposed portions of utility supports unless such supports are corrosion resistant. Painting shall be done in accordance with the applicable portions of the specifications.
4. The sequence of bridge construction work may be set forth in the Plans and/or the Specifications and will show at what stage of the work a utility owner will be allowed to make the utility installation. Further, all or any portion of the work under Subsection 1.02.E.3 may be included in the bridge contract by the Plans and/or the Specifications.
5. Any damage to the bridge structure caused by the utility installation shall be repaired to the satisfaction of the Engineer at the expense of the agency installing the utility facility.

F. Clearances

The Plans provide for at least minimum clearance of utilities as required by the National Electrical Safety Code, U.S. Department of Commerce, National Bureau of Standards. Any additional clearance the Contractor may desire or require in performing the work shall be arranged by the contractor with the utility owner. Macon-Bibb will pay no extra compensation for such additional clearances.

G. Delays

Delays and interruptions to the work caused by the adjustment or repair of water, gas, or other utility appurtenances and property will be considered for an extension of contract time unless such delays are due to the negligence of the Contractor.

H. Compensation

There will be no direct compensation for complying with the above. Any additional cost to the contractor for the above services, interruptions, or special procedures, shall be included in the over-all bid submitted.

1.03 KNOWN UTILITIES

The following utilities are known to have facilities on the project site. Those requiring relocation are identified below. See the plans for more detailed information on the affected areas. Known existing utilities are shown on the plans. The contractor is responsible for calling the Utilities Location Protection Center prior to digging to have all utilities in the project site located. The contractor is responsible to repair all damages to identified utilities as a result of his operations.

Utility

Contact

Relocation Required

Macon Water Authority	Algernon Wallace	478-464-5662	Possibly
Georgia Power			Possibly
Downtown	Chris Zeno	478-784-5705	
South and West	Phillip Saunders		
East of Ocmulgee	Lavelle Lewis		
North	Dennis Pritchett		
AT&T	Mel Redd	478-788-1040	Possibly
Cox Cable	Mike Adams	478-256-1544	Possibly
Atlanta Gas Light	Corey Alford	404-807-4915	Possibly
	(Engineer)		
	Larry Adams	678-725-0421	
	(Project Mgr.)		
Norfolk Southern	Leon Jackson	(404) 529-1251	No
Public Service Telephone	Jeremy Kendrick	478-847-6524	Possibly
Mitchell Harris		478-951-7815 (C)	
		478-847-6522	
		478-837-3877 (C)	
Southern Telecom			Possibly
Georgia Public Web	Greg Spell	770-661-2808	Possibly
888-662-6324 (24 Hour)			
Level III	Tony Charlton	321-312-3225	Possibly
(Formerly KMC Telecom and Telco)		relo@level3.com	
Macon-Bibb (Fiber)	Rob Ryals	478-751-0401	Possibly
Macon-Bibb Communications (traffic signal loop)	Kevin Poss	478-751-9266	Yes
Tower Cloud	Lee Clark	727-471-5600	No
Medical Center of CG	Tim Slocomb	478-633-1036	No
Windstream			No
Jointly Owned Natural Gas	Wayne James	478-654-6059	No

	Ronnie Jones	478-952-1605 (C)	
Colonial Pipeline	Kevin Railey	706-891-7584	No
Hargray	Jason White	843-815-1062	Possibly

1.04 SUBMITTALS:

A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items.

B. Material Submittals: None required under this section.

C. Other Submittals: Provide the following submittals as required by the contract or as directed by the Contracting Officer.

Para #	Description	Date Required	Inspector
1.02 B.	Utility Notification	When Identified	Checklist _____

<<<<< END OF SECTION >>>>>

Section 105—Control of Work

105.01 Authority of the Engineer

The Engineer will decide all questions that may arise as to the quality and acceptability of materials furnished, work performed, and the rate of progress of The Work; the interpretation of the Plans and Specifications, and all questions as to the acceptable fulfillment of the Contract on the part of the Contractor. The Engineer will determine the quantities of the several kinds of work performed and materials furnished which are to be paid for under the Contract and his determination shall be final.

The Engineer will have the authority to suspend The Work wholly or in part due to the failure of the Contractor to correct conditions unsafe for the workmen or general public; for failure to carry out provisions of the Contract, or for failure to carry out orders; for such periods as he may deem necessary due to unsuitable weather; for conditions considered unsuitable for the prosecution of The Work; or for any other condition or reason deemed to be in the public interest.

The Contractor may request and will receive written instructions from the Engineer upon any important items.

After the Contract has been executed, and before work begins, the Engineer may designate a time and place to hold a Preconstruction Conference with the Contractor. At such time, the Contractor shall furnish the Engineer with a Progress Schedule as provided in [Subsection 108.03](#) unless this schedule has been specifically exempted by Special Provision. The Contractor will also be given a decision on any alternate Traffic Control Plan that he may have previously submitted.

Any matters pertaining to order of work, interpretation of Plans and Specifications, traffic control, utility adjustments, or others, may be discussed at the Preconstruction Conference.

105.02 Plans and Working Drawings

Plans will show details of all structures, lines, grades, typical cross sections of the roadway, location and design of all structures, and a summary of Items appearing in the Proposal.

The Plans will be supplemented by such working drawings as are necessary to adequately control the Work. Working drawings for structures shall be furnished by the Contractor and shall consist of such detailed Plans as may be required to adequately control The Work and which are not included in the Plans furnished by the Department. They shall include stress sheets, shop drawings, erection plans, false work plans, cofferdam plans, bending diagrams for reinforcing steel or any other supplementary plans, or similar data required of the Contractor. All working drawings must be approved by the Engineer and such approval shall not operate to relieve the Contractor of any responsibility under the contract for the successful completion of The Work. The Contract Bid Prices shall include the cost of furnishing all working drawings.

105.03 Conformity with Plans and Specifications

All Work performed and all materials furnished shall be in reasonably close conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on the Plans or indicated in the Specifications.

Plan dimensions and contract Specification values are to be considered as the target values to be strived for and complied with as the design values from which any deviations are allowed. It is the intent of the Specifications that the materials and workmanship shall be uniform in character and shall conform as nearly as realistically possible to the prescribed target value or to the middle portion of the tolerance range. The purpose of the tolerance range is to accommodate occasional minor variations from the median zone that are unavoidable for practical reasons. When either a maximum and minimum value or both are specified, the production and processing of the material and the performance of the work shall be so controlled that material or work will not be preponderantly of borderline quality or dimension.

In the event the Engineer finds the materials or the finished product in which the materials are used not within reasonably close conformity with the Plans and Specifications, but that reasonably acceptable work has been produced, the Engineer shall then make a determination if the work shall be accepted and remain in place. In this event, except in cases where the appropriate price adjustments are provided for in the Specifications covering the materials and/or the finished product, a Supplemental Agreement will be executed documenting the basis of acceptance that will provide for an appropriate price

adjustment in the Contract Price for such work or materials as the Engineer deems necessary to conform to his determination based on engineering judgement.

In the event the Engineer finds the materials or the finished product in which the materials are used or the work performed are not in reasonably close conformity with the Plans and Specifications, and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor.

105.04 Coordination of Plans, Specifications, Supplemental Specifications, and Special Provisions

These *Standard Specifications*, the Supplemental Specifications, the Plans, Special Provisions, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work.

In cases of discrepancy, the governing descending order will be as follows:

1. Special Provisions
2. Project Plans including Special Plan Details
3. Supplemental Specifications
4. Standard Plans including Standard Construction Details
5. Standard Specifications

Calculated dimensions will govern over scaled dimensions.

The Contractor shall take no advantage of any apparent error or omission in the Plans or Specifications. In the event the Contractor discovers such an error or omission, he shall immediately notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Plans and Specifications.

A. Specifications of Other Organizations

When work is specified to be done or when materials are to be furnished according to the published specifications of organizations other than the Department, the latest specifications published by those organizations at the time bids are received shall apply unless otherwise specified.

AASHTO Interim Specifications and ASTM Tentative Specifications will be considered effective on date of issue.

B. Item Numbers

The first three digits of any Item Number in the itemized Proposal designates the Specification section under which the Item shall be constructed.

105.05 Cooperation by Contractor

The Contractor will be supplied with a minimum of two sets of approved Plans and Contract assemblies including Special Provisions, one set of which the Contractor shall keep available on The Work at all times.

The Contractor shall give the Work the constant attention necessary to facilitate the progress thereof, and shall cooperate with the Engineer, Inspectors, and other Contractors in every way possible.

The Contractor shall have on The Work at all times, as his agent, a competent Superintendent, capable of reading and thoroughly understanding the Plans and Specifications, and thoroughly experienced in the type of work being performed, who shall receive instructions from the Engineer or his authorized representatives. The Superintendent shall have full authority to execute orders or directions of the Engineer without delay and to promptly supply such materials, equipment, tools, labor, and incidentals as may be required. Such superintendence shall be furnished irrespective of the amount of work sublet.

The Superintendent shall notify the Engineer prior to starting any Pay Item Work. The Prime Contractor shall coordinate and be responsible to the Engineer for all activities of subcontractors.

105.06 Cooperation with Utilities

The Department will notify all utility companies, all pipeline owners, all railroad companies, or other parties affected of Award of the Contract, giving the name and address of the Contractor, and will assist the Contractor in arranging for all necessary adjustments of the public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction.

Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, railroad facilities, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense, except as otherwise provided for in the Special Provisions or as noted on the Plans.

It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present location or relocated positions, both as shown on the Plans, and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him due to any interference from said utility appurtenances or the operation of moving them. Delays and interruptions to the controlling Item or Items of The Work are covered in [Subsection 107.21.G](#).

It shall be each utility owner's responsibility to plan with the Contractor a schedule of operations which will clearly set forth at which stage of the Contractor's operations the utility owner will be required to perform his removal and relocation work.

105.07 Cooperation Between Contractors

The Department reserves the right at any time to Contract for and perform other or additional work on or near The Work covered by the Contract.

When separate Contracts are let within the limits of any one Project, each contractor shall conduct his work so as not to interfere with or hinder the progress or completion of The Work being performed by other Contractors. Contractors working on the same Project shall cooperate with each other.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with his Contract and shall protect and save harmless the Department from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced by him because of the presence and operations of other Contractors working within the limits of the same Project.

The Contractor shall arrange his work and shall place and dispose of the materials being used so as not to interfere with the operations of the other contractors within the limits of the same Project. He shall join his work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others. At the request of the Structure Contractor, the Engineer will designate an area within the right-of-way, adjacent to each structure, to be reserved for use by the Structure Contractor for Storage of Equipment and Materials necessary to construct the particular structure. So long as he occupies this area, the Structure Contractor shall be responsible for its maintenance. The Structure Contractor must relinquish this area, however, as it becomes practical to utilize completed portions of the structure.

105.08 Construction Stakes, Lines and Grades

(Subsection 105.08 Omitted)

105.09 Authority and Duties of the Resident Engineer

The Resident Engineer, regardless of his administrative title, is the Engineer designated by the Department to be the direct representative of the Chief Engineer. The Resident Engineer has immediate charge of the engineering details of each construction Project, and is responsible for the administration and construction of the Project. Such administration includes

the designation of subordinates to represent him and make routine decisions. The Resident Engineer has the authority to reject defective material and to suspend any work that is being improperly performed.

105.10 Duties of the Inspector

Inspectors employed by the Department are authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of The Work and to the preparation, fabrication, or manufacture of the materials to be used. The Inspector will not be authorized to alter or waive the provisions of the Contract. The Inspector will not be authorized to issue instructions contrary to the Plans and Specifications or to act as foreman for the Contractor.

105.11 Inspection of the Work

All materials and each part of the detail of The Work shall be subject to inspection by the Engineer.

The Engineer shall be allowed access to all parts of The Work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed Inspection.

Upon the Engineer's request, the Contractor, at any time before acceptance of The Work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of The Work to the standard required by the Specifications. Should The Work thus exposed or examined prove acceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed will be paid for as Extra Work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Any work done or materials used without supervision or inspection by an authorized Department representative may be ordered removed and replaced at the Contractor's expense, unless the Department representative failed to inspect after having been given reasonable notice in writing that The Work was to be performed.

When any unit of government or political subdivision or any railroad corporation is to pay a portion of the cost of The Work covered by the Contract, its respective representatives shall have the right to inspect The Work. Such inspection shall in no sense make any unit of government or political subdivision or any railroad corporation a party to the Contract and shall in no way interfere with the rights of either party hereunder.

105.12 Removal of Unacceptable and Unauthorized Work

All work that does not conform to the requirements of the Contract will be considered unacceptable unless otherwise determined acceptable under the provisions in [Subsection 105.03](#).

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the Final Acceptance of The Work, shall be removed immediately and replaced in an acceptable manner.

Except as elsewhere noted, no work shall be done without lines and grades having been given by the Engineer. Work done contrary to the instructions of the Engineer, work done beyond the lines shown on the Plans or as given, except as herein specified, or any Extra Work done without authority will be considered as unauthorized and will not be paid for under the provisions of the Contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer made under the provisions of this section, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced and to cause unauthorized work to be removed, and to deduct the costs from any monies due or to become due the Contractor.

105.13 Claims for Adjustments and Disputes

Whenever the Contractor believes that it is or will be entitled to additional compensation, whether due to delay, extra work, breach of contract, or other causes, the Contractor shall follow the procedures set forth in this Sub-Section.

A. Claims For Acceleration

The Department shall have no liability for any constructive acceleration. If the Department gives express written direction for the Contractor to accelerate its effort, then both parties shall execute a Supplemental Agreement as provided in [Subsection 104.03](#).

B. Claims For Delay and All Other Claims Except Acceleration

1. The Department shall have no liability for damages beyond those items which are specifically payable under this Sub-Section.
2. The Department will be liable only for those delay damages caused by or arising from acts or omissions on the part of the Department which violate legal or contractual duties owed to the Contractor by the Department. The Contractor assumes the risk of damages from all other causes of delay.
3. The parties recognize that delays caused by or arising from right of way problems, defects in plans or design, redesign, changes in the Work by the Department, the actions of suppliers or other Contractors, the shop-drawing approval process, injunctions, court orders and other such events, forces or factors are commonly experienced in highway construction work. Such delays shall not constitute breaches of the Contract. However, such delays may constitute a basis for a claim for delay damages, if found to be in accordance with [Subsection 105.13.B.2](#) above and other provisions of the Contract, and/or a request for a time extension.
4. The term "delay" shall be deemed to mean any event, action, force or factor which extends the Contractor's time of performance. This Subsection is intended to cover all such events, actions, forces or factors, whether they be styled "delay," "disruption," "interference," "impedance," "hindrance", "impact" or otherwise.
5. Compliance with the provisions of this Subsection will be an essential condition precedent to any recovery of damages by the Contractor.
6. The following items, and only the following items, may be recoverable by the Contractor as "damages":
 - a. Additional direct hourly rates paid to employees for job site labor, including payroll taxes, welfare, insurance, benefits and all other labor burdens.
 - b. Documented additional costs for materials.
 - c. Additional equipment costs, as determined in accordance with this Sub-Section.
 - d. Documented costs of extended job-site overhead. (Not applicable for claims other than delay claims.)
 - e. An additional 15 percent of the total of [Subsections 105.13.B.6](#), a, b, c and d, which sum includes home office overhead and profit.
 - f. Bond costs.
 - g. Subcontractor costs, as determined by, and limited to, those items identified as payable under [Subsection 105.13.B.6](#), a, b, c, d, e, and f.
7. For purposes of computing additional equipment costs, rates used shall be based on the Contractor's actual experienced cost for each piece of equipment. These rates shall be supported by equipment cost records furnished by the Contractor. In no case will equipment rates be allowed in excess of those determined utilizing the "Rental Rate Blue Book," with the appropriate adjustments noted in [Subsection 109.05](#).
8. The parties agree that, in any claim for damages, the Department will have no liability for the following items of damages or expense:

- a. Profit, in excess of that provided herein.
 - b. Loss of profit.
 - c. Labor inefficiencies, except as allowed under [Subsection 105.13.B.6.a.](#)
 - d. Home office overhead in excess of that provided herein.
 - e. Consequential damages, including but not limited to loss of bonding capacity, loss of bidding opportunities and insolvency.
 - f. Indirect costs or expenses of any nature.
 - g. Attorney's fees, claims preparation expenses, or costs of litigation.
 - h. Interest of any nature.
9. NOTICE OF POTENTIAL CLAIM: In any case in which the Contractor believes that it will be entitled to additional compensation, the Contractor shall notify the Engineer in writing of its intent to claim such additional compensation. Such notice shall be given in order that the Department can assess the situation, make an initial determination as to who is responsible, and institute appropriate changes or procedures to resolve the matter.
- a. Claims for Delay - The Department shall have no liability for any delay which occurred more than one week prior to the filing of such written notice. Failure of the Contractor to give such written notice in a timely fashion will be grounds for denial of the claim.
 - b. All Other Claims Except Acceleration and Delay - If the Contractor does not file such written notice before beginning the work out of which such claim arises, then the Contractor hereby agrees that it shall have waived any additional compensation for that work and the Contractor shall have no claim thereto.
10. RECORDS: After filing a "Notice of Potential Claim", the Contractor shall keep daily records of all labor, material, and equipment costs incurred for operations affected. These daily records shall identify each operation affected and the specific locations where work is affected. The Department will also keep records of all labor, material, and equipment used on operations affected. At the time and place, as designated by the Engineer, on Monday, or the first work day, of each week following the date of filing a "Notice of Potential Claim", the Contractor shall meet with the Department's representative and present the daily records for the preceding week. If the Contractor's records indicate costs greater than those kept by the Department, the Department will present its records to the Contractor. The Contractor shall notify the Engineer in writing within three (3) work days of any inaccuracies noted in, or disagreements with, the Department's records. Refusal or repeated failure by the Contractor to attend these weekly meetings and present its records will constitute a waiver by the Contractor of any objections as to the accuracy of the Department's records. When the Contractor makes an objection as to the accuracy of the Department's records, the Engineer shall review the matter, and correct any inaccuracies he finds in the Department's records. For purposes of computing damages, the Department's records will control.
- In the event the Contractor wishes to contest the accuracy of the Department's records, it may file a petition pursuant to Rule 672-1-.05 of the Official Rules and Regulations of the Department of Transportation. The decision of the Engineer, or, if contested, the decision of the Agency, will be final and binding upon the parties as to any objections to the accuracy of the Department's records, subject to the Contractor's right to judicial review under O.C.G.A. Section 50-13-19.
11. On a weekly basis after filing a "Notice of Potential Claim" for delay damages, the Contractor shall prepare and submit to the Engineer written reports providing the following information:

- a. Potential effect to the schedule caused by the delay.
- b. Identification of all operations that have been delayed, or are to be delayed.
- c. Explanation of how the Department's act or omission delayed each operation, and estimation of how much time is required to complete the project.
- d. Itemization of all extra costs being incurred, including:
 - 1) An explanation as to how those extra costs relate to the delay and how they are being calculated and measured.
 - 2) Identification of all project employees for whom costs are being compiled.
 - 3) Identification of all manufacturer's numbers of all items of equipment for which costs are being compiled.

C. Required Contents of Claims

All claims shall be submitted in writing, and shall be sufficient in detail to enable the Engineer to ascertain the basis and the amount of each claim. The claim submission shall include six (6) copies. All information submitted to the Department under this Subsection will be used exclusively for analyzing the claim, resolving the claim or any litigation which might arise from the claim. At a minimum, the following information shall be provided:

1. A description of the operations that were delayed, the reasons for the delay, how they were delayed, including the report of all scheduling experts or other consultants, if any. (Not applicable for claims other than delay claims)
2. An as-built chart, CPM scheme or other diagram depicting in graphic form how the operations were adversely affected. (Not applicable for claims other than delay claims except where an extension of time is sought)
3. A detailed factual statement of the claim providing all necessary dates, locations and items of work affected by the claim.
4. The date on which actions resulting in the claim occurred or conditions resulting in the claim became evident.
5. A copy of the "Notice of Potential Claim" filed for the specific claim by the Contractor.
6. The name, function, and activity of each Department official, or employee, involved in, or knowledgeable about facts that gave rise to such claim.
7. The name, function, and activity of each Contractor or Subcontractor official, or employee, involved in, or knowledgeable about facts that gave rise to such claim.
8. The identification of any pertinent documents, and the substance of any material oral communication relating to such claim.
9. A statement as to whether the additional compensation or extension of time sought is based on the provisions of the Contract or an alleged breach of Contract.
10. The specific provisions of the Contract which support the claim, and a statement of the reasons why such provisions support the claim.
11. The amount of additional compensation sought and a break-down of that amount into the categories specified as payable under [Subsection 105.13.B.6](#), above.
12. If an extension of time is also sought, the specific days for which it is sought and the basis for such request.

D. Required Certification of Claims

When submitting the claim, the Contractor shall certify in writing, under oath in accordance with the formalities required by Georgia law, as to the following:

1. That the claim is made in good faith.
2. That supportive data are accurate and complete to the Contractor's best knowledge and belief that the amount of the claim accurately reflects what the Contractor in good faith believes to be the Department's liability.

The Contractor shall use the CERTIFICATE OF CLAIM form, which can be obtained from the Department, to comply with these requirements.

E. Auditing of Claims

All claims filed against the Department shall be subject to audit at any time following the filing of such claim, whether or not such claim is part of a suit pending in the courts of this State. The audit may be performed by employees of the Department or by an independent auditor on behalf of the Department. The audit may begin on ten days' notice to the Contractor, Subcontractor, or Supplier. The Contractor, Subcontractor, or Supplier shall make a good faith effort to cooperate with the auditors. Failure to cooperate with the auditor shall constitute a waiver by the Contractor of the claim in its entirety. Failure of the Contractor, Subcontractor, or Supplier to maintain and retain sufficient records to allow the Department's auditor to verify the claim shall constitute a waiver of that portion of such claim that cannot be verified and shall bar recovery thereunder. If the claim is part of a suit pending in a court of this state or if the claim becomes a part of a suit in a court of this state, the questions of whether the Contractor has cooperated with the auditor or failed to maintain and retain sufficient records to allow the auditor to verify the claim shall be questions for determination by the judge without the assistance of a jury.

Without limiting the generality of the foregoing, and as a minimum, the auditors shall have available to them the following documents:

1. Daily time sheets and foreman's daily reports.
2. Project payroll register.
3. Profit and loss statements for the Project.
4. Payroll tax returns.
5. Material invoices, purchase orders, and all material and supply acquisition contracts for the Project.
6. Material cost distribution worksheet for the Project.
7. Equipment records (list of company equipment, rates, etc.)
8. Vendor rental agreements, and subcontractor invoices.
9. Subcontractor payment certificates.
10. Canceled checks (payroll and vendors) for the Project.
11. Job cost report for the Project.
12. Job payroll ledger for the Project.
13. General ledger, general journal, (if used) and all subsidiary ledgers and journals together with all supporting documentation pertinent to entries made in these ledgers and journals.

14. Cash Disbursements journal for the Project.
15. Certified financial statements for all years reflecting the operations on this project.
16. Depreciation records on all company equipment whether such records are maintained by the company involved, its accountant, or others.
17. If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents.
18. All documents which relate to each and every claim together with all documents which support the amount of damages as to each claim.
19. Worksheets used to prepare the claim establishing the cost components for items of the claim including, but not limited to, labor, benefits and insurance, materials, equipment, subcontractors, and all documents which establish the time periods, individuals involved, the hours and the rates for the individuals.

F. Mediation

After compliance by the Contractor with parts B., C., D. and E. of [Subsection 105.13](#) and if the Contractor's claim has been disallowed in whole or in part, then the Contractor may, within 30 calendar days from receipt of the ruling of the Engineer, make a written request to the Engineer that the claim or claims be referred to mediation.

If requested in accordance with this specification, mediation shall be granted by the Department. In which case, within 30 days of receipt by the Department of the Contractor's request for mediation, the Contractor and the Department will meet to select a mediator. The mediator will then schedule the mediation at a place, time, and earliest date agreeable to the Contractor and the Department.

The Contractor and the Department mutually agree that mediation shall be a condition precedent to the filing of any lawsuit concerning claims or alleged breaches of the Contract. The costs and expenses of the mediator, selected by mutual agreement of the parties, will be divided equally between the Department and the Contractor. Each party to the mediation shall bear its own costs of preparing for and participating in the mediation.

G. Remedies Exclusive

In the event any legal action is instituted against the Department by the Contractor on account of any claim for additional compensation, whether on account of delay, acceleration, breach of contract, claimed extra work, or otherwise, the Contractor agrees that the Department's liability will be limited to those items which are specifically identified as payable in this Sub-Section.

105.14 Maintenance During Construction

The Contractor shall maintain the project during construction and until the Project is accepted. This maintenance shall constitute the continuous and effective work prosecuted day by day, with adequate equipment and forces to the end that all areas of the project are kept in satisfactory condition at all times.

The Contractor's area of responsibility for maintenance is confined to the physical construction limits plus any areas affected by the Contractor's activities. Once maintenance acceptance or final acceptance has been made, the Contractor is no longer responsible for damage to The Work other than that attributable to the Contractor's actions or inadequate construction.

In case of separate contracts, each Contractor shall be responsible for any damage to the completed work of others caused by his actions or negligence. Where the work of one Contractor has been accepted by the Department, the Contractor performing subsequent work in the area shall be responsible for the maintenance and protection of all work previously completed.

If separate bridge contracts are let within the limits of a Roadway Project and the Bridge Contractor completes his Contract before the Roadway Contractor, the Bridge Contract may be accepted and the Roadway Contractor will be responsible for maintenance of the new bridge until it is opened to traffic. If the Roadway Contractor hauls materials across the bridge the

Roadway Contractor shall protect the end posts, deck surface, deck edges, joints, and all other vulnerable features of the bridge by use of adequate timber or earth cushions as directed by the Engineer. The Roadway Contractor shall repair all damage caused by such use, including resealing of joints and rerubbing of finish at his own expense.

All cost of maintenance work during construction and before the Project is accepted shall be included in the Unit Prices Bid on the various Pay Items and the Contractor will not be paid an additional amount for such work except as provided in [Subsection 104.05.B](#).

The Contractor shall not allow vegetative growth at any time to obstruct signs, delineation, traffic movements, or sight distance. The Contractor shall at intervals not to exceed six months, clean up and remove litter and debris; remove weeds from around guardrail, barrier, poles, standards, utility facilities, and other structures; and cut or trim trees, bushes or tall grass. These requirements shall apply to all areas within the project termini and lateral limits.

105.15 Failure to Maintain Roadway or Structures

If at any time, the Contractor fails to comply with the provisions of [Subsection 105.14](#), the Engineer will immediately notify the Contractor of such noncompliance. If the Contractor fails to remedy the unsatisfactory maintenance within 48 hours after receipt of such notice, the Engineer may immediately proceed to maintain The Work, and the entire cost of this maintenance will be deducted from monies due or to become due the Contractor under the Contract. As an alternative to the Engineer's maintaining the Work, all the Items and quantities of work done, but not properly maintained, may be deducted from the current progress estimate, even if such Items have been paid for in a previous estimate.

105.16 Final Inspection and Acceptance

Upon due written notice from the Contractor of substantial completion of the entire Project, the Engineer will determine if the Project is ready for a Final Inspection. The Engineer will have the final decision on when the Project is substantially complete and thereby ready for a Final Inspection. If the Engineer finds the Project substantially complete the Engineer will schedule the Final Inspection. If all construction provided for and contemplated by the Contract is found completed to the Engineer's satisfaction and all documents required in connection with the Project have been submitted by the Contractor, the Engineer will make the Final Acceptance and notify the Contractor in writing of this acceptance.

If, however, the Final Inspection discloses any work, in whole or part, as being unsatisfactory, the Engineer will provide the Contractor with a written punch-list that includes the necessary instructions for correction of same. The punch-list will also include any remaining work to be completed and any final reports and other documentation required to be submitted by the Contractor. The Contractor shall immediately comply with and execute such instructions. When all construction provided for and contemplated by the Contract is found completed to the Engineer's satisfaction, including submission of any required documentation, the Engineer will make the Final Acceptance and notify the Contractor in writing of this acceptance.

When the Contractor has finished a major portion of the Contract, the Contractor may request that a semi-final inspection be made. At the discretion of the Engineer, who shall be sole judge as to making the inspection, if the work is satisfactory, as described in the first paragraph of this Section, that portion of the Contract may be accepted, opened to traffic, if not already carrying traffic, and the Contractor relieved of the maintenance obligations as described elsewhere in these Specifications.

Such partial acceptance shall in no way relieve the Contractor of responsibility for satisfactory completion of the Contract, or for failure of any portion of the accepted work prior to Final Acceptance of the Project.

END OF SECTION

106.01 Source of Supply and Quantity of Materials

The materials used in The Work shall meet all quality requirements of the Contract. Materials will not be considered as finally accepted until all tests, including any to be taken from the finished Work, have been completed and evaluated. To expedite the inspection and testing of materials, the Contractor shall notify the Engineer in writing of his proposed sources of materials at least 2 weeks before delivery, or earlier if blend determinations or mix designs are required. When required, representative preliminary samples of the character and quality prescribed shall be submitted for examination and testing. The approval of preliminary samples does not obligate the Engineer to accept materials from the same source delivered later. If, after trial, it is found that sources of supply for previously approved materials do not produce uniform and satisfactory products, or if the product from any source proves unacceptable at any time, the Contractor shall furnish materials from other sources. The Engineer shall have the right to reject the entire output of any source from which he finds it is impractical to secure a continuous flow of uniformly satisfactory material.

Upon request by the Department, the Contractor shall furnish formal written invoices from the materials suppliers. The invoice shall show the date shipped, the quantities, and the unit prices.

The Contractor shall purchase materials from suppliers who are willing for the Contractor to furnish the Department copies of invoices as noted herein upon request by the Department.

Materials used and operations performed under [Section 400- Hot Mix Asphaltic Concrete Construction](#), shall be controlled and tested by the Contractor. This shall be done in such a manner as to produce a uniform product that meets Specification requirements. In the event the Contractor's quality control procedures do not achieve the desired objective, operations shall be suspended until satisfactory results are obtained.

The Contractor's quality control personnel shall be properly instructed and trained to perform all tests and make calculations, and shall be competent to control all processes so that the requirements are met.

END OF SECTION

Section 400: Appendix 2

109.01 Measurement and Quantities

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the Contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made along the surface, and no deductions will be made for individual fixtures having an area of 9 ft² (1 m²) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the Plans or ordered in writing by the Engineer.

Where payment is to be made by the square yard (square meter) for a specified thickness, the length will be measured on the surface along the centerline and the pay width shall be that width specified on the plans for the Final surface of the completed section. Intermediate courses shall be placed at a width sufficient to support successive courses with no detriment to the stability of the successive courses. The width of material required beyond the pay width will not be eligible for payment and shall be considered incidental to the work.

Structures will be measured according to neat lines shown on the Plans or as altered to fit field conditions.

All items which are measured by the linear foot (linear meter), such as pipe culverts, guard rail, underdrains, etc., will be measured parallel to the base or foundation upon which such structures are placed, unless otherwise shown on the Plans.

In computing volumes of excavation, the average end area method or other acceptable methods will be used.

The term "gage," when used in connection with the measurement of steel plates, will mean the U.S. Standard Gage.

When the term "gage" refers to the measurement of electrical wire it will mean the wire gage specified in the National Electrical Code.

The term "ton" will mean the short ton consisting of 2,000 pounds avoirdupois. The term "megagram" will mean one metric ton, equivalent to 1,000 kg. Any commodity paid for by weight shall be weighed on scales that have been approved as specified below and which are furnished at the expense of the Contractor or Supplier. Weighing and measuring systems including remote controls shall be subject to type-approval by the Department of Transportation. The manufacture, installation, performance, and operation of such devices located in Georgia shall conform to, and be governed by, the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act, the Georgia Weights and Measures Regulations, as amended and adopted, the current edition of the National Bureau of Standards Handbook 44, and these Specifications. Weighing and measuring systems located outside Georgia which are utilized for weighing materials to be used in Department work shall be manufactured, installed, approved, and operated in accordance with applicable laws and regulations for the state in which the scales are located.

All weighing, measuring, and metering devices used to measure quantities for payment shall be suitable for the purpose intended and will be considered to be "commercial devices." Commodity scales located in Georgia shall be certified before use for accuracy, condition, etc., by the Weights and Measures Division of the Georgia Department of Agriculture, its authorized representative, or the Georgia Department of Transportation Office of Materials and Research. Scales located outside Georgia shall be certified in accordance with applicable laws and regulations for the state in which the scales are located. The Georgia Department of Transportation Office of Materials and Research may certify the scales. This certification shall have been made within a period of not more than one year prior to date of use for weighing commodity.

All equipment and all mechanisms and devices attached thereto or used in connection therewith shall be constructed, assembled, and installed for use so that they do not facilitate the perpetration of fraud. Any scale component or mechanism, which if manipulated would alter true scale values (including manual zero setting mechanisms) shall not be accessible to the scale operator. Such components and mechanisms that would otherwise be accessible to the scale operator shall be enclosed. Provisions shall be made for security seals where appropriate on equipment and accessories. A security seal shall be affixed to any adjustment mechanism designed to be sealed. Scale or accessory devices shall not be used if security seals have been broken or removed.

Any certified scale or scale component which has been repaired, dismantled, or moved to another location shall again be tested and certified before it is eligible for weighing.

Whenever materials that are paid for based on weight are from a source within the State, the scales shall be operated by and the weights attested to by signature and seal of a duly authorized Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted. When such materials originate from another state that has a certified or licensed weigher program, the scales shall be operated by a weigher who is certified by that state in accordance with applicable laws, and weight ticket recordation shall be in accordance with Standard Operating Procedure 15.

When materials are paid for based on weight and originate from another state which has no program for certifying or licensing weighers, the materials shall be weighed on scales located in the State of Georgia by a Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted.

No scale shall be used to measure weights greater than the scale manufacturer's rated capacity. A digital recorder shall be installed as part of any commodity scale. The recorder shall produce a printed digital record on a ticket with the gross, tare, and net weights of the delivery trucks, along with the date and time printed for each ticket. Provisions shall be made so that the scales or recorders may not be manually manipulated during the printing process. The system shall be so interlocked as to allow printing only when the scale has come to rest. Either the gross or net weight shall be a direct scale reading. Printing and recording systems that are capable of accepting keyboard entries shall clearly and automatically differentiate a direct scale weight value from any other weight values printed on the load ticket.

All scales used to determine pay quantities shall be provided to attain a zero balance indication with no load on the load receiving element by the use of semi-automatic zero (push-button zero) or automatic zero maintenance.

Vehicle scales shall have a platform of sufficient size to accommodate the entire length of any vehicle weighed and shall have sufficient capacity to weigh the largest load. Adequate drainage shall be provided to prevent saturation of the ground under the scale foundation.

The Engineer, at his discretion, may require the platform scales to be checked for accuracy. For this purpose the Contractor shall load a truck with material of his choosing, weigh the loaded truck on his scales, and then weigh it on another set of certified vehicle scales. When the difference exceeds 0.4 percent of load, the scales shall be corrected and certified by a registered scale serviceman registered in the appropriate class as outlined in the Georgia Weights and Measures Regulations or in accordance with applicable requirements of the state in which the scales are located. A test report shall be submitted to the appropriate representative of the Department of Agriculture.

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to their water level capacity as determined by the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined.

Cement and lime will be measured by the ton (megagram). Whenever cement or lime is delivered to the Project in tank trucks, a certified weight shall be made at the shipping point by an authorized Certified Public Weigher who is not an employee of the Department. Whenever cement and lime are from a source within the State, the scales shall be operated by the weights attested to by signature and seal of a duly authorized Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted. When such materials originate from another state that has a certified or licensed weigher program, the scales shall be operated by a weigher who is certified by that state in accordance with applicable laws, and the weight ticket recordation shall be in accordance with Standard Operating Procedure 15. When cement and lime originate from another state that has no program for certifying or licensing weighers, the materials shall be weighed on scales located

in the State of Georgia by a Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted.

The shipping invoice shall contain the certified weights and the signature and seal of the Certified Public Weigher. A security seal shall also be affixed to the discharge pipe cap on the tank truck before leaving the shipping point. The number on the security seal shall also be recorded on the shipping invoice. The shipping invoice for quicklime shall also contain a certified lime purity percentage. Unsealed tank trucks will require reweighing by a Certified Public Weigher.

Timber will be measured by the thousand feet board measure (MFBM) (cubic meter) actually incorporated in the structure. Measurements will be based on nominal widths and thickness and the actual length in place. No additional measurement will be made for splices except as noted for overlaps as shown on the Plans.

The term “Lump Sum” when used as an item of payment will mean complete payment for the Work described in the Contract.

When a complete structure or structural unit (in effect, “Lump Sum” work) is specified as the unit of the measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured as defined in [Subsection 109.05.B.4](#).

When standard manufactured items are specified as fence, wire, plates, rolled shapes, pipe conduits, etc., and these items are identified by gage, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerance in cited Specifications, manufacturing tolerances established by the industries involved will be accepted.

END OF SECTION

Section 300 – General Specifications for Base and Subbase Courses

Section 301 : Appendix B

300.3 Construction Requirements

300.3.01 Personnel

Supply all personnel and equipment necessary for obtaining samples from base plants and delivering them to the plant laboratory.

300.3.02 Equipment

Ensure that all equipment for constructing base and subbase courses is of an approved design and in satisfactory condition before construction begins. The equipment required for each type of base or subbase will be determined according to the construction method used.

A. Central Mix Plants

The central mixing plant will not be approved for proportioning, batching, or mixing unless a field laboratory meeting the requirements of [Section 152](#) is available for the exclusive use of the Engineer or Inspector.

Design, coordinate, and operate plants so that the mixture is produced within the specified tolerances. The requirements are as follows.

1. Scales

Before any mixture is delivered to the Project, check all scales with standard weights for accuracy and for agreement with each other.

If weight proportioning is used, provide accurate scales so all ingredients of the mixture can be weighed separately. Use scales that are accurate to within 0.5 percent of the measured load. Support scales with rigid supports so that vibration from the plant does not interfere with accurate readings.

a. Weight Box and Hopper Scales

Use springless dial scales of a standard make and design for weight boxes and hopper. Inspect and seal scales when the Engineer determines it necessary to assure accuracy. Ensure that at least ten 50 lb. (25 kg) weights are available for testing the scales.

b. Motor Truck Scales

With each plant, include a motor truck scale with a platform large enough to accommodate the entire length of any vehicle used. Ensure that the scale is certified according to [Section 109](#) and is large enough to weigh the largest anticipated load. Do not measure weights greater than the rated capacity of the scales.

Ensure that the weights of the aggregate batches in the truck before delivery to the Project are within two percent of the sum of the weights of the batch ingredients.

Complete Forms OMR-TM-141 (Daily Truck Weights) and Form 474 (Tally Sheet) for each day's production and submit them to the Engineer.

2. Mixer

Equip each central mix plant with an approved mixer.

If Portland cement is required, begin mixing immediately after the cement is added to the coarse aggregate and soil mortar. Continue mixing until a homogeneous and uniform mixture is produced.

If the equipment does not produce a homogeneous and uniform mixture that meets these Specifications, the Engineer will require the Contractor to make the changes necessary to accomplish this result.

Any adjustments made to the charge in a batch mixer or the rate of feed to a continuous mixer must ensure a complete mix of all of the material.

Correct dead areas in the mixer where the material does not move or is not sufficiently agitated, by reducing the volume of material or by making other adjustments.

3. Mixture Proportioning

Add Portland cement, bituminous materials, aggregates, or other ingredients in such a manner that they are uniformly distributed throughout the mixture during the mixing operation.

4. Water Proportioning

In all plants, proportion water by weight. Provide a means for the Engineer to verify the amount of water per batch or the rate of flow for continuous mixing.

Use spray bars to evenly distribute moisture throughout the mixture.

5. Sampling

Use sampling equipment approved by the Engineer to obtain samples before combining them with other ingredients or introducing them into the mixer.

Use sampling equipment to provide an accurate representation of the furnished material.

6. Additional Requirements for Continuous-Mixing Plants

a. Feeder System

Continuous mixing plants shall use a feeder system that accurately proportions aggregate from each bin by weight.

Equip each feeder with a device that can change the quantity of material being fed. Use a feeder with adjustments that can be securely fastened.

Ensure that the plant has an interlocking system of feeders and conveyors that can be synchronized to supply a continuous flow of aggregate, including a positive flow of dry and liquid additives for mixing.

Provide an electronic belt-weighing device to monitor the combined aggregates. Ensure that there are meters for maintaining the aggregates and additives at varying production rates.

Use an electronic control package capable of tracking which accepts a signal from the belt-weighing device and signals to continuously vary the dry and liquid additive feeder speed and maintain the feed rate.

Proportion dry additives with a gravimetric (depleting weight) system meeting the following requirements:

- The dry additive gravimetric (depleting weight) system includes an isolation vessel supported by load cells independent of the fines silo.
 - Use load cells in conjunction with an electronic scale package having remote digital display and the necessary controls. Continuously weigh the material being metered with a positive displacement feeder mounted on the discharge of the isolation vessel.
- b. Control System
- Use a control package that has a plant interlock shutdown capability. Plants must be able to shut down if actual flow rates differ from desired flow rates excessively. If the flow rate deviates excessively, an alarm shall sound at any of the aggregate, dry additive, or liquid additive metering devices.
- Provide a monitoring station to control the entire operation that shows continuous quantitative data on the production and proportioning of the mix ingredients.
- a. Portable Power Units
- Equip plants that use portable electric power generators with a frequency meter (graduated and accurate to one hertz) and a voltmeter (graduated and accurate to two volts), installed in the power circuit.
- b. Mixer
- Use a mixer equipped with enough paddles or blades to produce a uniform and homogeneous mixture. Replace paddle blades that show more than 25 percent wear in the face area. Use paddles that can be adjusted to angular positions on the shafts and that can be reversed to retard the flow of the mix. Keep the mixer level.
- c. Surge Hopper
- Equip the mixer with a surge hopper. Use a surge hopper that automatically discharges the mixture when it reaches a predetermined level.
7. Additional Requirements For Batch-Mixing Plants
- a. Weigh Box or Hopper
- Use weigh boxes and hoppers that are suspended on scales, large enough to hold a full batch without spilling or needing hand raking, and equipped with a device for accurately weighing each size of aggregate. Provide a convenient and accurate means of obtaining samples of aggregates from each bin before the material enters the mixing chamber. Equip each bin compartment with a bin level indicator that automatically stops weighing when a bin is empty.
- b. Mixer
- Include an approved, leak-proof batch mixer in the plant. Use a mixer fast enough or equipped with enough paddles or blades to produce a properly and uniformly mixed batch. Replace paddles and blades that show more than 25 percent wear in the face area.
- a. Weighing Cement
- Weigh cement on scales separate from the aggregate batching scales. Ensure that all scales meet the requirements of [Section 109](#).
- d. Proportioning Bituminous
- Introduce bituminous material into the mixer through spray bars and weigh it on scales separate from the aggregate batching scales.
- e. Control of Mixing Time
- Use a time-locking device that automatically limits mixing time. Do not mix materials for less than 30 seconds.

B. In-Place Mixers

For in-place mixing operations, use mixers that meet the following requirements:

1. Multiple Pass Mixers

Use approved rotary-type multiple pass mixers with sufficient tines that mix cement, soil or soil-aggregate, and water uniformly for the full depth of the course.

2. Traveling Plant Mixers

Use approved traveling mixing plants to pick up the aggregate, soil, or other materials from the windrow or roadway. Use plants equipped with a bottom shell or pan that pick up and mix the material while it is separated from the foundation material during at least 50 percent of the mixing cycle.

Use plants that mix the material for the full depth of the section. Ensure that travelling plants move forward with successive increments the length and width of the roadbed so that the roadbed is compacted and finished in one operation. Ensure that none of the materials being mixed are lost or segregated.

Use plants mounted on wheels or crawler tracks wide enough so that they will not rut or damage the mixed surface when loaded to capacity.

Use plants with a pressurized metering device that introduces water during mixing.

Ensure that devices for proportioning water and materials to be mixed accurately measures the specified amounts while the machine is in motion.

For bituminous stabilization, use plants equipped with a metering device that accurately measures the bituminous material into the mixer within the tolerances specified in [Section 302.3.05.B](#). Ensure that the meter indicator dial has a scale with divisions indicating gallons (liters).

If mixing equipment does not produce a homogeneous and uniform mixture, make the changes necessary to produce this result, as required by the Engineer.

C. Mechanical Cement Spreader

When the material is to be mixed in-place, use an approved mechanical cement spreader to uniformly and accurately spread the cement. Do not use pneumatic tubes to transfer the cement from the tanker to the material to be stabilized.

D. Mixture Spreader

Use an approved mechanical spreader that meets the following requirements to uniformly spread the mixture:

- A height-adjustable strike-off plate to obtain the specified thickness of the finished base
- A self-propelled spreader with rollers to contact the truck tires and push the truck without skewing the spreader or truck
- A hopper large enough to prevent spilling or wasting the material

E. Static Rollers

Use static rollers that meet the following requirements. Use self-propelled static rollers on cement stabilized base.

1. Trench Roller

In this context, “roller” describes a wheel made of a flat metal surface; “wheel” describes a rubber wheel of the automotive type.

When base widening is specified, use at least one trench roller. Use a trench roller that has a guiding roller or wheel that operates in tandem with the compression roller on the area to be compacted or with the auxiliary wheel or roller.

Ensure that the trench roller is equipped with an auxiliary wheel or roller, mounted on a height-adjustable axle. The contact surface of the auxiliary wheel or roller must be adjustable to at least 10 in (250 mm) above and 2 in (50 mm) below the rolling plane of the compression roller. If this adjustment is not sufficient to compact the subgrade to the Plan elevation, adjust the contact surface the necessary amount.

If the steering roller or wheel operates in tandem with the auxiliary wheel or roller, it does not need to be height-adjustable.

Ensure that the auxiliary wheel or roller operates on the surface of the pavement adjacent to the area to be compacted, and at a distance from the edge of the pavement that no damage occurs. Keep the height adjustment of the auxiliary wheel or roller such that the compression roller will develop a smooth, compacted surface true to crown.

Use gas-propelled trench rollers equipped with reversing, smooth operating friction clutches. Ensure that friction clutches have smooth operating brakes of ample capacity. Use either hand-powered or power-operated steering devices.

The compression per inch (25 mm) width of compression roller shall not be less than 300 lbs (545 kg) and not greater than 365 lbs. (660 kg). If necessary, use a hollow compression roller and secure the minimum weight with liquid ballast. The trench roller must compact a minimum width of at least 15 in (375 mm).

Fit rollers with adjustable spring scrapers that can scrape in both directions.

2. Steel-Wheel Rollers

Use three-wheel or tandem steel-wheel rollers. Use self-propelled rollers equipped with cleaning devices to prevent material from adhering to the wheels.

For base or subbase materials, use 3-wheel rollers on base or subbase materials that have a minimum weight of 10 tons (9 Mg) and a minimum compression of 325 pounds per inch (580 kg/100 mm) of width for the rear wheels.

Use steel wheel tandem rollers with a minimum weight of 10 tons (9 Mg) and a minimum compression of 225 pounds per inch (400 kg/100 mm) of width for the rear drum.

3. Pneumatic-Tire Rollers

Use pneumatic-tire rollers with a minimum contact pressure of 50 psi (345 kPa) per wheel.

Equip rollers to uniformly distribute the load between all wheels.

Use multiple axle, multiple wheel rollers with wheels staggered on the axles and spaces between each wheel to provide uniform compaction for the full compacting width of roller.

Ensure that the air pressure of any tire does not vary more than 5 psi (35 kPa) from the established pressure.

Operate rollers between 3 mph (5 kph) and 8 mph (13 kph), unless otherwise directed by the Engineer.

4. Sheepsfoot Rollers

Use vibratory or static compaction sheepsfoot rollers of sufficient size and weight to obtain the desired compaction.

F. Vibratory Rollers

Use an approved vibratory roller designed to activate the frequency of vibration and the roller movement separately. Ensure that the weight and amplitude of the roller can compact the surface to Specifications with a minimum number of passes.

G. Bituminous Sampling Valve

Use bituminous transfer pumps that include a valve for sampling bituminous materials.

H. Fine Grading Machine

Specifications for the Fine Grading Machine are included in either a Special Provision or a Supplemental Specification in the Proposal or in the current Supplemental Specification book.

300.3.03 Preparation

A. Alternate Methods

When alternate methods of construction are provided without restriction, the Contractor may select these alternate methods at will, provided the equipment and organization are suited to the method selected. Before starting construction, discuss the proposed method with the Engineer. The method selected must:

- Spread base or subbase material uniformly without damaging the subgrade, subbase, or the material being placed
- Mix the materials until they are homogeneous
- Use the specified water and cement or bitumen content
- Compact throughout the depth of the course to the density specified
- Complete the work within the specified time limits

Organize the work and equipment so that spreading, compacting, and finishing the base or subbase is a continuous operation. Do not exceed minimum or maximum time limits where the detailed Specifications require them, except in unusual cases where permitted by the Engineer.

B. Preparing the Pit Site

Remove grass, weeds, roots, and other debris from local materials pits. Adhere to the requirements of [Subsection 107.23, “Environmental Considerations”](#) when performing this work. Include the cost in the prices bid for the pertinent Pay Items. This work is not considered as clearing and grubbing.

C. Preparing the Subgrade

If the subgrade does not meet the requirements of [Section 209](#) for surface, compaction, and stability, repair all defective portions until it meets the requirements of that Section. Remove unsuitable materials and replace with acceptable material, if necessary. Compact the subgrade as specified in [Section 209](#).

Have enough prepared subgrade meeting the requirements of [Section 209](#) for at least one day of base construction before beginning work.

D. Preparing the Subbase

If a subbase is required, prepare it according to the requirements for surface and compaction. Ensure that it is stable enough to support the equipment that will place the base material without rutting or pumping. Repair all defective portions and replace any unsuitable material with acceptable material, if the subbase does not meet the requirements of the Specifications.

300.3.04 Fabrication

General Provisions 101 through 150.

300.3.05 Construction

A. Draining and Leaving Materials Pits

Keep materials pits well drained while materials are being removed from them. After removing materials, leave pits in the condition required by [Section 106](#) and [Section 160](#).

B. Mining and Mixing in a Pit

Mine all local materials pits within the pit boundaries and grid depths established by the Engineer.

Mine all materials from top to bottom. Mix materials in the pit before hauling to the roadbed or plant.

Place materials in windrows or stockpiles with a dragline or backhoe. Blend the gradation and moisture strata from each pit to a uniform mixture.

When a rim ditch is required and its depth exceeds the specified grid depth of soil-cement material, include only the material above the grid depth as base material. Use this material for the windrow or stockpile of material to be used for soil-cement base unless the Engineer determines that below-the-grid material is satisfactory.

Only use ladder pans and scrapers for stockpiling and windrowing in pits that are less than 18 in (450 mm) deep.

After the preliminary mixing, prevent the coarse materials from segregating from the fine materials with loading equipment that continues to blend the material.

C. Placing Materials

1. Mixture Control

The Engineer will determine the proportions of the materials to be used in compounding the base or subbase. The Engineer will determine the analysis basis of the components.

Change the mix, if required by the Engineer, to ensure that the finished base meets the requirements of these Specifications.

2. Moisture Control

Control the moisture content according to the specified requirements for each type of base or subbase.

Add water uniformly, allow it to evaporate or aerate, and roll the materials as often as necessary, to control the moisture content within the limits specified.

3. Number of Courses

Because the maximum thickness of base or subbase materials to be mixed or spread in one course varies with the equipment used, it is subject to the Engineer’s approval. Ensure that the thickness meets the requirements of [Subsection 300.3 .05.C.5, “Compaction .”](#)

4. Widening Work

Ensure that widening work conforms to [Section 150](#).

When widening in traffic areas, excavate an area that can be completed in the same day.

When widening pavement on which there is traffic on both sides, stagger operations to keep the widening trench open in one lane of traffic at a time.

5. Compaction

Compact the entire thickness of all bases and subbases to the specified maximum dry weight per cubic foot (meter), as determined by the method specified in the Section for each base or subbase.

If any base or subbase is more than 6 in (150 mm) thick, construct according to the following table for layer thickness:

Material	Layer Thickness
Topsoil, Sand-Clay, or Chert	Two equal layers, or one layer not to exceed 8 in (200 mm)
Graded Aggregate	Two equal layers, or one layer not to exceed 8 in (200 mm)
Cement Stabilized Graded Aggregate	Two equal layers, or one layer not to exceed 8 in (200 mm)
Cement Stabilized Soil Aggregate	Two equal layers, or one layer not to exceed 8 in (200 mm)
Sand Bituminous	Two equal layers, or one layer not to exceed 8 in (200 mm)
Soil-Cement	One layer not to exceed 8 in (200 mm)

D. Meeting Surface Requirements

Produce a smooth, uniform surface that complies with these Specifications.

Rebuild any areas that do not meet the requirements or remove or add material to the area until the Engineer approves of the Work.

300.3.06 Quality Acceptance

A. Monitoring Quality Control

Ensure that the mixture and the materials used meet the following quality controls:

- Before producing any mixture for the Project, calibrate the electronic sensors, devices, or settings for proportioning all mixture ingredients by scale weight. Calibrate in the presence of the Engineer, the proportioning of every ingredient for all rates of production.
- Maintain a dated, written record of the most recent calibration. Post the calibration at the base plant and make the record available for the Engineer's inspection at all times. Format records as graphs, tables, charts, or mechanically prepared data. If the material changes, the rate of production changes by more than +/- 20%, the plant is not producing base material for more than two weeks, or if a component affecting the ingredient proportions has been repaired, replaced, or adjusted, check and recalibrate the proportions.
- Verify the moisture of the mixture being produced. Perform checks on ingredient proportioning and verify truck weight as directed by the Engineer.

Provide quality control personnel and all necessary equipment to perform and document moisture tests. Perform moisture tests at a frequency of at least one test per hour of base plant production.

B. Repairing Defects

During construction: If materials that do not meet these Specifications are placed on the roadway at any time during construction, remove and replace them with acceptable materials as a part of the Pay Item for the base or subbase being constructed.

After construction: Promptly correct defects discovered in the surface finish, thickness, or compaction of the completed base or subbase before The Work is accepted.

- If the base, subbase, or shoulders are deficient in thickness and it is determined that the subgrade elevation is high, remove the materials, lower the subgrade, and reconstruct the course, according to these Specifications at no cost to the Department.
- If job conditions permit and the Engineer mandates, correct areas deficient in thickness by raising the elevation of the surface or adding material to the course.
- In other cases, the Engineer may determine that the defective portions must be entirely removed. Add, mix, spread, and compact new material according to the Specifications and at no cost to the Department.
- If a surface is less than 3 in (75 mm) deep, scarify the area to a depth of at least 3 in (75 mm), except in the case of stabilized bases or subbases. Mix and compact the new and old materials.
- Repair stabilized bases or subbases according to [Section 301](#), [Section 302](#), [Section 310](#), or [Section 316](#), whichever is applicable.

END OF SECTION

Section 301: Appendix A

831.2.03 Fly Ash, Raw or Calcined Natural Pozzolan, Slag, and Micro silica

A. Requirements

1. Fly Ash

Fly ash is finely divided residue from the combustion of ground or powdered coal that is transported from the boiler by flue gases.

Use fly ash that meets the requirements of AASHTO M 295, Class F or C and that are listed in [QPL 30](#).

2. Raw or Calcined Natural Pozzolan

This is a siliceous or siliceous and aluminous material.

Use Pozzolan that meets the requirements of AASHTO M 295, Class N and that are listed in [QPL 30](#).

3. Granulated Iron Blast-Furnace Slag

This is a glassy granular material formed when molten blast-furnace slag is rapidly chilled and then finely ground.

Use slag that meets the requirements of AASHTO M 302, Grade 100 or 120 and that are listed in [QPL 30](#).

4. Microsilica (Silica Fume)

This is an amorphous material with high silica content and purity, made as a by-product of high purity quartz that is reduced with other ingredients in an electric-arc furnace.

Use microsilica that meets the requirements of AASHTO M 307.

END OF SECTION

GEORGIA DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

SPECIAL PROVISION

Section 400—Hot Mix Asphaltic Concrete Construction

Delete Section 400 and substitute the following:

400.1 General Description

This work includes constructing one or more courses of bituminous plant mixture on the prepared foundation or existing roadway surface. The mixture shall conform with lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

This section includes the requirements for all bituminous plant mixtures regardless of the gradation of the aggregates, type and amount of bituminous material, or pavement use.

Work will be accepted on a lot-to-lot basis according to the requirements of this Section and [Section 106](#).

400.1.01 Definitions

Segregated Mixture: Mixture lacking homogeneity in HMA constituents of such a magnitude that there is a reasonable expectation of accelerated pavement distress or performance problems. May be quantified by measurable changes in temperature, gradation, asphalt content, air voids, or surface texture.

New Construction: A roadway section more than 0.5 mile (800 m) long that is not longitudinally adjacent to the existing roadway. If one or more lanes are added longitudinally adjacent to the existing lane, the lane(s) shall be tested under the criteria for a resurfacing project. If work is performed on the existing roadway including leveling, grade changes, widening and/or resurfacing then that lane shall be tested under the criteria for a resurfacing project.

Trench Widening: Widening no more than 4 ft. (1.2 m) in width.

Comparison sample: Opposite quarter of material sampled by the Contractor.

Independent Sample (Quality Assurance Sample): A sample taken by the Department to verify an acceptance decision without regard to any other sample that may also have been taken to represent the material in question.

Referee sample: A sample of the material retained during the quartering process which is used for evaluation if a comparison of Contractor and Departmental test results is outside allowable tolerances.

400.1.02 Related References

A. Standard Specifications

[Section 106—Control of Materials](#)

[Section 109—Measurement and Payment](#)

[Section 152—Field Laboratory Building](#)

[Section 413—Bituminous Tack Coat](#)

[Section 424—Bituminous Surface Treatment](#)

[Section 802—Coarse Aggregate for Asphaltic Concrete](#)

[Section 820 – Asphalt Cement](#)

[Section 828—Hot Mix Asphaltic Concrete Mixtures](#)

B. Referenced Documents

AASHTO T 315

AASHTO T 209

AASHTO T 202

AASHTO T 49

[Georgia Department of Transportation Standard Operating Procedure \(SOP\) 27](#)

[Georgia Department of Transportation Standard Operating Procedure \(SOP\) 15](#)

[Georgia Department of Transportation Standard Operation Procedure \(SOP\) 40](#)

[GDT 38](#)

[GDT 73](#)

[GDT 78](#)

[GDT 83](#)

GDT 93

[GDT 119](#)

[GDT 125](#)

[GDT 134](#)

[GSP 15](#)

[GSP 21](#)

[QPL 1](#)

[QPL 2](#)

[QPL 7](#)

[QPL 26](#)

[QPL 30](#)

[QPL 39](#)

[QPL 41](#)

[QPL 45](#)

[QPL 65](#)

[QPL 67](#)

QPL 70

[QPL 77](#)

400.1.03 Submittals

A. Invoices

Furnish formal written invoices from a supplier for all materials used in production of HMA when requested by the Department. Show the following on the Bill of Lading:

Date shipped

Quantity in tons (megagrams)

Included with or without additives (for asphalt cement)

Purchase asphaltic cement directly from a supplier listed on [Qualified Products List 7](#) and provide copies of Bill of Lading at the Department's request.

B. Paving Plan

Before starting asphaltic concrete construction, submit a written paving plan to the Engineer for approval. Include the following on the paving plan:

- Proposed starting date
- Location of plant(s)
- Rate of production
- Average haul distance(s)
- Number of haul trucks
- Paver speed feet (meter)/minute for each placement operation
- Mat width for each placement operation
- Number and type of rollers for each placement operation
- Sketch of the typical section showing the paving sequence for each placement operation
- Electronic controls used for each placement operation
- Temporary pavement marking plan

If staged construction is designated in the Plans or contract, provide a paving plan for each construction stage.

If segregation is detected, submit a written plan of measures and actions to prevent segregation. Work will not continue until the plan is submitted to and approved by the Department.

C. Job Mix Formula

After the Contract has been awarded, submit a written job mix formula proposed for each mixture type to be used based on an approved mix design to the Engineer. Furnish the following information for each mix:

- Specific project for which the mixture will be used
- Source and description of the materials to be used
- Mixture I.D. Number
- Proportions of the raw materials to be combined in the paving mixture
- Single percentage of the combined mineral aggregates passing each specified sieve
- Single percentage of asphalt by weight of the total mix to be incorporated in the completed mixture
- Single temperature at which to discharge the mixture from the plant
- Theoretical specific gravity of the mixture at the designated asphalt content
- Name of the person or agency responsible for quality control of the mixture during production

Do the following to have the formulas approved in accordance with [SOP 40—Approval of Contractor Job Mix Formulas](#) and to ensure their quality:

1. Submit proposed job mix formulas for review at least two weeks before beginning the mixing operations.
2. Do not start hot mix asphaltic concrete work until the Engineer has approved a job mix formula for the mixture to be used. No mixture will be accepted until the Engineer has given approval.
3. Provide mix designs for all Superpave and 4.75 mm mixes to be used.
4. After a job mix formula has been approved, assume responsibility for the quality control of the mixtures supplied to the Department according to [Subsection 106.01, –Source of Supply and Quantity of Materials.I \(see Appendix 1\)](#)

D. Omitted

400.2 Materials

Ensure that materials comply with the specifications listed in Table 1.

Table 1—Materials Specifications

Material	Subsection
Asphalt Cement, Grade Specified	820.2
Coarse Aggregates for Asphaltic Concrete	802.2.02
Fine Aggregates for Asphaltic Concrete	802.2.01
Mineral Filler	883.1
Heat Stable Anti-Stripping Additive	831.2.04
Hydrated Lime	882.2.03
Silicone Fluid (When approved by the Office of Materials and Research)	831.2.05
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	820.2
Hot Mix Asphaltic Concrete Mixtures	828

400.2.01 Delivery, Storage, and Handling

Storage of material is allowed in a properly sealed and insulated system for up to 24 hours except that Stone Matrix Asphalt (SMA), Open-Graded Friction Course (OGFC), or Porous European Mix (PEM) mixtures shall not be stored more than 12 hours. Mixtures other than SMA, OGFC, or PEM may be stored up to 72 hours in a sealed and insulated system, equipped with an auxiliary inert gas system, with the Engineer’s approval. Segregation, lumpiness, drain-down, or stiffness of stored mixture is cause for rejection of the mixture. The Engineer will not approve using a storage or surge bin if the mixture segregates, loses excessive heat, or oxidizes during storage.

The Engineer may obtain mixture samples or recover asphalt cement according to [GDT 119](#). AASHTO T 315, AASHTO T 202 and T 49 will be used to perform viscosity and penetration tests to determine how much asphalt hardening has occurred.

A. Vehicles for Transporting and Delivering Mixtures

Ensure trucks used for hauling bituminous mixtures have tight, clean, smooth beds.

Follow these guidelines when preparing vehicles to transport bituminous mixtures:

1. Use an approved releasing agent from [QPL 39](#) in the transporting vehicle beds, if necessary, to prevent the mixture from sticking to the bed. Ensure that the releasing agent is not detrimental to the mixture. When applying the agent, drain the excess agent from the bed before loading. Remove from the project any transporting vehicles determined to contain unapproved releasing agents.
2. Protect the mixture with a waterproof cover large enough to extend over the sides and ends of the bed. Securely fasten the waterproof cover before the vehicle begins moving.
3. Insulate the front end and sides of each bed with an insulating material with the following specifications:
 - Consists of builders insulating board or equivalent
 - Has a minimum –R| value of 4.0
 - Can withstand approximately 400 °F (200 C) temperatures

Install the insulating material so it is protected from loss and contamination. A –Heat Dump Body|| may be used in lieu of insulation of the bed. –Heat Dump Body|| refers to any approved transport vehicle that is capable of diverting engine exhaust and transmitting heat evenly throughout the dump body to keep asphalt at required temperature. Mark the –Heat Dump Body|| clearly with –OPEN|| and –CLOSE|| position at the exhaust diverter. Install a padlock and lock it in the –OPEN|| position when the –Heat Dump Body|| is used to transport bituminous mixtures.
4. Mark each transporting vehicle with a clearly visible identification number.
5. Create a hole in each side of the bed so that the temperature of the loaded mixture can be checked. The placement of these holes shall be located to assure that the thermometer is being placed in the hot mix asphaltic concrete.

Ensure the mixture is delivered to the roadway at a temperature within ± 20 °F (± 11 °C) of the temperature on the job mix formula.

If the Engineer determines that a truck may be hazardous to the Project or adversely affect the quality of the work, remove the truck from the project.

B. Containers for Transporting, Conveying, and Storing Bituminous Material

To transport, convey, and store bituminous material, use containers free of foreign material and equipped with sample valves. Bituminous material will not be accepted from conveying vehicles if material has leaked or spilled from the containers.

400.3 Construction Requirements

400.3. Omitted

400.3.02 Equipment

Hot mix asphaltic concrete plants that produce mix for Department use are governed by [Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia, Laboratory Standard Operating Procedure No. 27.](#)

The Engineer will approve the equipment used to transport and construct hot mix asphaltic concrete. Ensure that the equipment is in satisfactory mechanical condition and can function properly during production and placement operations. Place the following equipment at the plant or project site:

A. Omitted

B. Plant Equipment

1. Scales

Provide scales as follows:

- a. Furnish (at the Contractor's expense) scales to weigh bituminous plant mixtures, regardless of the measurement method for payment.
- b. Ensure that the weight measuring devices that provide documentation comply with [Subsection 109.01, -Measurement and Quantities. I \(see Appendix 2\)](#)
- c. When not using platform scales, provide weight devices that record the mixture net weights delivered to the truck. A net weight system will include, but is not limited to:
 - Hopper or batcher-type weight systems that deliver asphaltic mixture directly to the truck
 - Fully automatic batching equipment with a digital recording device
- d. Use a net weight printing system only with automatic batching and mixing systems approved by the Engineer.
- e. Ensure that the net weight scale mechanism or device manufacturer, installation, performance, and operation meets the requirements in [Subsection 109.01, -Measurement and QuantitiesII](#)
- f. Provide information on the Project tickets according to [Department of Transportation SOP-15.](#)

2. Time-Locking Devices

Furnish batch type asphalt plants with automatic time-locking devices that control the mixing time automatically. Construct these devices so that the operator cannot shorten or eliminate any portion of the mixing cycle.

3. Surge- and Storage-Systems

Provide surge and storage bins as follows:

- a. Ensure bins for mixture storage are insulated and have a working seal, top and bottom, to prevent outside air infiltration and to maintain an inert atmosphere during storage. Bins not intended as storage bins may be used as surge bins to hold hot mixtures for part of the working day. However, empty these surge bins completely at the end of the working day.
- b. Ensure surge and storage bins can retain a predetermined minimum level of mixture in the bin when the trucks are loaded.
- c. Ensure surge and storage systems do not contribute to mix segregation, lumpiness, drain-down, or stiffness.

- d. Ensure the scale mechanism or device manufacture, installation, performance, and operation meets the requirements in [Subsection 109.01 Measurement and Quantities](#).
4. Controls for Dust Collector Fines
- Control dust collection as follows:
- a. When collecting airborne aggregate particles and returning them to the mixture, have the return system meter all or part of the collected dust uniformly into the aggregate mixture and waste the excess. The collected dust percentage returned to the mixture is subject to the Engineer's approval.
 - b. When the collected dust is returned directly to the hot aggregate flow, interlock the dust feeder with the hot aggregate flow and meter the flow to maintain a flow that is constant, proportioned, and uniform.
5. Hydrated Lime Treatment System
- When hydrated lime is required as a mixture ingredient:
- a. Use a separate bin and feed system to store and proportion the required quantity into the mixture.
 - b. Ensure that the aggregate is uniformly coated with hydrated lime aggregate before adding the bituminous material to the mixture. Add the hydrated lime so that it will not become entrained in the exhaust system of the drier or plant.
 - c. Control the feeder system with a proportioning device that meets these specifications:
 - Is accurate to within ± 10 percent of the amount required
 - Has a convenient and accurate means of calibration
 - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes and to ensure that mixture produced is properly treated with lime

Provide flow indicators or sensing devices for the hydrated lime system and interlock them with the plant controls to interrupt mixture production if hydrated lime introduction fails to meet the required target value after no longer than 60 seconds.
6. Net Weight Weighing Mechanisms
- Certify the accuracy of the net weight weighing mechanisms by an approved registered scale serviceperson at least once every 6 months. Check the accuracy of net weight weighing mechanisms at the beginning of Project production and thereafter as directed by the Engineer. Check mechanism accuracy as follows:
- a. Weigh a load on a set of certified commercial truck scales. Ensure that the difference between the printed total net weight and that obtained from the commercial scales is no greater than 4 lbs/1,000 lbs (4 kg/Mg) of load. Check the accuracy of the bitumen scales as follows:
 - Use standard test weights.
 - If the checks indicate printed weights are out of tolerance, have a registered scale serviceperson check the batch scales and certify the accuracy of the printer.
 - While the printer system is out of tolerance and before its adjustment, continue production only if using a set of certified truck scales to determine the truck weights.
 - b. Ensure plants using batch scales maintain ten 50 lb (25 kg) standard test weights at the plant site to check batching scale accuracy.
 - c. Ensure plant scales that are used only to proportion mixture ingredients, and not to determine pay quantities, are within two percent throughout the range.

C. Equipment at Project Site

1. Cleaning Equipment

Provide sufficient hand tools and power equipment to clean the roadway surface before placing the bituminous tack coat. Use power equipment that complies with [Subsection 424.3.02.F.-Power Broom and Power Blower . || \(see Appendix 3\)](#)

2. Pressure Distributor

To apply the bituminous tack coat, use a pressure distributor complying with [Subsection 424.3.02. B , -Pressure Distributor . ||](#)

3. Bituminous Pavers

To place hot mix asphaltic concrete, use bituminous pavers that can spread and finish courses that are:

As wide and deep as indicated on the Plans

True to line, grade, and cross section

Smooth

Uniform in density and texture

- a. Continuous Line and Grade Reference Control. Furnish, place, and maintain the supports, wires, devices, and materials required to provide continuous line and grade reference control to the automatic paver control system.
- b. Automatic Screed Control System. Equip the bituminous pavers with an automatic screed control system actuated from sensor-directed mechanisms or devices that will maintain the paver screed at a pre-determined transverse slope and elevation to obtain the required surface.
- c. Transverse Slope Controller. Use a transverse slope controller capable of maintaining the screed at the desired slope within ± 0.1 percent. Do not use continuous paving set-ups resulting in unbalanced screed widths or off-center breaks in the main screed cross section unless approved by the Engineer.
- d. Screed Control. Equip the paver to permit the following four modes of screed control. The method used shall be approved by the Engineer.

Automatic grade sensing and slope control

Automatic dual grade sensing

Combination automatic and manual control

Total manual control

Ensure the controls are referenced with a taut string or wire set to grade, or with a ski-type device or mobile reference at least 30 ft (9 m) long when using a conventional ski. Approved non-contacting laser or sonar-type skis listed on QPL 91 –Georgia’s List of Approved Non-contacting Laser and Sonar-type Electronic Grade and Slope Controls may be used in lieu of conventional 30 ft (9m) skis. Under limited conditions, a short ski or shoe may be substituted for a long ski on the second paver operating in tandem, or when the reference plane is a newly placed adjacent lane.

Automatic screed control is required on all Projects; however, when the Engineer determines that Project conditions prohibit the use of such controls, the Engineer may waive the grade control, or slope control requirements, or both.

- e. Paver Screed Extension. When the laydown width requires a paver screed extension, use bolt-on screed extensions to extend the screeds, or use an approved mechanical screed extension device. When the screed is extended, add auger extensions to assure a length of no more than 18 inches (0.5 m) from the auger to the end gate of the paver. Auger extensions may be omitted when paving variable widths. Ensure the paver is equipped with tunnel extensions when the screed and augers are extended.

<p>NOTE: Do not use extendible strike-off devices instead of approved screed extensions. Only use a strike-off device in areas that would normally be luted in by hand labor.</p>
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4. Compaction Equipment

Ensure that the compaction equipment is in good mechanical condition and can compact the mixture to the required density. The compaction equipment number, type, size, operation, and condition is subject to the Engineer’s approval.

400.3.03 Preparation

A. Prepare Existing Surface

Prepare the existing surface as follows:

1. Clean the Existing Surface. Before applying hot mix asphaltic concrete pavement, clean the existing surface to the Engineer’s satisfaction.
2. Patch and Repair Minor Defects
Before placing leveling course:

- a. Correct potholes and broken areas requiring patching in the existing surface and base as directed by the Engineer.
 - b. Cut out, trim to vertical sides, and remove loose material from the areas to be patched.
 - c. Prime or tack coat the area after being cleaned. Compact patches to the Engineer's satisfaction. Material for patches does not require a job mix formula, but shall meet the gradation range shown in [Section 828](#). The Engineer must approve the asphalt content to be used.
3. Apply Bituminous Tack Coat
- Apply the tack coat according to [Section 413 \(see Appendix 4\)](#). The Engineer will determine the application rate, which must be within the limitations Table 2.

Table 2—Application Rates for Bituminous Tack, gal/yd² (L/m²)

	Minimum	Maximum
All Mixes *	0.04 (0.180)	0.06(0.270)
*On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.02 to 0.04 gal/yd ² (0.09 to 0.18 L/m ²).		

B. Place Patching and Leveling Course

1. When the existing surface is irregular, bring the surface area to the proper cross section and grade with a leveling course of hot mix asphaltic concrete materials.
2. Place leveling at the locations and in the amounts directed by the Engineer.
3. Use leveling course mixtures meeting the requirements of the job mix formulas defined in:
 - [Subsection 400.3.05.A, -Observe Composition of Mixtures](#)
 - [Section 828](#)
 - Leveling acceptance schedules in
 - [Subsection 400.3.06.A, -Acceptance Plans for Gradation and Asphalt Cement Content](#)
4. If the leveling and patching mix type is undesignated, determine the mix type by the thickness or spread rate according to Table 3, but do not use 4.75 mm mix on interstate projects.

Table 3—Leveling and Patching Mix Types

Thickness	Rate of Spread	Type of Mix
Up to 0.75 in (19 mm)	Up to 85 lbs/yd ² (45 kg/m ²)	4.75 mm Mix or 9.5 mm Superpave Type 1
0.75 to 1.5 in (19 to 38 mm)	85 to 165 lbs/yd ² (45 to 90 kg/m ²)	9.5 mm Superpave Type 2
1.5 to 2 in (38 to 50 mm)	165 to 220 lbs/yd ² (90 to 120 kg/m ²)	12.5 mm Superpave *
2 to 2.5 in (50 to 64 mm)	220 to 275 lbs/yd ² (120 to 150 kg/m ²)	19 mm Superpave *
Over 2.5 in (64 mm)	Over 275 lbs/yd ² (150 kg/m ²)	25 mm Superpave

* These mixtures may be used for isolated patches no more than 6 in. (150 mm) deep and no more than 4 ft. (1.2 m) in diameter or length.

400.3.04 Fabrication: Omitted

400.3.05 Construction

Provide the Engineer at least one day's notice prior to beginning construction, or prior to resuming production if operations have been temporarily suspended.

A. Observe Composition of Mixtures

1. Calibration of plant equipment

If the material changes, or if a component affecting the ingredient proportions has been repaired, replaced, or adjusted, check and recalibrate the proportions.

Calibrate as follows:

- a. Before producing mixture for the Project, calibrate by scale weight the electronic sensors or settings for proportioning mixture ingredients.
- b. Calibrate ingredient proportioning for all rates of production.

2. Mixture control

Compose hot mix asphaltic concrete from a uniform mixture of aggregates, bituminous material, and if required, hydrated lime, mineral filler, or other approved additive.

Ensure the constituents are proportional to produce mixtures that meet the requirements in [Section 828](#). (see Appendix 5). The general composition limits prescribed are extreme ranges within which the job mix formula must be established. Base mixtures on a design analysis that meets the requirements of Section 828.

Ensure that the field performance of the in-place mixtures meet the requirements of [Subsection 828.2.B](#) for Permeability, Moisture Susceptibility, Rutting Susceptibility and Fatigue. In-place mix may be evaluated for compliance with requirements of [Subsection 828.2.B](#) at the discretion of the State Bituminous Construction Engineer under the following conditions:

Deviates greater than 10 percent on gradation for mixture control sieves from the approved Job Mix Formula based on Acceptance or Independent Samples.

Deviates greater than 0.7 percent in asphalt cement content from the approved Job Mix Formula based on Acceptance or Independent Samples.

The calculated mean pavement air voids result in an adjusted pay factor less than 0.80 or any single sub lot result in mean pavement air voids exceeding 10.5 percent.

Mix produced not using an approved mix design and/or job mix formula.

Remove and replace (at the Contractor's expense) any areas determined to not meet the requirements of [Subsection 828.2.B](#)

If control test results show that the characteristic tested does not conform to the job mix formula control tolerances given in [Section 828](#), take immediate action to ensure that the quality control methods are effective.

Control the materials to ensure that extreme variations do not occur. Maintain the gradation within the composition limits in [Section 828](#).

B. Prepare Bituminous Material

Uniformly heat the bituminous material to the temperature specified in the job mix formula with a tolerance of ± 20 °F (± 11 °C).

C. Prepare the Aggregate

Prepare the aggregate as follows:

1. Heat the aggregate for the mixture, and ensure a mix temperature within the limits of the job mix formula.
2. Do not contaminate the aggregate with fuel during heating.
3. Reduce the absorbed moisture in the aggregate until the asphalt does not separate from the aggregate in the prepared mixture. If this problem occurs, the Engineer will establish a maximum limit for moisture content in the aggregates. When this limit is established, maintain the moisture content below this limit.

D. Prepare the Mixture

Proportion the mixture ingredients as necessary to meet the required job mix formula. Mix until a homogenous mixture is produced.

1. Add Hydrated Lime

When hydrated lime is included in the mixture, add it at a rate specified in [Section 828](#) and the job mix formula. Use methods and equipment for adding hydrated lime according to [Subsection 4 00.3.02.B.6 , - Hydrated Lime Treatment System. ¶](#)

Add hydrated lime to the aggregate by using Method A or B as follows:

Method A—Dry Form—Add hydrated lime in its dry form to the mixture as follows, according to the type of plant:

- a. Batch Type Asphalt Plant: Add hydrated lime to the mixture in the weigh hopper or as approved and directed by the Engineer.
- b. Continuous Plant Using Pugmill Mixer: Feed hydrated lime into the hot aggregate before it is introduced into the mixer so that dry mixing is complete before the bituminous material is added.
- c. Continuous Plant Using Drier-Drum Mixer: Add hydrated lime so that the lime will not become entrained into the air stream of the drier and so that thorough dry mixing will be complete before the bituminous material is added.

Method B—Lime/Water Slurry—Add the required quantity of hydrated lime (based on dry weight) in lime/water slurry form to the aggregate. This solution consists of lime and water in concentrations as directed by the Engineer.

Equip the plant to blend and maintain the hydrated lime in suspension and to mix it with the aggregates uniformly in the proportions specified.

2. Add Gilsonite Modifier

When approved by the Office of Materials and Research and required by the Contract, add the Gilsonite modifier to the mixture at a rate to ensure eight percent by weight of the asphalt cement is replaced by Gilsonite. Use either PG 64-22 or PG 67-22 asphalt cement as specified in [Subsection 820.2.01](#). (see Appendix 6) Provide suitable means to calibrate and check the rate of Gilsonite being added. Introduce Gilsonite modifier by either of the following methods.

- a. For batch type plants, incorporate Gilsonite into the pugmill at the beginning of the dry mixing cycle. Increase the dry mix cycle by a minimum of 10 seconds after the Gilsonite is added and prior to introduction of the asphalt cement. For this method, supply Gilsonite in plastic bags to protect the material during shipment and handling and store the modifier in a waterproof environment. The bags shall be capable of being completely melted and uniformly blended into the combined mixture.

Gilsonite may also be added through a mineral filler supply system as described in [Subsection 400.3.02.B.5, -Mineral Filler Supply System. ¶](#) The system shall be capable of injecting the modifier into the weigh hopper near the center of the aggregate batching cycle so the material can be accurately weighed.

- b. For drum drier plants, add Gilsonite through the recycle ring or through an acceptable means which will introduce the Gilsonite prior to the asphalt cement injection point. The modifier shall be proportionately fed into the drum mixer at the required rate by a proportioning device which shall be accurate within 10 percent of the amount required. The entry point shall be away from flames and ensure the Gilsonite will not be caught up in the air stream and exhaust system.

3. Materials from Different Sources

Do not use mixtures prepared from aggregates from different sources intermittently. This will cause the color of the finished pavement to vary.

E. Observe Weather Limitations

Do not mix and place asphaltic concrete if the existing surface is wet or frozen. Follow the temperature guidelines in the following table:

Table 4—Lift Thickness Table

Lift Thickness	Minimum Temperature
1 in (25 mm) or less	55 °F (13 °C)
1.1 to 2 in (26 mm to 50 mm)	45 °F (8 °C)
2.1 to 3 in (51 mm to 75 mm)	40 °F (4 °C)
3.1 to 4 in (76 mm to 100 mm)	35 °F (2 °C)
4.1 to 8 in (101 mm to 200 mm)	32 °F (0 °C) and rising. Base Material must not be frozen.

F. Perform Spreading and Finishing

Spread and finish the course as follows:

1. Determine the course’s maximum compacted layer thickness by the type mix being used according to Table 5.

Table 5—Maximum Layer Thickness

Mix Type	Minimum Layer Thickness	Maximum Layer Thickness	Maximum Total Thickness
25 mm Superpave	2 1/2 in (64 mm)	4 in (100 mm) *	—
19 mm Superpave	1 3/4 in (44 mm)	3 in (75 mm) *	—
12.5 mm Superpave	1 3/8 in (35 mm)	2 1/2 in (64 mm)**	8 in (200 mm)
9.5 mm Superpave Type II	1 1/8 in.(28 mm)	1 1/2 in (38 mm)**	4 in (100 mm)
9.5 mm Superpave Type I	7/8 in (22 mm)	1 1/4 in (32 mm)	4 in (100 mm)
4.75 mm Mix	3/4 in (19 mm)	1 1/8 in (28 mm)	2 in (50 mm)
* Allow up to 6 in (150 mm) per lift on trench widening. **Place 9.5 mm Superpave and 12.5 mm Superpave up to 4 in (100 mm) thick for driveway and side road transition.			

2. Unload the mixture into the paver hopper or into a device designed to receive the mixture from delivery vehicles.
3. Except for leveling courses, spread the mixture to the loose depth for the compacted thickness or the spread rate. Use a mechanical spreader true to the line, grade, and cross section specified.
4. For leveling courses, use a motor grader equipped with a spreader box and smooth tires to spread the material or use a mechanical spreader meeting the requirements in [Subsection 400.3.02.C,-Equipment at Project Site. ll](#)
5. Obtain the Engineer’s approval for the sequence of paving operations, including paving the adjoining lanes. Minimize tracking tack onto surrounding surfaces.
6. Ensure the outside edges of the pavement being laid are aligned and parallel to the roadway center line.
7. For New Construction or Resurfacing Contracts containing multiple lifts or courses, arrange the width of the individual lifts so the longitudinal joints of each successive lift are offset from the previous lift at least 1 ft (300 mm). This requirement does not apply to the lift immediately over thin lift leveling courses.
Ensure the longitudinal joint(s) in the surface course and the mix immediately underneath asphaltic concrete OGFC or PEM are at the lane line(s).

NOTE: Perform night work with artificial light provided by the Contractor and approved by the Engineer.

8. Where mechanical equipment cannot be used, spread and rake the mixture by hand. Obtain the Engineer’s approval of the operation sequence, including compactive methods, in these areas.
9. Keep small hand raking tools clean and free from asphalt build up. Do not use fuel oil or other harmful solvents to clean tools during the work.
10. Do not use mixture with any of these characteristics:
 - Segregated
 - Nonconforming temperature
 - Deficient or excessive asphalt cement content
 - Otherwise unsuitable to place on the roadway in the work
11. Remove and replace mixture placed on the roadway that the Engineer determines has unacceptable blemish levels from segregation, raveling, streaking, pulling and tearing, or other deficient characteristics. Replace with acceptable mixture at the Contractor’s expense. Do not continually place mixtures with deficiencies.
Do not place subsequent course lifts over another lift or courses placed on the same day while the temperature of the previously placed mix is 140 °F (60 °C) or greater.

12. Obtain the Engineer's approval of the material compaction equipment. Perform the rolling as follows:
 - a. Begin the rolling as close behind the spreader as possible without causing excessive distortion of the asphaltic concrete surface.
 - b. Continue rolling until roller marks are no longer visible.
 - c. Use pneumatic-tired rollers with breakdown rollers on all courses except asphaltic concrete OGFC, PEM and SMA or other mixes designated by the Engineer.
13. If applicable, taper or feather asphaltic concrete from full depth to a depth no greater than 0.5 in (13 mm) along curbs, gutters, raised pavement edges, and areas where drainage characteristics of the road must be retained. The Engineer will determine the location and extent of tapering.

G. Maintain Continuity of Operations

Coordinate plant production, transportation, and paving operations to maintain a continuous operation. If the spreading operations are interrupted, construct a transverse joint if the mixture immediately behind the paver screed cools to less than 250 °F (120 °C).

H. Construct the Joints

1. Construct Transverse Joints
 - a. Construct transverse joints to facilitate full depth exposure of the course before resuming placement of the affected course.
 - b. Properly clean and tack the vertical face of the transverse joint before placing additional material.

NOTE: Never burn or heat the joint by applying fuel oil or other volatile materials.

- c. Straightedge transverse joints immediately after forming the joint.
 - d. Immediately correct any irregularity that exceeds 3/16 in. in 10 ft (5 mm in 3 m).
2. Construct Longitudinal Joints
Clean and tack the vertical face of the longitudinal joint before placing adjoining material. Construct longitudinal joints so that the joint is smooth, well-sealed, and bonded.

I. Protect the Pavement

Protect sections of the newly finished pavement from traffic until the traffic will not mar the surface or alter the surface texture. If directed by the Engineer, use artificial methods to cool the newly finished pavement to open the pavement to traffic more quickly.

J. Modify the Job Mix Formula

If the Engineer determines that undesirable mixture or mat characteristics are being obtained, the job mix formula may require immediate adjustment.

400.3.06 Quality Acceptance

A. Acceptance Plans for Gradation and Asphalt Cement Content

The Contractor will randomly sample and test mixtures on a lot basis. The Department will monitor the Contractor testing program and perform comparison and quality assurance testing. The Contractor's Quality Control Technicians shall participate in the Department's Independent Assurance Systems Basis Program.

1. Determine Lot Amount

A lot consists of the tons (megagrams) of asphaltic concrete produced and placed each production day. If this production is less than 500 tons (500 Mg), or its square yard (meter) equivalent, production may be incorporated into the next working day. The Engineer may terminate a lot when a pay adjustment is imminent if a plant or materials adjustment resulting in a probable correction has been made. Terminate all open lots at the end of the month, except for materials produced and placed during the adjustment period. If the final day's production does not constitute a lot, the production may be included in the lot for the previous day's run; or, the Engineer may treat the production as a separate lot with a corresponding lower number of tests.

2. Determine Lot Acceptance

If the Engineer determines that the material is not acceptable to leave in place, the materials shall be removed and replaced at the Contractor's expense.

3. Provide Quality Control Program

Provide a Quality Control Program as established in SOP 27 which includes:

Assignment of quality control responsibilities to specifically named individuals who have been certified by the Office of Materials and Research

Provisions for prompt implementation of control and corrective measures

Provisions for communication with Project Manager, Bituminous Technical Services Engineer, and Testing Management Operations Supervisor at all times

Provisions for reporting all test results daily through the Office of Materials and Research computerized Field Data Collection System; other checks, calibrations and records will be reported on a form developed by the Contractor and will be included as part of the project records

Notification in writing of any change in quality control personnel

a. Certification Requirements:

Use laboratory and testing equipment certified by the Department. (Laboratories which participate in and maintain AASHTO accreditation for testing asphaltic concrete mixtures will be acceptable in lieu of Departmental certification.)

Provide certified quality control personnel to perform the sampling and testing. A Quality Control Technician (QCT) may be certified at three levels:

- 1) Temporary Certification – must be a technician trainee who shall be given direct oversight by a certified Level 1 or Level 2 QCT while performing acceptance testing duties during the first 5 days of training. The trainee must complete qualification requirements within 30 GDOT production days after being granted temporary certification. A trainee who does not become qualified within 30 GDOT production days will not be re-eligible for temporary certification. A certified Level 1 or Level 2 QCT shall be at the plant at all times during production and shipment of mixture to monitor work of the temporarily certified technician.
- 2) Level 1 – must demonstrate they are competent in performing the process control and acceptance tests and procedures related to hot mix asphalt production and successfully pass a written exam.
- 3) Level 2 – must meet Level 1 requirements and must be capable of and responsible for making process control adjustments, and successfully pass a written exam.

Technician certification is valid for 3 years from the date on the technician's certificate unless revoked or suspended. Eligible technicians may become certified through special training and testing approved by the Office of Materials and Research. Technicians who lose their certification due to falsification of test data will not be eligible for recertification in the future unless approved by the State Materials and Research Engineer.

b. Quality Control Management

- 1) Designate at least one Level 2 QCT as manager of the quality control operation. The Quality Control Manager shall meet the following requirements:

Be accountable for actions of other QCT personnel

Ensure that all applicable sampling requirements and frequencies, test procedures, and Standard Operating Procedures are adhered to

Ensure that all reports, charts, and other documentation is completed as required

- 2) Provide QCT personnel at the plant as follows:

If daily production for all mix types is to be greater than 250 tons (megagrams), have a QCT person at the plant at all times during production and shipment of mixture until all required acceptance tests have been completed

If daily production for all mix types will not be greater than 250 tons (megagrams) a QCT may be responsible for conducting tests at up to two plants, subject to random number sample selection

Have available at the plant or within immediate contact by phone or radio a Level 2 QCT responsible for making prompt process control adjustments as necessary to correct the mix

- 3) Sampling, Testing, and Inspection Requirements.

Provide all sample containers, extractants, forms, diaries, and other supplies subject to approval of the Engineer.

Perform daily sampling, testing, and inspection of mixture production that meets the following requirements:

- (a) Randomly sample mixtures according to [GSP 15](#), and [GDT 73 \(Method C\)](#) and test on a lot basis. In the event less than the specified number of samples are taken, obtain representative 6 in (150 mm) cores from the roadway at a location where the load not sampled was placed. Take enough cores to ensure minimum sample size requirements are met for each sample needed.
- (b) Maintain a printed copy of the computer generated random sampling data as a part of the project records.
- (c) Perform sampling, testing, and inspection duties of [GSP 21](#).
- (d) Perform extraction or ignition test ([GDT 83](#) or [GDT 125](#)) and extraction analysis ([GDT 38](#)). If the ignition oven is used, a printout of sample data including weights shall become a part of the project records. For asphalt cement content only, digital printouts of liquid asphalt cement weights may be substituted in lieu of an extraction test for plants with digital recorders. Calculate the asphalt content from the ticket representing the mixture tested for gradation.
- (e) Save extracted aggregate, opposite quarters, and remaining material (for possible referee testing) of each sample as follows:
 - Store in properly labeled, suitable containers
 - Secure in a protected environment
 - Store for three working days. If not obtained by the Department, within three days they may be discarded in accordance with [GSP 21](#).
- (f) Add the following information on load tickets from which a sample or temperature check is taken:
 - Mixture temperature
 - Signature of the QCT person performing the testing
- (g) Calibrate the lime system when hydrated lime is included in the mixture:
 - Perform a minimum of twice weekly during production
 - Post results at the plant for review
 - Provide records of materials invoices upon request (including asphalt cement, aggregate, hydrated lime, etc.)
- (h) Take action if acceptance test results are outside Mixture Control Tolerances of [Section 828](#).
 - One sample out of tolerance
 - (1) Contact Level 2 - QCT to determine if a plant adjustment is needed
 - (2) Immediately run a process control sample. Make immediate plant adjustments if this sample is also out of tolerance
 - (3) Test additional process control samples as needed to ensure corrective action taken appropriately controls the mixture
 - Two consecutive acceptance samples of the same mix type out of tolerance regardless of Lot or mix design level, or three consecutive acceptance samples out of tolerance regardless of mix type
 - (1) Stop plant production immediately
 - (2) Reject any mixture already in storage that:
 - Deviates more than 10 percent in gradation from the job mix formula based on the acceptance sample
 - Deviates more than 0.7 percent in asphalt content from the job mix formula based on the acceptance sample
 - (3) Make a plant correction to any mix type out of tolerance prior to resuming production

Do not send any mixture to the project before test results of a process control sample meets Mixture Control Tolerances

Reject any mixture produced at initial restarting that does not meet Mixture Control Tolerances

4) Comparison Testing and Quality Assurance Program

Periodic comparison testing by the Department will be required of each QCT to monitor consistency of equipment and test procedures. The Department will take independent samples to monitor the Contractor's quality control program.

a) Comparison Sampling and Testing

Retain samples for comparison testing and referee testing if needed as described in [Subsection 400.3.06.A.3.b.3](#). Discard these samples only if the Contractor's acceptance test results meet a 1.00 pay factor and the Department does not procure the samples within three working days.

The Department will test comparison samples on a random basis. Results will be compared to the respective contractor acceptance tests and the maximum difference shall be as follows:

Table 6—Allowable Percent Difference Between Department and Contractor Acceptance Tests

<u>SIEVE SIZE</u>	<u>SURFACE</u>	<u>SUB-SURFACE</u>
1/2 in. (12.5 mm)		4.0%
3/8 in. (9.5 mm)	3.5%	4.0%
No. 4 (4.75 mm)	3.5%	3.5%
No. 8 (2.36 mm)	2.5%	3.0%
No. 200 (75 m)	2.0%	2.0%
A.C.	0.4%	0.5%

(1) If test comparisons are within these tolerances:

Continue production

Use the Contractor's tests for acceptance of the lot

(2) If test comparisons are not within these tolerances:

Another Departmental technician will test the corresponding referee sample

Results of the referee sample will be compared to the respective contractor and Departmental tests using the tolerance for comparison samples given above.

(a) If referee test results are within the above tolerances when compared to the Contractor acceptance test, use the Contractor's test for acceptance of the effected lot.

(b) If referee test results are not within the above tolerances when compared to the Contractor acceptance test, the Department will review the Contractor's quality control methods and determine if a thorough investigation is needed.

b) Independent Verification Sampling and Testing

(1) Randomly take a minimum of two independent samples from the lesser of five days or five lots of production regardless of mix type or number of projects.

(2) Compare test deviation from job mix formula to Mixture Control Tolerances in [Section 828](#). If results are outside these tolerances, another sample from the respective mix may be taken.

NOTE: For leveling courses less than 110 lb/yd² (60 kg/m²) having quality assurance test results outside the Mixture Control Tolerances of [Section 828](#), use the Department's test results only.

If test results of the additional sample are not within Mixture Control Tolerances, the Department will take the following action:

Take random samples from throughout the subject lot(s) as established in [Subsection 400.3.06.A.3.b.3](#) and use these test results for acceptance and in calculations for the monthly plant rating. Determine if the Contractor's quality control program is satisfactory and require prompt corrective action by the Contractor if specification requirements are not being met.

Determine if the QCT has not followed Departmental procedures or has provided erroneous information.

Take samples of any in-place mixture represented by unacceptable QCT tests and use the additional sample results for acceptance and in calculations for the monthly plant rating. The Contractor QCT tests will not be included in the monthly plant rating.

B. Compaction

Determine the mixture compaction using either [GDT 39](#) , [GDT 59](#) or AASHTO T-331. The method of GDT-39 for –Uncoated Specimens, Dense Graded Mixtures Only shall not apply when the water absorption of a sample exceeds 2.0 percent, as measured according to AASHTO T-166. In this case, either AASHTO T-331 or the paraffin method of GDT-39 shall apply. The compaction is accepted in lots defined in [Subsection 400.3.06.A–Acceptance Plans for Gradation and Asphalt Cement Content](#) and is within the same lot boundaries as the mixture acceptance.

1. Calculate Pavement Mean Air Voids

The Department will calculate the pavement air voids placed within each lot as follows:

- a. One test per sub-lot.
Lots \geq 500 tons of mix should be divided into 5 sub-lots of equal distance.
Lots $<$ 500 tons of mix should be comprised of a sub-lot or sub-lots consisting of up to 100 tons of mix each. There may be less than 5 sub-lots.
- b. Average the results of all tests run on randomly selected sites in that lot.
- c. Select the random sites using [GDT 73](#).

Density tests are not required for asphaltic concrete placed at 125 lbs./yd² (68 kg/m²) or less, 4.75 mm mix and mixes placed as variable depth or width leveling. Compact these courses to the Engineer's satisfaction. Density tests will not be performed on turn-outs and driveways.

The targeted maximum Pavement Mean Air Void content for all Superpave mixtures is 5.0 percent. Ensure that the maximum Pavement Mean Air Voids for all Superpave mixtures does not exceed 7.8 percent. The maximum Pavement Mean Air Voids for 2 foot shoulder widening is 9.0 percent. The adjustment period for density shall be three lots or three production days, whichever is less, in order for the contractor to ensure maximum compactive effort has been achieved which will yield no more than the specified maximum allowed Mean Air Voids. If the contractor needs to adjust the mixture to improve density results, a change in the job mix formula may be requested for approval during the adjustment period so long as the following values are not exceeded:

Coarse pay sieve	4%
No. 8 (2.36 mm) sieve	2%
No. 200 (75 m) sieve	1%
Asphalt Content	0.2%

All value changes must still be within specification limits

If the Department is satisfied that the contractor has exerted the maximum compactive effort and is not able to maintain Pavement Mean Air Voids at no more than 7.8%, the Engineer may establish a maximum target for Pavement Mean Air Voids.

If the Pavement Mean Air Voids within a Lot exceeds 7.8 (or 100% of the maximum target air voids, if established is not maintained); the Engineer may stop the paving operation until appropriate steps are taken by the Contractor to correct the deficiency. Upon approval of the Engineer, the paving operation may be restarted but will be limited to a

1000 ft (300 m) test section to verify that the corrective action taken will result in satisfactory density. Continued operation may not be permitted if the Pavement Mean Air Voids fail to meet the specified density requirements.

2. Parking Facilities Pavement Mean Air Voids

7.8 percent or less for state funded Park and Ride Parking Lots

8.3 percent or less for all other parking facilities on Contracts with \geq 1000 tons combined of all asphaltic concrete mix types.

9.0 percent or less for all other parking facilities on Contracts with $<$ 1000 tons combined of all asphaltic concrete mix types.

If the Office of Materials and Research is satisfied that the contractor has exerted the maximum compactive effort and is not able to maintain the specified Pavement Mean Air Voids, the Engineer may establish a maximum allowable percent Pavement Mean Air Voids. To determine a maximum allowable percent Pavement Mean Air Voids, a Control Strip (100 feet minimum) shall be placed to the same width and thickness to be utilized during construction of that mix type. The materials used in the construction of the Control Strip shall conform to the requirements of the approved Job Mix Formula as defined in Sub-Section 400.1.03. The materials shall be furnished from the same source and shall be of the same type used in the remainder of the pavement course and mix type represented by the Control Strip. The in-place air voids of the Control Strip, if accepted, shall be the maximum allowable percent Pavement Mean Air Voids for the remainder of the pavement course which it represents. The in-place air voids of the Control Strip will be determined by averaging the results of five density tests taken at randomly selected sites within the Control Strip. The density tests shall be tested in accordance with GDT 73, Procedure 2.a (Cores) or Procedure 2.b (Nuclear Gauge). Compaction of the Control Strip shall be continued until no appreciative increase in density can be obtained by additional roller coverages.

3. Obtain Uniform Compaction

For a lot to be accepted for compaction, the air void range cannot exceed 4 percent for new construction or 5 percent for resurfacing projects. The range is the difference between the highest and lowest acceptance test results within the affected lot.

C. Surface Tolerance

In this Specification, pavement courses to be overlaid with an Open-Graded Friction Course or PEM are considered surface courses. Asphalt paving is subject to straightedge and visual inspection and irregularity correction as shown below:

1. Visual and Straightedge Inspection

Paving is subject to visual and straightedge inspection during and after construction operations until Final Acceptance. Locate surface irregularities as follows:

- a. Keep a 10 ft (3 m) straightedge near the paving operation to measure surface irregularities on courses. Provide the straightedge and the labor for its use.
- b. Inspect the base, intermediate, and surface course surfaces with the straightedge to detect irregularities.
- c. Correct irregularities that exceed 3/16 in. in 10 ft (5 mm in 3 m) for base and intermediate courses, and 1/8 in. in 10 ft (3 mm in 3 m) for surface courses.

Mixture or operating techniques will be stopped if irregularities such as rippling, tearing, or pulling occur and the Engineer suspects a continuing equipment problem. Stop the paving operation and correct the problem.

D. Reevaluation of Lots

Reevaluation of Lots and acceptance will be based on Department evaluations. The Department will be reimbursed by the Contractor for all costs of these evaluations. Request for reevaluation shall be made within 5 working days of notification of the lot results.

E. Segregated Mixture

Prevent mixture placement yielding a segregated mat by following production, storage, loading, placing, and handling procedures. Ensure needed plant modifications and provide necessary auxiliary equipment. (See [Subsection 400.1.01, -Definitions. I](#))

If the mixture is segregated in the finished mat, the Department will take actions based on the degree of segregation. The actions are described below.

4. Unquestionably Unacceptable Segregation

When the Engineer determines the segregation in the finished mat is unquestionably unacceptable, follow these measures:

- d. Suspend Work and require the Contractor to take positive corrective action. The Department will evaluate the segregated areas to determine the extent of the corrective work to the in-place mat as follows:

Perform extraction and gradation analysis by taking 6 in (150 mm) cores from typical, visually unacceptable segregated areas.

Determine the corrective work according to [Subsection 400.3.06.E.3](#).

- e. Require the Contractor to submit a written plan of measures and actions to prevent further segregation. Work will not continue until the plan is submitted to and approved by the Department.
- f. When work resumes, place a test section not to exceed 500 tons (500 Mg) of the affected mixture for the Department to evaluate. If a few loads show that corrective actions were not adequate, follow the measures above beginning with step 1.a. above. If the problem is solved, Work may continue.

2. Unacceptable Segregation Suspected

When the Engineer observes segregation in the finished mat and the work may be unacceptable, follow these measures:

- g. Allow work to continue at Contractor's risk.
- h. Require Contractor to immediately and continually adjust operation until the visually apparent segregated areas are eliminated from the finished mat. The Department will immediately investigate to determine the severity of the apparent segregation as follows:

Take 6 in (150 mm) cores from typical areas of suspect segregation.

Test the cores for compliance with the mixture control tolerances in [Section 828](#).

When these tolerances are exceeded, suspend work for corrective action as outlined in [Subsection 400.3.06.E.3](#).

3. Corrective Work

- a. Remove and replace (at the Contractor's expense) any segregated area where the gradation on the control sieves is found to vary 10 percent or more from the approved job mix formula, the asphalt cement varies 1.0% or more from the approved job mix formula, or if in-place air voids exceed 13.5% based on [GDT 39](#). The control sieves for each mix type are shown in [Subsection 400.5.01.B -Determine Lot Acceptance . II](#)
- b. Subsurface mixes. For subsurface mixes, limit removal and replacement to the full lane width and no less than 10 ft. (3 m) long and as approved by the Engineer.
 - i. Surface Mixes. For surface mixes, ensure that removal and replacement is not less than the full width of the affected lane and no less than the length of the affected areas as determined by the Engineer.

Surface tolerance requirements apply to the corrected areas for both subsurface and surface mixes.

400.3.07 Contractor Warranty and Maintenance

A. Contractor's Record

Maintain a dated, written record of the most recent plant calibration. Keep this record available for the Engineer's inspection at all times. Maintain records in the form of:

Graphs

Tables

Charts

Mechanically prepared data

400.4 Measurement

Thickness and spread rate tolerances for the various mixtures are specified in [Subsection 400.4.A.2.b, Table 11, Thickness and Spread Rate Tolerance at Any Given Location](#). These tolerances are applied as outlined below:

A. Hot Mix Asphaltic Concrete Paid for by Weight

1. Plans Designate a Spread Rate

- a. Thickness Determinations. Thickness determinations are not required when the Plans designate a spread rate per square yard (meter).
If the spread rate exceeds the upper limits outlined in the [Subsection 400.4.A.2.b, Table 11, -Thickness and Spread Rate Tolerance at Any Given Location](#), the mix in excess will not be paid for.
If the rate of spread is less than the lower limit, correct the deficient course by overlaying the entire lot.
The mixture used for correcting deficient areas is paid for at the Contract Unit Price of the course being corrected and is subject to the [Mixture Acceptance Schedule—Table 9 or 10](#).
- b. Recalculate the Total Spread Rate. After the deficient hot mix course has been corrected, the total spread rate for that lot is recalculated, and mix in excess of the upper tolerance limit as outlined in the [Subsection 400.4.A.2.b, Table 11, -Thickness and Spread Rate Tolerance at Any Given Location](#) is not paid for.
The quantity of material placed on irregular areas such as driveways, turnouts, intersections, feather edge section, etc., is deducted from the final spread determination for each lot.

2. Plans Designate Thickness

If the average thickness exceeds the tolerances specified in the [Subsection 400.4.A.2.b, Table 11, -Thickness and Spread Rate Tolerance at Any Given Location](#), the Engineer shall take cores to determine the area of excess thickness. Excess quantity will not be paid for.

If the average thickness is deficient by more than the tolerances specified in the Thickness and Spread Rate Tolerance at Any Given Location table below, the Engineer shall take additional cores to determine the area of deficient thickness. Correct areas with thickness deficiencies as follows:

- a. Overlay the deficient area with the same mixture type being corrected or with an approved surface mixture. The overlay shall extend for a minimum of 300 ft (90 m) for the full width of the course.
- b. Ensure that the corrected surface course complies with [Subsection 400.3.06.C.1, -Visual and Straightedge Inspection](#). The mixture required to correct a deficient area is paid for at the Contract Unit Price of the course being corrected.

The quantity of the additional mixture shall not exceed the required calculated quantity used to increase the average thickness of the overlaid section to the maximum tolerance allowed under the following table.

Table 11—Thickness and Spread Rate Tolerance at Any Given Location

Course	Thickness Specified	Spread Rate Specified
Asphaltic concrete base course	± 0.5 in (±13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)
Intermediate and/or wearing course	± 0.25 in (± 6 mm)	+20 lbs, -25 lbs (+10 kg, -15 kg)
Overall of any combination of 1 and 2	± 0.5 in (±13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)

Note: Thickness and spread rate tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness of spread rate not specified.

When the Plans specify a thickness, the Engineer may take as many cores as necessary to determine the average thickness of the intermediate or surface course. The Engineer shall take a minimum of one core per 1,000 ft (300 m) per two lanes of roadway. Thickness will be determined by average measurements of each core according to [GDT 42](#).

If the average exceeds the tolerances specified in the [Subsection 400.4.A.2.b, Table 11, -Thickness and Spread Rate Tolerance at Any Given Location](#), additional cores will be taken to determine the area of excess thickness and excess tonnage will not be paid for.

B. Hot Mix Asphaltic Concrete Paid for by Square Yard (Meter)

- 1. The thickness of the base course or the intermediate or surface course will be determined by the Department by cutting cores and the thickness will be determined by averaging the measurements of each core.

2. If any measurement is deficient in thickness more than the tolerances given in the table above, additional cores will be taken by the Department to determine the area of thickness deficiency. Correct thickness deficiency areas as follows:
 - a. Overlay the deficient area with the same type mixtures being corrected or with surface mixture. Extend the overlay at least 300 ft (90 m) for the full width of the course.
 - b. Ensure that the corrected surface course complies with [Subsection 400.3.06.C.1, Visual and Straightedge Inspection](#)
 - c. The mixture is subject to the [Mixture Acceptance Schedule—Table 9 or 10](#).
3. No extra payment is made for mixtures used for correction.
4. No extra payment is made for thickness in excess of that specified.

C. Asphaltic Concrete

Hot mix asphaltic concrete, complete in place and accepted, is measured in tons (megagrams) or square yards (meters) as indicated in the Proposal. If payment is by the ton (megagram), the actual weight is determined by weighing each loaded vehicle on the required motor truck scale as the material is hauled to the roadway, or by using recorded weights if a digital recording device is used.

The weight measured includes all materials. No deductions are made for the weight of the individual ingredients. The actual weight is the pay weight except when the aggregates used have a combined bulk specific gravity greater than 2.75. In this case the pay weight is determined according to the following formula:

$$T1 = T \times \left\{ \frac{\% AC + \left(\frac{\% \text{ Aggregate} \times 2.75}{\text{combined bulk Specific Gravity}} \right) + \% Y}{100} \right\}$$

Where:

T1	Pay weight, tonnage (Mg)
T=	Actual weight
% AC=	Percent asphalt cement by weight of total mixture
% Aggregate =	Percent aggregate by weight of total mixture
Combined Bulk Sp. Gr.=	Calculated combined bulk specific gravity of various mineral aggregates used in the mixture
% Y=	Percent hydrated lime by weight of mineral aggregate

D. Bituminous Material

Bituminous material is not measured for separate payment.

E. Hydrated Lime

When hydrated lime is used as an anti-stripping additive, it is not measured for separate payment.

F. Field Laboratory

The field laboratory required in this Specification is not measured for separate payment.

G. Asphaltic Concrete Leveling

Payment of hot mix asphaltic concrete leveling, regardless of the type mix, is full compensation for furnishing materials, bituminous materials, and hydrated lime (when required) for patching and repair of minor defects, surface preparation, cleaning, hauling, mixing, spreading, and rolling.

Mixture for leveling courses is subject to the acceptance schedule as stated in [Subsection 400.3.06.A](#) and [Subsection 400.3.06.B](#).

H. Asphaltic Concrete Patching

Hot mix asphaltic concrete patching, regardless of the type mix, is paid for at the Contract Unit Price per ton (Megagram), complete in place and accepted. Payment is full compensation for:

- Furnishing materials such as bituminous material and hydrated lime (when required)
- Preparing surface to be patched
- Cutting areas to be patched, trimmed, and cleaned
- Hauling, mixing, placing, and compacting the materials

400.4.01 Limits

When the asphaltic concrete is paid for by the square yard (meter) and multiple lifts are used, the number and thickness of the lifts are subject to the Engineer's approval and are used to prorate the pay factor for the affected roadway section.

400.5 Payment

Hot mix asphaltic concrete of the various types are paid for at the Contract Unit Price per ton (megagram) or per square yard (meter). Payment is full compensation for furnishing and placing materials including asphalt cement, hydrated lime when required, approved additives, and for cleaning and repairing, preparing surfaces, hauling, mixing, spreading, rolling, and performing other operations to complete the Contract Item.

Payment will be made under:

Item No. 400	Asphaltic concrete <u>type</u> , Superpave, <u>group-blend</u> , including bituminous materials and hydrated lime	Per ton (megagram)
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Item No. 400	Asphaltic concrete <u>type</u> Stone Matrix Asphalt, <u>group-blend</u> , including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> OGFC, <u>group 2</u> only, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> OGFC, <u>group 2</u> only, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> Porous European Mix, <u>group 2</u> only, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)

400.5.01 Adjustments

A. Determine Lot Acceptance

The control sieves used in the mixture acceptance schedule for the various types of mix are indicated below:

Control Sieves Used in the Mixture Acceptance Schedule	
Asphaltic concrete 25 mm Superpave	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement

Control Sieves Used in the Mixture Acceptance Schedule	
Asphaltic concrete 9.5 mm Superpave	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 4.75 mm Mix	No. 8 (2.36 mm) sieve and asphalt cement

The Department will perform the following tasks:

1. Determine the mean of the deviations from the job mix formula per test results per lot.
2. Determine this mean by averaging the actual numeric value of the individual deviations from the job mix formula;
disregard whether the deviations are positive or negative amounts.

C. Calculate Pavement Mean Air Voids

The Department will determine the percent of maximum air voids for each lot by dividing the pavement mean air voids by the maximum pavement mean air voids acceptable.

D. Asphaltic Concrete For Temporary Detours

Hot mix asphaltic concrete placed on temporary detours not to remain in place as part of the permanent pavement does not require hydrated lime. Hot mix used for this purpose is paid for at an adjusted Contract Price. The payment for this item shall cover all cost of construction, maintenance and removal of all temporary mix. Hot mix asphaltic concrete placed as temporary mix shall meet requirements established in [Subsection 400.3.05.F](#).

Where the Contract Price of the asphaltic concrete for permanent pavement is let by the ton (megagram), the Contract

Price for the asphaltic concrete placed on temporary detours is adjusted by subtracting \$0.75/ton (\$0.85/mg) of mix used.

Where the Contract price of the mix in the permanent pavement is based on the square yard (meter), obtain the adjusted price for the same mix used on the temporary detour by subtracting \$0.04/yd² (\$0.05/ m²) per 1-in (25-mm) plan depth.

Further price adjustments required in [Subsection 400.3.06,-Quality Acceptance , ll](#) are based on the appropriate adjusted

Contract Price for mix used in the temporary detour work.

E. Determine Lot Payment

If the Engineer determines that the material is not acceptable to leave in place, remove and replace the materials at the Contractor's expense.

400.6: Submittals:

<u>Para #</u> <u>Date received</u>	<u>Description</u>	<u>Date required</u>
400.1.03.B _____	Paving plan	14 days prior
400.1.03.C _____	Job mix formula	14 days prior
400.3.05.J _____	Modified job mix formula	upon request
400.3.06.A.3.b.3 _____	Sampling, testing & Inspection	daily/upon request
400.3.06.A.4a _____	Comparison testing	as requested
400.3.06.A.4.b _____	Independent sampling	as requested

END OF SECTION

SECTION 412 – BITUMINOUS PRIME

Section 301: Appendix C

412.3.02 Equipment

Provide equipment that is in good repair, including at least the following units that meet the requirements of [Subsection 424.3.02, “Equipment.”](#)

- Pressure distributor
- Power broom and blower
- Aggregate spreader (if required)

412.3.03 Preparation

See [Sub section 412.3.05.B, “Condition of Surface.”](#)

412.3.04 omitted**412.3.05 Construction**

Prime the following bases and other areas:

- Cement or lime stabilized bases or subbases, regardless of pavement thickness
- Soil or aggregate bases or sub-bases on which bituminous surface treatment will be placed
- Soil or aggregate bases or sub-bases on which less than 5 in (125 mm) total thickness of hot mix asphaltic concrete will be placed

Prime is not required on driveway construction and paved shoulders.

A. Weather Limitations

Do not apply bituminous prime under any

of these conditions:

- Surface is wet.
- Air temperature is below 40 °F (4 °C) in the shade.
- Rain is imminent.
- Weather conditions may prevent proper prime coat construction.

B. Condition of Surface

Ensure that the surface to which the prime is to be applied has been finished to the line, grade, and cross section specified.

Ensure that the surface is uniformly compacted and bonded. Correct surface irregularities according to the Specifications for the construction being primed.

C. Cleaning

Remove from the road loose material, dust, caked clay, and other material that may prevent bonding of the prime with the surface. Use power sweepers or blowers the full width of the prime and 2 ft (600 mm) more on each side. Where necessary, sweep by hand.

D. Moisture

Ensure that the surface is only slightly damp. If the surface is too wet, allow it to dry. If it is too dry, the Engineer may require that it be sprinkled lightly just before priming.

E. Temperature and Surface Texture

The surface texture and condition of the surface determine the bituminous material grades to be used.

The following table shows the bituminous material grades and application temperatures as they are applied to various surface textures.

Base Texture	Tight	Average	Open
Materials and grade	MC-30 RC-30	RC-70 or MC-70	RC-250 or MC-250
Application temperature °F (°C)	80–120 (27–49)	105-180 (41–82)	145–220 (63–104)

The Engineer will determine the temperature for applying bituminous prime within the limits shown above.

Heat and apply bituminous materials as specified in [Sub section 424.3.05.D, “Heating Bituminous Material”](#) and [Subsection 424.3 .05.E, “Applying Bituminous Material.”](#)

F. Amount and Extent of Prime

The Engineer will determine the exact amount of bituminous material to be used within minimum and maximum rates of

0.15 to 0.30 gal/yd² (0.7 to 1.4 liters/m²). Apply the specified amount as follows:

1. Apply the determined amount uniformly and accurately. Ensure that the amount applied to any 0.5-mile (800 m) section is within 5 percent of the amount specified.
2. Apply the prime the full width of the proposed wearing surface that will be superimposed plus 6 in (150 mm) more on each side.

G. Protection, Curing, and Maintenance

Do the following after priming the surface:

1. Close to Traffic
Do not allow traffic on the primed surface. Leave the surface undisturbed until the prime thoroughly cures and does not pick up under traffic.
2. Roll
If the surface becomes soft after it is primed, roll the surface longitudinally with a pneumatic-tired roller at no more than 6 mph (10 kph) until the surface is firmly set.
3. Blot
If necessary to prevent the prime from being picked up, spread clean, dry, sharp sand over the surface by hand or mechanically. Apply sand only to places that are tacky and use the least amount needed to prevent pick up. No extra payment for this work or material will be made.
4. Open to Traffic
After rolling and sanding (if required), open the primed surface to ordinary traffic subject to the conditions in [Subsection 412.3 .05.G.1, “Close to Traffic.”](#)
5. Maintenance
Maintain the prime coat and the primed course surface until it is covered by other construction. Remove excess bituminous material.

END OF SECTION

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
SPECIAL PROVISION

Section 413—Bituminous Tack Coat

Delete Section 413 and substitute the following:

413.1 General Description

This work includes furnishing and applying a bituminous tack coat on a prepared road surface including cleaning the road surface.

413.1.01 Definitions

General Provisions 101 through 150.

413.1.02 Related References

A. Standard Specifications

[Section 109—Measurement and Payment](#)

[Section 400—Hot Mix Asphaltic Concrete Construction](#)

[Section 424—Bituminous Surface Treatment](#)

[Section 427—Emulsified Asphalt Slurry Seal](#)

[Section 820—Asphalt Cement](#)

[Section 822 – Emulsified Asphalt](#)

[Section 824—Cationic Asphalt Emulsion](#)

B. Referenced Documents

General Provisions 101 through 150.

413.1.03 Submittals

General Provisions 101 through 150.

413.2 Materials

Ensure materials meet the following Specifications:

Material	Section
Asphalt cement, performance grade PG 58-22, PG 64-22, or PG 67-22	820.2.01
Anionic emulsion asphalt NTSS-1HM	822.2.01

Cationic emulsified asphalt CRS-2h or CRS-3	824.2.01
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Asphalt cement of performance grade PG 58-22, PG 64-22 or PG 67-22 is used for bituminous tack coat in work performed in [Section 400](#). Use anionic emulsified asphalt as an option with the approval of the Engineer. Use cationic emulsified asphalt as a special application material only if directed by the Engineer.

The Department may change the grade or type of bituminous materials without a change in the Contract

Unit Price if the Engineer determines the grade or type selected is not performing satisfactorily.

413.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

Emulsified Asphalt

Maintain all equipment used for the delivery, storage, and handling of anionic emulsified asphalt or cationic emulsified asphalt to prevent contamination of the emulsion. Transfer anionic emulsified asphalt or cationic emulsified asphalt directly to the pressure distributor from the transport tanker.

Provide and maintain temperature measuring devices to continuously monitor the temperature of anionic emulsified asphalt or cationic emulsified asphalt in storage and in the pressure distributor. Do not allow anionic emulsified asphalt or cationic emulsified asphalt to freeze.

Note 1: Do not store anionic emulsified asphalt or cationic emulsified asphalt for a period longer than 30 days from the time of initial loading.

Note 2: Do not use anionic emulsified asphalt or cationic emulsified asphalt on GDOT funded Off System Projects after 30 days of initial loading.

413.3 Construction Requirements

413.3.01 Personnel

General Provisions 101 through 150.

413.3.02 Equipment

Provide equipment in good repair, including the following units that meet the requirements of [Subsection 424.3.02, Equipment.](#)

Power broom and blower

Pressure distributor

Provide a dedicated pressure distributor for anionic emulsified asphalt NTSS-IHM to avoid contamination with incompatible materials.

413.3.03 Preparation

General Provisions 101 through 150.

413.3.04 Fabrication

General Provisions 101 through 150.

413.3.05 Construction

A. Seasonal and Weather Limitation

Do not apply tack coat if the existing surface is wet or frozen. Do not place emulsified asphalt if the air temperature in the shade is less than 40 °F (4 °C).

B. Application

Coat the entire areas to be paved with the tack coat unless directed otherwise by the Engineer. Apply tack coat with distributor spray bars instead of hand hoses, except in small areas inaccessible to spray bars.

Application Rates for Anionic Emulsified Asphalt or Cationic Emulsified Asphalt, gal/yd² (L/m²)

Type Mix	Minimum	Maximum
All Mixes except OGFC and PEM	0.06 (0.270)	0.10 (0.450)
On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.04 to 0.06 gal/yd ² (0.180 to 0.270 L/m ²).		
Allow anionic emulsified asphalt or cationic emulsified asphalt to break for a minimum of 30 minutes after initial application. Proceed with paving only after the anionic emulsified asphalt NTSS-1HM has cured to the satisfaction of the Engineer.		
Do not use anionic emulsified asphalt or cationic emulsified asphalt under OGFC or PEM.		

C. Temperature of Material

Apply bituminous materials within the temperature ranges specified below.

Bituminous Materials	Temperature of Application °F (°C)
Asphalt cement	350 - 400 (175 - 205)
Anionic Emulsified Asphalt NTSS-1HM	140 - 180 (60 - 80)
Cationic Emulsified Asphalt CRS-2h, CRS-3	140 - 180 (60 - 80)

D. Cleaning

Immediately before applying the tack coat, clean the entire area free of loose dirt, clay, and other foreign materials.

E. Application Rate

The Engineer will determine the application rate of the bituminous tack coat.

F. Limitations and Areas Coated

Apply only enough tack coat to the prepared road surface that can be covered with the new pavement course the same working day the tack coat is applied.

G. Maintenance and Protection

After applying the tack coat material, allow it to break until it is tacky enough to receive the surface course. Do not allow traffic on the tack.

413.3.06 Quality Acceptance

General Provisions 101 through 150.

413.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

413.4 Measurement

Bituminous materials for tack coat applied and accepted are measured as outlined in [Subsection 109.02, -Measurement of Bituminous Materials. II](#)

Diluting emulsified tack coat is not ordinarily allowed except when used underneath slurry seal and approved by the Engineer. The composition of diluted emulsified tack coat defined in [Subsection 427.3.05](#), [—Construction](#) is measured by the gallon (liter) of diluted mix.

413.4.01 Limits

General Provisions 101 through 150.

413.5 Payment

The accepted volume of bituminous material will be paid for at the Contract Unit Price per gallon (liter) for bituminous tack coat of the type and grade approved by the Engineer, complete in place. Payment is full compensation for preparing, cleaning, furnishing, hauling, applying material, and providing incidentals to complete the work.

Payment will be made under:

Item No. 413	Bituminous tack coat	Per gallon (liter)
Item No. 413	Diluted emulsified asphalt tack coat	Per gallon (liter)

Section 400: Appendix 4

413.3 Construction Requirements

413.3.01 Omitted.

413.3.02 Equipment

Provide equipment in good repair, including the following units that meet the requirements of [Subsection 424.3.02, Equipment.](#)

- Power broom and blower
- Pressure distributor

413.3.03 Omitted.

413.3.04 Omitted

413.3.05 Construction

A. Seasonal and Weather Limitation

Do not apply tack coat if the existing surface is wet or frozen. Do not place emulsified asphalt if the air temperature in the shade is less than 40 °F (4 °C).

B. Application

Coat the entire areas to be paved with the tack coat unless directed otherwise by the Engineer. Apply tack coat with distributor spray bars instead of hand hoses, except in small areas that are inaccessible to spray bars.

C. Temperature of Material

Apply bituminous materials within the temperature ranges specified below.

Bituminous Materials	Temperature of Application °F (°C)
Asphalt cement	350 - 400 (175 - 205)
CRS-2h	140 - 180 (60 - 80)
CRS-3	140 - 180 (60 - 80)

D. Cleaning

Immediately before applying the tack coat, clean the entire area free of loose dirt, clay, and other foreign materials.

E. Application Rate

The Engineer will determine the application rate of the bituminous tack coat.

F. Limitations and Areas Coated

Apply only enough tack coat to the prepared road surface that can be covered with the new pavement course the same working day the tack coat is applied.

G. Maintenance and Protection

After applying the tack coat material, allow it to break until it is tacky enough to receive the surface course. Do not allow traffic on the tack.

Section 400: Appendix 5

828.2.03 Superpave Asphalt Concrete Mixtures

A. Requirements for Superpave Mixtures (except Parking Lot Mixtures)

Produce the mixture according to an approved mix design and Job Mix Formula. Ensure Superpave Asphalt Concrete mixtures meet the following mixture control tolerances and mix design limits:

I. Gradation limits for Superpave mixtures are as follows:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing				
		9.5mm Superpave Type I	9.5mm Superpave Type II	12.5 mm Superpave (Note 1)	19mm Superpave	25mm Superpave
1 1/2 in (37.5 mm)						100*
1- in (25.0 mm)	± 8.0			100*	100*	90-100
3/4 in (19.0 mm)	±8.0**	100*	100*	98-100****	90-100	55-89**
1/2 in (12.5 mm)	±6.0***	98-100****	98-100****	90-100	60-89***	50-70
3/8 in (9.5 mm)	±5.6	90-100	90-100	70-89	55-75	
No.4 (4.75 mm) s	±5.6	65-85	55-75			
No. 8 (2.36 mm)	±4.6	48-55	42-47	38-46	32-36	30-36
No. 200 (75 1-1m)	±2.0	5.0-7.0	5.0-7.0	4.5-7.0	4.0-6.0	3.5-6.0
Range for % AC (Note 3)	±0.4 (Note 2)	5.50-7.25	5.25-7.00	5.00-6.25	4.25-5.50	4.00-5.25

• Mixture control tolerance is not applicable to this sieve for this mix.

**Ensure mixture control tolerance is within ± 10.0% for this sieve for 25 mm Superpave.

***Ensure mixture control tolerance is within ± 8.0% for this sieve for 19 mm Superpave.

***Ensure mixture control tolerance is within ± 2.0% for this sieve for 12.5 mm and 9.5 mm mixes.

Note 1: Use PG 76-22 in 12.5 mm Superpave, excluding shoulder construction, on all projects with ADT greater than 25,000 as detailed in the Contract Pay Item.

Note 2: Quality Acceptance Test Results for AC content deviating $>\pm 0.3\%$ from the approved Job Mix Formula (JMF) consistently over three Lots may subject the mix to a revised AC content on the project JMF at the discretion of the State Materials Engineer based on statistical trend.

Note 3: Range for % AC is Original Optimum AC (OOAC) at 65 gyrations prior to the Corrected Optimum AC (COAC) calculation detailed in SOP 2 (Appendix D).

2. Volumetric limits are as follows:

Design Parameter	Mix Type	Limits
% of Max. Specific Gravity (Gmm) at design gyrations, (Ndes)	All	96%
% Gmm at the initial number of gyrations, Ni	All	91.5% maximum
% voids filled with asphalt (VFA) at Ndes	9.5 mm Type I	Min. 72; Max. 80
	9.5 Type II and 12.5 mm	Min. 72; Max. 76
	19mm	Min. 71; Max 76
	25mm	Min. 69; Max 76
Fines to effective asphalt binder ratio (F/Pbe)	9.5 mm Type I	0.6 to 1.4
	All other types	0.8 to 1.6
Minimum Film Thickness (microns)*	All	> 7.00
Minimum % Voids in Mineral Aggregate (VMA) Note: VMA shall be calculated using the effective specific gravity of the aggregate (Gse). See SOP-2SP.	25mm	13.0
	19mm	14.0
	12.5 mm	15.0
	9.5 Type I	16.0
	9.5 Type II	16.0

*Superpave Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirements by the State Materials Engineer.

Note 2: Quality Acceptance Test Results for AC content that deviate $>\pm 0.3\%$ from the approved Job Mix Formula (JMF) consistently over three lots may subject the mix to a revised AC content on project JMF at the discretion of the State Materials Engineer based on statistical trend.

413.3 Construction Requirements

413.3.01 Omitted.

413.3.02 Equipment

Provide equipment in good repair, including the following units that meet the requirements of [Subsection 424.3.02, Equipment.](#)”

- Power broom and blower
- Pressure distributor

413.3.03 Omitted.

413.3.04 Omitted

413.3.05 Construction

A. Seasonal and Weather Limitation

Do not apply tack coat if the existing surface is wet or frozen. Do not place emulsified asphalt if the air temperature in the shade is less than 40 °F (4 °C).

B. Application

Coat the entire areas to be paved with the tack coat unless directed otherwise by the Engineer. Apply tack coat with distributor spray bars instead of hand hoses, except in small areas that are inaccessible to spray bars.

C. Temperature of Material

Apply bituminous materials within the temperature ranges specified below.

Bituminous Materials	Temperature of Application °F (°C)
Asphalt cement	350 - 400 (175 - 205)
CRS-2h	140 - 180 (60 - 80)
CRS-3	140 - 180 (60 - 80)

D. Cleaning

Immediately before applying the tack coat, clean the entire area free of loose dirt, clay, and other foreign materials.

E. Application Rate

The Engineer will determine the application rate of the bituminous tack coat.

F. Limitations and Areas Coated

Apply only enough tack coat to the prepared road surface that can be covered with the new pavement course the same working day the tack coat is applied.

G. Maintenance and Protection

After applying the tack coat material, allow it to break until it is tacky enough to receive the surface course. Do not allow traffic on the tack.

Section 400: Appendix 5

828.2.03 Superpave Asphalt Concrete Mixtures

A. Requirements for Superpave Mixtures (except Parking Lot Mixtures)

Produce the mixture according to an approved mix design and Job Mix Formula. Ensure Superpave Asphalt Concrete mixtures meet the following mixture control tolerances and mix design limits:

I. Gradation limits for Superpave mixtures are as follows:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing				
		9.5mm Superpave Type I	9.5mm Superpave Type II	12.5 mm Superpave (Note 1)	19mm Superpave	25mm Superpave
1 1/2 in (37.5 mm)						100*
1- in (25.0 mm)	± 8.0			100*	100*	90-100
3/4 in (19.0 mm)	±8.0**	100*	100*	98-100****	90-100	55-89**
1/2 in (12.5 mm)	±6.0***	98-100****	98-100****	90-100	60-89***	50-70
3/8 in (9.5 mm)	±5.6	90-100	90-100	70-89	55-75	
No.4 (4.75 mm) s	±5.6	65-85	55-75			
No. 8 (2.36 mm)	±4.6	48-55	42-47	38-46	32-36	30-36
No. 200 (75 1-m)	±2.0	5.0-7.0	5.0-7.0	4.5-7.0	4.0-6.0	3.5-6.0
Range for % AC (Note 3)	±0.4 (Note 2)	5.50-7.25	5.25-7.00	5.00-6.25	4.25-5.50	4.00-5.25

• Mixture control tolerance is not applicable to this sieve for this mix.

**Ensure mixture control tolerance is within ± 10.0% for this sieve for 25 mm Superpave.

***Ensure mixture control tolerance is within ± 8.0% for this sieve for 19 mm Superpave.

****Ensure mixture control tolerance is within ± 2.0% for this sieve for 12.5 mm and 9.5 mm mixes.

Note 1: Use PG 76-22 in 12.5 mm Superpave, excluding shoulder construction, on all projects with ADT greater than 25,000 as detailed in the Contract Pay Item.

Note 2: Quality Acceptance Test Results for AC content deviating $\geq \pm 0.3\%$ from the approved Job Mix Formula (JMF) consistently over three Lots may subject the mix to a revised AC content on the project JMF at the discretion of the State Materials Engineer based on statistical trend.

Note 3: Range for % AC is Original Optimum AC (OOAC) at 65 gyrations prior to the Corrected Optimum AC (COAC) calculation detailed in SOP 2 (Appendix D).

2. Volumetric limits are as follows:

Design Parameter	Mix Type	Limits
------------------	----------	--------

% of Max. Specific Gravity (Gmm) at design gyrations, (Ndes)	All	96%
% Gmm at the initial number of gyrations, Ni	All	91.5% maximum
% voids filled with asphalt (VFA) at Ndes	9.5 mm Type I	Min. 72; Max. 80
	9.5 Type II and 12.5 mm	Min. 72; Max. 76
	19mm	Min. 71; Max 76
	25mm	Min. 69; Max 76
Fines to effective asphalt binder ratio (F/Pbe)	9.5 mm Type I	0.6 to 1.4
	All other types	0.8 to 1.6
Minimum Film Thickness (microns)*	All	> 7.00
Minimum % Voids in Mineral Aggregate (VMA) Note: VMA shall be calculated using the effective specific gravity of the aggregate (Gse). See SOP-2SP.	25mm	13.0
	19mm	14.0
	12.5 mm	15.0
	9.5 Type I	16.0
	9.5 Type II	16.0

*Superpave Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirements by the State Materials Engineer.

Note 2: Quality Acceptance Test Results for AC content that deviate $\pm 0.3\%$ from the approved Job Mix Formula (JMF) consistently over three lots may subject the mix to a revised AC content on project JMF at the discretion of the State Materials Engineer based on statistical trend.

END OF SECTION

Section 400: Appendix 3

424.3.02 Equipment

Have the Engineer approve equipment types and quantities before using equipment on the Project.

Ensure that the equipment used to construct the surface treatment:

- Produces work that complies with the standards in this section
- Is on the Project and in proper working order before construction begins

A. Aggregate Spreader

The Department will inspect annually the aggregate spreader before it is used in the work. If the spreader is approved, the Department will attach an equipment certification sticker to the spreader.

Use a self-propelled aggregate spreader that can apply aggregate at the desired rate uniformly and accurately without corrugation, overlaps, or excess deficient areas.

Ensure that the spreader can spread courses to the required widths. Provide spreaders to promptly cover the full width of the asphalt application.

B. Pressure Distributor

The Department will inspect annually the pressure distributor before it is used in the work. If the distributor is approved, the Department will attach an equipment certification sticker to the distributor. The pressure distributor should be equipped as follows:

1. Mount the pressure distributor on pneumatic tires wide enough to prevent damage to the road surface.
2. Design, equip, maintain, and operate the distributor so that the bituminous material will be heated and applied evenly throughout the length of the spray bars. Ensure that it maintains a constant, uniform pressure on the nozzles.
3. Install screens between the tank and the nozzles and clean them frequently to prevent clogging.
4. Use an adjustable distributor that can deliver controlled amounts of bituminous material from 0.04 to 1.0 gal/yd², ± 0.02 gal/yd² (0.18 to 4.53 L/m², ± 0.10 L/m²) up to 24 ft (7.2 m) wide without atomization, streaking, or pulsation in the flow.
5. Use a distributor equipped with the following:
 - A tachometer and thermometers to indicate the application rate and the temperature of the tank contents
 - Measuring devices to accurately indicate the amount of bituminous material, in gallons (liters), in the distributor before and after each application
 - Full circulating spray bars that can be adjusted laterally to conform to a stringline and capable of vertical and horizontal adjustment.
 - A positive shut-off control to prevent dripping bituminous material on the roadway
 - A distributor tank equipped with a sample valve in a safe and convenient location to obtain bituminous material samples

C. Heating Equipment

Ensure that heating equipment will heat and maintain the bituminous material uniformly at the temperature required. Provide an accurate thermometer.

D. Smooth-Wheeled Rollers

Use self-propelled, tandem-type smooth-wheeled rollers that can be alternated with pneumatic-tired wheels. The rollers shall weigh from 3 to 8 tons (3 to 7 Mg). Ensure that the roller weights within these limits can properly compact the materials.

E. Pneumatic-Tired Rollers

Use self-propelled pneumatic-tired rollers with treads that will not disturb the aggregates. Rollers with pneumatic-tired wheels that can be alternated with a steel drum are also permitted.

F. Power Broom and Power Blower

Provide at least one power broom and one power blower, or a combination power broom and blower that can remove dust or loose materials from the road surface.

END OF SECTION

Section 432—Mill Asphaltic Concrete Pavement

432.1 General Description

This work includes milling existing asphaltic concrete pavement to restore proper grade and/or transverse slope, removing structurally unsound material, providing clearance for overlay in curb and gutter sections, or other purposes deemed necessary due to existing conditions. Perform the work according to these Specifications and Plan details.

432.1.01 Omitted

432.1.02 Related References

A. Omitted

B. Referenced Documents

[GDT 126](#)

432.1.03 Omitted.

432.2 Materials

432.2.01 Delivery, Storage, and Handling

When specified, stockpile the milled material at locations shown on the Plans.

1. Uniformly stockpile the materials approximately 6 – 8 ft (1.8 – 2.4 m) high.
2. Maintain the existing drainage pattern of water from the stockpile storage area.
3. Dress the reclaimed asphalt area to drain rainwater from the material.
4. Obtain the Engineer's approval of the stockpile locations and the method used to prevent milled material degradation, segregation, and reconsolidation.

432.3 Construction Requirements

432.3.01 Omitted

432.3.02 Equipment

A. Milling Equipment

Use power-driven, self-propelled milling equipment that is the size and shape that allows traffic to pass safely through areas adjacent to the work. Also, use equipment that is:

- Designed to mill and remove a specified depth of existing asphalt paving
- Equipped with grade and slope controls operating from a stringline or ski and based on mechanical or sonic operation
- Capable of removing pavement to an accuracy of 1/8 in (3 mm)
- Furnished with a lighting system for night work, as necessary
- Provided with conveyors capable of side, rear, or front loading to transfer the milled material from the roadway to a truck

B. Dust Control

Provide power brooms, vacuum sweepers, power blowers, or other means to remove loose debris or dust. Do not allow dust control to restrict visibility of passing traffic or to disrupt adjacent property owners.

432.3.03 Omitted

432.3.04 Omitted.

432.3.05 Construction

A. Milling Operation

Follow the Plans to mill the designated areas and depths including bridge decks, shoulders, and ramps, as required. Ensure the following requirements are met:

1. Schedule the construction operation. Use milling methods that will produce a uniform finished surface and maintain a constant cross slope between extremities in each lane.
2. Provide positive drainage to prevent water accumulation on the milled pavement, as shown on the Plans or directed by the Engineer.
3. Bevel back the longitudinal vertical edges greater than 2 in (50 mm) that are produced by the removal process and left exposed to traffic. Bevel them back at least 3 in for each 2 in (75 mm for each 50 mm) of material removed. Use an attached mold board or other approved method.
4. When removing material at ramp areas and ends of milled sections, taper the transverse edges 10 ft (3 m) to avoid creating a traffic hazard and to produce a smooth surface.
5. Protect with a temporary asphaltic concrete tie-in (paper joint) vertical edges at other areas such as bridge approach slabs, drainage structures, and utility appurtenance greater than 1/2 in that are left open to traversing vehicles. Place the temporary tie-in at taper rate of at least 6 to 1 horizontal to vertical distance.
6. Remove dust, residue, and loose milled material from the milled surface. Do not allow traffic on the milled surface and do not place asphaltic concrete on the milled surface until removal is complete.
7. The contractor must provide disposal tickets from a certified scale to verify the amount of millings removed from the job site. The reclaimed asphaltic pavement becomes the Contractor's property unless otherwise specified.

432.3.06 Quality Acceptance

Ensure that the milling operation produces a uniform pavement texture that is true to line, grade, and cross section.

Milled pavement surface acceptance testing will be performed using the Laser Road Profiler method in [GDT 126](#). Milled pavement will be evaluated on individual test sections, normally 1 mile (1 km) long.

Remill mile (kilometer) areas to meet the specified limits when the indices are exceeded. Remill at no additional cost to the Department.

Milled pavement surfaces are subject to visual and straightedge inspection. Keep a 10 ft (3 m) straightedge near the milling operation to measure surface irregularities of the milled pavement surface. Remill irregularities greater than 1/8 in per 10 ft (3 mm in 3 m) at no additional cost to the Department.

Ensure that the cross slope is uniform and that no depressions or slope misalignments greater than 1/4 in per 12 ft (6 mm in

3.6 m) exist when the slope is tested with a straightedge placed perpendicular to the center line.

432.3.07 Omitted

432.4 Measurement

Milling existing asphaltic concrete pavement is measured by the ton.

432.4.01 Omitted

432.5 Payment

Milling asphaltic concrete pavement, measured as specified, will be paid for at the Contract Unit Price bid per ton. The price bid for this item includes the credit value of all Reclaimed Asphalt Pavement (RAP) recovered, and no adjustment in the unit price for this item or other items will be considered for variations in the amount of RAP actually recovered.

Payment is full compensation for furnishing equipment, milling, hauling, stockpiling milled material, and satisfactorily performing the work.

END OF SECTION

Section 652—Painting Traffic Stripe

652.1 General Description

This work includes furnishing and applying reflectorized traffic line paint according to these Specifications.

This Item also includes applying words and symbols according to existing markings, specifications, and the current Manual on Uniform Traffic Control Devices. The contractor shall reproduce the existing marking pattern unless directed otherwise. The contractor will be required to video record the existing striping and submit that video to the Macon-Bibb Engineering prior to working on the roadway.

652.1.01 Definitions

Painted Stripes:

Solid or broken (skip) lines.

Skip Traffic Stripes:

Painted segments between unpainted gaps as specified by Macon-Bibb County. The location and color are designated to copy existing markings.

652.1.02 Related References

A. Standard Specifications

[GDOT Section 656—Removal of Pavement Markings](#)

[GDOT Section 870—Paint](#)

B. Referenced Documents

[GDOT QPL 46](#)
AASHTO M 247

652.1.03 Omitted

652.2 Materials

Ensure that materials for painting traffic stripe, words, and symbols meet the following requirements:

Material	Section
Traffic Line Paint 5A and 5B	GDOT 870.2.02.A.2 and 870.2.02.A.3
Glass Beads for Use in Luminous Traffic Lines	AASHTO M 247 Type 1*

*In addition, meet the following requirements for glass beads:

- Maximum quantity of angular particles is less than 1% by weight
- Maximum quantity of particles with milkiness, scoring, or scratching is less than 2% by weight
- Glass beads do not impart any noticeable hue to the paint film
- Glass beads conforming to the following alternate gradation may be used provided that all other requirements of AASHTO M 247 and this Specification are met.

Alternate Gradation	
Sieve Size	Percent Passing
No. 16 (1.190 mm)	99 - 100
No. 20 (0.850 mm)	75 - 95
No. 30 (0.600 mm)	55 - 85
No. 50 (0.300 mm)	10 - 35
No. 100 (0.150 mm)	0 - 5

652.2.01 Delivery, Storage, and Handling

General

The contractor will be responsible for successful delivery any required storage and handling of any paint products used during the execution of this project.

652.3 Construction Requirements

652.3.01 Personnel

The contractor is responsible for providing qualified personnel to successfully execute this project.

652.3.02 Equipment

A. Traveling Traffic Stripe Painter

Use a traffic stripe painter that can travel at a predetermined speed both uphill and downhill, applying paint uniformly.

Ensure that the painter feeds paint under pressure through nozzles spraying directly onto the pavement.

Use a paint machine equipped with the following:

1. Three adjacent spray nozzles capable of simultaneously applying separate stripes, either solid or skip, in any pattern.
2. Nozzles equipped with the following:
 - a. Cutoff valves for automatically applying broken or skip lines
 - b. A mechanical bead dispenser that operates simultaneously with the spray nozzle to uniformly distribute beads at the specified rate
 - c. Line-guides consisting of metallic shrouds or air blasts
3. Tanks with mechanical agitators
4. Small, portable applicators or other special equipment as needed

B. Hand Painting Equipment

Use brushes, templates, and guides when hand painting.

C. Cleaning Equipment

Use brushes, brooms, scrapers, grinders, high-pressure water jets, or air blasters to remove dirt, dust, grease, oil, and other foreign matter from painting surfaces without damaging the underlying pavement.

652.3.03 Preparation

Locate approved paint manufacturers on GDOT [QPL 46](#).

Before starting each day's work, thoroughly clean paint machine tanks, connections, and spray nozzles, using the appropriate solvent. Thoroughly mix traffic stripe paint in the shipping container before putting it into machine tanks.

Before painting, thoroughly clean pavement surfaces of dust, dirt, grease, oil, and all other foreign matter.

652.3.04 Omitted

652.3.05 Construction

A. Alignment

Ensure that the traffic stripe is the specified length, width, and placement. On sections where no previously applied markings are present, ensure accurate stripe location by establishing control points at spaced intervals. Macon-Bibb County will approve control points.

B. Application

Apply traffic stripe paint by machine. If areas or markings are not adaptable to machine application, use hand equipment.

1. Application Rate

All work will be subject to application rate checks for both paint and beads.

Apply 5 in wide traffic stripe at the following minimum rates:

- a. Solid Traffic Stripe Paint: At least 25 gal/mile

- b. Skip Traffic Stripe Paint: At least 6.3 gal/mile

NOTE: Change minimum rate proportionately for varying stripe widths.

2. Thickness

Maintain a 15 mils minimum wet film thickness for all painted areas.

Do not apply paint to areas of pavement when:

- a. The surface is moist or covered with foreign matter.
 - b. Air temperature in the shade is below 40 °F
 - c. Wind causes dust to land on prepared areas or blows paint and beads around during application.
3. Apply a layer of glass beads immediately after laying the paint. Apply beads at a minimum rate of 6 lbs to each gallon of paint.

C. Protective Measures

Protect newly applied paint as follows:

1. Traffic

Control and protect traffic with warning and directional signs during painting. Set up warning signs before beginning each operation and place signs well ahead of the painting equipment. When necessary, use a pilot car to protect both the traffic and the painting operation.

2. Fresh Paint

Protect the freshly painted stripe using cones or drums. Repair stripe damage or pavement smudges caused by traffic according to [GDOT Subsection 652.3.06](#).

D. Appearance and Tolerance of Variance

Continually deviating from stated dimensions is cause for stopping the work and removing the nonconforming stripe. (See [GDOT Section 656](#).) Adhere to the following measurements:

1. Width

Do not lay stripe less than the specified width. Do not lay stripe more than 1/2 in over the specified width.

2. Length

Ensure that the 10ft painted skip stripe and the 30ft gap between painted segments vary no more than ± 1 ft each.

3. Alignment

- a. Ensure that the stripe does not deviate from the intended alignment by more than 1 in on tangents or curves of 1 degree or less.
- b. Ensure that the stripe does not deviate by more than 2 in on curves exceeding 1 degree.

652.3.06 Quality Acceptance

Ensure that stripes and segments of stripes are clean-cut and uniform. Markings that do not appear uniform or satisfactory, either during the day or night, or do not meet specifications, will be corrected at the contractor's expense. Work will be subject to application rate checks for both paint and beads.

The following will be accepted:

- Sections of painted stripe, words, and symbols that have dried so that paint will not be picked up or marred by vehicle tires

- Sections placed according to these specifications

The Contractor will be relieved of responsibility for maintenance on accepted sections.

A. Correction of Alignment

When correcting a deviation that exceeds the permissible tolerance in alignment, do the following:

1. Remove the affected portion of stripe, plus an additional 25 ft. in each direction.
2. Paint a new stripe according to these Specifications.

Remove the old stripe according to GDOT [Section 656](#).

B. Removal of Excess Paint

Remove misted, dripped, or spattered paint to Bibb County's satisfaction. Do not damage the underlying pavement during removal.

Refer to the applicable portions of GDOT [Section 656](#).

652.3.07 Omitted

652.4 Measurement

Roadway striping is measured by the linear mile of painted roadway. The contractor shall measure the length of roadway using an acceptable method or device approved by the Engineer. On curves, chord measurements not exceeding 100 linear feet may be used.

Traffic stripe and markings, complete in place, are measured and accepted for payment as follows:

A. Solid Traffic Stripe

Solid traffic stripes are included in the overall linear length of roadway.

B. Skip Traffic Stripe

Skip traffic stripes are included in the overall linear length of roadway.

C. Pavement Markings

Markings are words and symbols completed and are measured as separate line items in the bid schedule.

- Each letter of words.
- Each directional arrow.
- Linear feet of cross walk measured along the centerline of the cross walk.
- Each stop bar.
- Linear feet of hatching measured along the center line of the hatching when located in the middle of the driving surface but along the longest curve when located at an intersection

652.4.01 Omitted

652.5 Payment

Payment will be full compensation for the work under this Section, including the following:

1. Cleaning and preparing surfaces
2. Furnishing materials, including paints, beads, and thinners
3. Applying, curing, and protecting paints
4. Protecting traffic, including providing and placing necessary warning signs
5. Furnish tools, machine and other equipment necessary to complete the project

652.5.01 Submittals

Para #	Description	Date Required	Inspector Checklist
652.1	Striping video	5 days prior	_____
652.2	Paint Mix	21 days prior	_____
652.2	Reflective Glass Beads	21 days prior	_____

END OF SECTION

Section 653—Thermoplastic Traffic Stripe

868.1 General Description

This work includes furnishing and applying thermoplastic reflectorized pavement marking compound. Ensure that markings conform to Plan details and locations, these Specifications, and the Manual on Uniform Traffic Control Devices.

Thermoplastic traffic stripe consists of solid or broken (skip) lines, words, and symbols according to Plan color, type, and location.

868.1.01 Definitions

Thermoplastic Marking Compound: A compound extruded or mechanically sprayed on the pavement that cools to pavement temperature. When combined with glass spheres it produces a reflectorized pavement marking.

Short Lines: Crosswalks, stop bars, arrows, symbols, and crosshatching. Extrude short lines rather than spraying them on. Unless otherwise specified, spray all other lines.

868.1.02 Related References

A. Standard Specifications

[Section 652—Painting Traffic Stripe](#)

B. Referenced Documents

[QPL 46](#)

Federal Test Method Standard 141,
Method 4252 ASTM D 1155
ASTM D 620
ASTM D 570
ASTM D 256
ASTM D 2240
ASTM E 28
ASTM 121

868.1.03 Submittals

Ensure that the producers of the thermoplastic compound and glass spheres furnish to the Department copies of certified test reports showing results of all tests specified in this Section. Also ensure that producers certify that the materials meet the other requirements of this Section by submitting copies of certification at the time of sampling. Final Acceptance, however, will be based on satisfactory test results from samples obtained by the Department before delivery.

868.2 Materials

A. General Characteristics of Thermoplastic

1. Deterioration

Use thermoplastic material with the following characteristics:

- a. Does not deteriorate upon contact
 - with: Pavement materials
 - Petroleum droppings from traffic
 - Chemicals, such as sodium chloride or calcium chloride, used to prevent formation of ice on roadways or streets
- b. Does not scorch, discolor, or deteriorate if kept at the manufacturer's recommended application temperature, or at least 375 °F (190 °C), for up to 4 hours.
- c. Has a temperature versus viscosity characteristic that remains constant from batch to batch through four re- heatings.

Section 653—Thermoplastic Traffic Stripe

2. Fumes

Use material that in the plastic state does not give off fumes that are toxic or harmful to persons or property.

B. Detailed Characteristics of Thermoplastic

1. Material Composition

Use material binder with the following characteristics:

- A mixture of synthetic resins, with at least one resin that is solid at room temperature, and high boiling point plasticizers
- A total binder content of 18 percent to 35 percent by weight
- A pigmented binder that is well-dispersed and free of dirt, foreign objects, or ingredients that cause bleeding, staining, or discoloration

The binder shall be Type A—alkyd. Ensure that at least 33% of the binder composition or at least 8% by weight of the entire material formulation is a maleic-modified glycerol ester of resin. Ensure that the finished thermoplastic pavement marking material is not adversely altered by contact with oily pavement materials or by contact from oil dropping onto the pavement surface from traffic.

Ensure that the filler has the following

- characteristics: White calcium
- carbonate or equivalent Compressive strength of 5,000 psi (34.5 MPa)

2. Suitability for Markings

Use thermoplastic material that is especially compounded for traffic markings and has the following characteristics:

- Prevents markings from smearing or spreading under normal traffic conditions at temperatures below 120 °F (49 °C)
- Gives a uniform cross section, with pigment evenly dispersed
- throughout the material Has a uniform material density and character throughout its thickness
- Allows the stripe to maintain its original dimensions and placement
- Ensures that the exposed surface is free from tack and is not
- slippery when wet Does not lift from the pavement in freezing weather
- Has cold ductility properties that permit normal movement with the road surface without chipping or cracking

3. Drying Time

When applied at a temperature range of 400 °F to 425 °F (204 °C – 218 °C) and a thickness of 1/8 in. to 3/16 in. (3 mm to 5 mm), the material shall set to bear traffic in a maximum of 2 minutes when the air temperature is 50 °F ± 3

°F (10 °C ± 2 °C) and shall set to bear traffic in a maximum of 10 minutes when the air temperature is 90 °F ± 3 °F (32 °C ± 2 °C).

4. Reflectorization

Ensure that during manufacturing, reflectorizing glass spheres were mixed into the compound to the following specifications:

- At least 16 percent by weight using glass spheres with a minimum refractive
- index of 1.65 At least 25 percent by weight using glass spheres with a

Section 653—Thermoplastic Traffic Stripe

minimum refractive index of 1.50

C. Physical Requirements of Thermoplastic

1. Color

Confirm the color of thermoplastic as follows:

- a. White thermoplastic material contains at least 8 percent by weight titanium dioxide that meets the requirements of ASTM D 476, Type II, Rutile. The white thermoplastic material shall be pure white and free from dirt or tint.

The material, when compared to the magnesium oxide standard using a standard color spectrophotometer according to ASTM D 4960, shall meet the following:

Scale	Definition	Magnesium Oxide Standard	Sample
Rd	Reflectance	100	75 min.

a	Redness-Greenness	0	-5 to + 5
b	Yellowness-Blueness	0	-10 to + 10

Compare yellow material to match Federal Test Standard Number 595, Color 13538.

2. Color Retention

Use thermoplastic stripe tested for color retention as follows:

- a. Test specimens prepared from samples submitted according to ASTM D 620 by the Department Inspector.
- b. Use an ultraviolet light source as specified in the test procedure, or use a 275 watt sunlamp with a built-in reflector.
- c. Ensure that after 100 hours of exposure to the light source, the test specimens show no color change when compared to an unexposed specimen.

3. Water Absorption

Ensure that materials have no more than 0.5 percent by weight of retained water when tested by ASTM D 570, procedure (a).

4. Softening Point

Ensure that materials have a softening point of at least 175 °F (79 °C) as determined by ASTM E 28.

5. Specific Gravity

Ensure that the specific gravity of the thermoplastic compound at 77 °F (25 °C) is between 1.9 to 2.5.

6. Impact Resistance

Use material with an impact resistance of at least 10 in-lbs. at 77 °F (1.13 N·m at 25 °C), tested as follows:

- a. Heat for 4 hours at 400 °F (204 °C).
- b. Cast into bars of 1 in² (625 mm²) cross sectional area, 3 in (75 mm) long.
- c. Place with 1 in (25 mm) extending above the vise in a cantilever beam (Izod type) tester using the 25 in-lbs. (2.82 N·m) scale. This instrument is described in ASTM D 256.

7. Indentation Resistance

Measure the hardness by a Shore Durometer, Type A2, as described in ASTM D 2240. Maintain the temperature of the Durometer, 4.4 lb. (2 kg) load and the specimen at 115 °F (45 °C). Apply the Durometer and 4.4 lb. (2 kg) load to the specimen and the reading shall be between 50 to 75 units, after 15 seconds.

8. Low Temperature Stress Resistance

- a. Furnish sample test blocks as follows:
 - 1) Coat the samples using the same method as the planned installation of the compound.
 - 2) Coat the samples with at least 32 in² (206 mm²) of the compound.
- b. Have the samples tested as follows:

Section 653—Thermoplastic Traffic Stripe

- 1) Immerse a sample in cold water for one hour.
- 2) Immediately place the sample in a freezer chest or other insulated cold compartment and maintain at a temperature of -20°F (-29°C) for 24 hours.
- 3) After 24 hours, remove the sample and bring it to normal room temperature.

Following the test, confirm that the sample does not crack, flake, or fail to adhere to the substrate.

9. Reheating

Ensure that the compound does not break down, deteriorate, scorch, or discolor if held for 6 hours at the plastic temperature of 425°F (218°C); or if reheated up to the plastic temperature 4 times.

10. Abrasion Resistance

Have the material tested for abrasion resistance as follows:

- a. Ensure that the maximum loss of the material does not exceed 0.4 grams when subjected to 200 revolutions on a Taber Abraser at 77°F (25°C), using H-22 Calibrade wheels that are weighted to 500 grams.
- b. Keep the wearing surface wet with distilled water throughout the test.
- c. Prepare the panel by forming a representative lot of material at a thickness of 0.125 in. (3.18 mm) on a 4 in (100 mm) square steel plate with a thickness of 0.050 ± 0.001 in ($1.27 \text{ mm} \pm 0.03 \text{ mm}$), on which a primer has been previously applied.

11. Yellowness Index

The white thermoplastic material shall not exceed a yellowness index of 0.12 according to AASHTO T 250.

12. Flowability

After heating the thermoplastic material for 240 ± 5 minutes at $425^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($218^{\circ}\text{C} \pm 2^{\circ}\text{C}$) and testing the flowability, ensure that the white thermoplastic has a maximum of 21 percent residue according to AASHTO T 250.

13. Flowability-Extended Heating

After heating the thermoplastic material for 8.0 ± 0.5 hours at $425^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($218^{\circ}\text{C} \pm 2^{\circ}\text{C}$), while stirring the last 6 hours and testing for flowability, ensure that the thermoplastic has a maximum percent residue of 28 according to AASHTO T 250.

14. Storage Life

The material shall meet the requirements of this specification for 1 year. Ensure that the thermoplastic melts uniformly with no evidence of skins or unmelted particles during the 1-year period.

D. Physical Requirements of Glass Spheres

1. Premixed Glass Spheres

Ensure that the compound has been manufactured with glass spheres in the proportion specified in [Subsection 653.2.B.4, —Reflectorization.](#) The glass spheres contained in the material shall meet the following requirements:

- a. Index of Refraction. Determine the index of refraction of the premixed glass spheres by the liquid immersion method at 77°F (25°C).
- b. Roundness. Ensure that the minimum percentages of premixed glass spheres are true spheres according to the following table:

Percent of Premixed Glass Spheres That are True Spheres (when tested according to ASTM D 1155)		
Minimum Index of Refraction	Percent of Overall Beads	Percent of Beads Retained on any Sieve
1.65	At least 75%	At least 70%
1.50	At least 70%	At least 60%

- c. Imperfections. Ensure that no more than 5 percent of the spheres show air inclusions, bubbles, lap lines, chill wrinkles, or other imperfections when viewed through a 60-power microscope in the refractive index liquid.
- d. Foreign Matter. Ensure that the quantity of foreign matter does not exceed 1 percent.

Section 653—Thermoplastic Traffic Stripe

- e. Gradation. Have the beads tested using ASTM: D 1214 to ensure they have the following gradations:

U.S. Sieve Standard Sieve Size	Percent Passing
No. 16 (1.18 mm)	100
No. 30 (600 μm*)	60 to 90
No. 50 (300 μm)	15 to 40
No. 80 (180 μm)	0 to 10
No. 100 (150 μm)	0 to 5
*μ = micro meter	

- f. Chemical Resistance. Use material manufactured with glass spheres that withstand immersion in water and acids without corroding or etching, and withstand sulfides without darkening or decomposing. Have the chemical resistance tested by placing a 3 g to 5 g sample in each of three glass beakers or porcelain dishes and immersing as follows:

- Cover the first with distilled water.
- Cover the second with a 3N solution of sulfuric acid.
- Cover the third with a solution of 50 percent sodium sulfide, 48 percent distilled water, and 2 percent Aerosol 1B or similar wetting agent.

Ensure that after one hour no darkening, hazing, or other evidence of instability is evident when examined microscopically.

2. Drop-On Glass Spheres

Ensure that these spheres meet the requirements of [Subsection 652.2](#).

E. Requirements of Sealing Primer

Place the particular type of two-part epoxy binder-sealer at the application rate as recommended in writing by the thermoplastic material manufacturer.

868.2.01 Delivery, Storage, and Handling

Use material delivered in 50 lb (22.7 kg) unit cardboard containers or bags strong enough for normal handling during shipment and on-the-job transportation without loss of material.

Ensure that each unit container is clearly marked to indicate the

following: Color of the material

Process batch number or similar manufacturer's

identification Manufacturer's name

Address of the plant Date

of manufacture

868.3 Construction Requirements

868.3.01 Personnel

General Provisions 101 through 150.

868.3.02 Equipment

Depending on the marking required, use hand equipment or truck-mounted application units on roadway installations.

A. Spray Application Machine

Ensure that each spray application machine is equipped with the

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Section 653—Thermoplastic Traffic Stripe

following features: Parts continuously mix and agitate the material.

- Truck-mounted units for lane, edge, and center lines can operate at a minimum of 5 mph (8 kph) while installing striping.
- Conveying parts between the main material reservoir and the shaping die or gun prevent accumulation and clogging.
- Parts that contact the material are easily accessible and exposable for cleaning and maintenance.
- Mixing and conveying parts, including the shaping die or gun, maintain the material at the plastic temperature with heat transfer oil or electrical element controlled heat. Do not use an external source of direct heat.
- Parts provide continuously uniform stripe dimensions.
- Applicator cleanly and squarely cuts off stripe ends and applies skip lines. Do not use pans, aprons, or similar appliances that the die overruns.
- Parts produce varying widths of traffic markings.
- Applicator is mobile and maneuverable enough to follow straight lines and make normal curves in a true arc.

B. Automatic Bead Dispenser

Apply glass spheres to the surface of the completed stripe using a dispenser attached to the striping machine to automatically dispense the beads instantaneously upon the installed line. Synchronize the glass sphere dispenser cutoff with the automatic cutoff of the thermoplastic material.

C. Special Kettles

Use special kettles for melting and heating the thermoplastic material. Kettles equipped with automatic thermostatic control devices provide positive temperature control and prevent overheating. Ensure that the applicator and kettles are equipped and arranged according to the requirements of the National Fire Underwriters.

D. Hand Equipment

Use hand equipment for projects with small quantities of lane lines, edge lines, and center lines, or for conditions that require the equipment. Use hand equipment approved by the Engineer.

Ensure that hand equipment can hold 150 lbs. (68 kg) of molten material and is maneuverable to install crosswalks, arrows, legends, lane, edge, and center lines.

E. Auxiliary Vehicles

Supply the necessary auxiliary vehicles for the operation.

868.3.03 Preparation

General Provisions 101 through 150.

868.3.04 Fabrication

General Provisions 101 through 150.

868.3.05 Construction

1. General Application

Thoroughly clean pavement areas to be striped. Use hand brooms, rotary brooms, air blasts, scrapers, or other approved methods that leave the pavement surface clean and undamaged. Take care to remove all vegetation and road film from the striping area. All new Portland Cement Concrete pavement surfaces shall be mechanically wire brushed or abrasive cleaned to remove all laitance and

Section 653—Thermoplastic Traffic Stripe

curing compound before being striped.

Lay stripe with continuous uniform dimensions.

Apply the type of stripe at each location according to the Plans, using one of the

- following methods: Spray techniques
- Extrusion methods wherein one side of the shaping die is the pavement, and the other three sides are contained by or are part of the suitable equipment to heat and control the flow of material.

a. Temperature

Apply thermoplastic traffic stripe only when the pavement temperature in the shade is above 40 °F (4 °C).

To ensure optimum adhesion, install the thermoplastic material in a melted state at the manufacturer's recommended temperature but not at less than 375 °F (190 °C).

b. Moisture

Do not apply when the surface is moist. When directed by the Engineer, perform a moisture test on the Portland cement concrete pavement surface. Perform the test as follows:

- 1) Place approximately 1 yd² (1m²) of roofing felt on the pavement surface.
- 2) Pour approximately 1/2 gallon (2 L) of molten thermoplastic onto the roofing felt.
- 3) After 2 minutes, lift the roofing felt and inspect to see if moisture is present on the pavement surface or underside of the roofing felt.
- 4) If moisture is present, do not proceed with the striping operation until the surface has dried sufficiently to be moisture free.

c. Binder-Sealer

To ensure optimum adhesion, apply a binder-sealer material before installing the thermoplastic in each of the following cases:

- Extruded thermoplastic
- Where directed by the Engineer for sprayed
- thermoplastic Old asphaltic concrete pavements with exposed aggregates

- Portland cement concrete pavements as directed by the Engineer

Ensure that the binder-sealer material forms a continuous film that mechanically adheres to the pavement and dries rapidly. Use a binder-sealer currently in use and recommended by the thermoplastic material manufacturer according to [QPL 46](#).

To ensure optimum adhesion, apply a two-part epoxy binder-sealer on all Portland cement concrete pavements for either sprayed or extruded thermoplastic material.

Apply the epoxy binder-sealer immediately in advance of, but concurrent with, the application of the thermoplastic material. Apply in a continuous film over the pavement surface.

d. Bonding to Old Stripe

The old stripe may be renewed by overlaying with new material. Ensure the new material bonds to the old line without splitting or cracking.

e. Offset from Construction Joints

Off-set longitudinal lines at least 2 in (50 mm) from construction joints of Portland cement concrete pavements.

f. Crosswalks, Stop Bars, and Symbols

Make crosswalks, stop bars, and symbols at least 3/32 in (2.4 mm) thick at the edges and no more than 3/16 in (4.8 mm) thick at the center.

Section 653—Thermoplastic Traffic Stripe

g. Film Thickness

- 1) Maintain the following minimum average film thicknesses on all open graded asphalt concrete friction courses:
 - 0.120 in (3.0 mm)* for lane lines
 - 0.090 in (2.3 mm)* for edge lines
 - 0.150 in (3.8 mm)* for gore area lines
- 2) Maintain the following minimum average film thicknesses on all other pavement types:
 - 0.090 in (2.3 mm)* for lane lines
 - 0.060 in (1.5 mm)* for edge lines

0.120 in (3.0 mm)* for gore area lines

(See below for ‘*’ reference.)

Compute the minimums by the amount of material used each day, as follows:

(For 5 in wide stripe)	
* Average Film Thickness (in) =	$[(\text{lbs used}) (\text{total linear feet})] \times 0.236$
(For 125 mm wide stripe)	
* Average Film Thickness (mm) =	$[(\text{kg used}) (\text{total linear meters})] \times 4.0$
(For 10 in wide stripe)	
* Average Film Thickness (in) =	$[(\text{lbs used}) (\text{total linear feet})] \times 0.118$
(For 250 mm wide stripe)	
* Average Film Thickness (mm) =	$[(\text{kg used}) (\text{total linear meters})] \times 2.0$

h. Glass Spheres

- 1) Apply glass spheres to installed stripe surface at a minimum rate of 14 lbs. of spheres to each 100 square feet ((700 g/m²) of thermoplastic material.
- 2) Apply the glass sphere top-coating with a pressure-type gun specifically designed for applying glass spheres that will embed at least one-half of the sphere’s diameter into the thermoplastic immediately after the material has been applied to the pavement.

2. Removing Existing Stripe

Remove existing stripe according to

[Section 656](#). Remove 100 percent of

existing traffic stripe from:

- Portland cement concrete pavement where the new stripe will be placed at the same location as the existing marking
- Pavement where the new stripe will be placed at a different location from the existing markings

3. Tolerance and Appearance

No traffic stripe shall be less than the specified width and shall not exceed the specified width by more than 1/2 in (13mm). The length of the 10 ft (3 m) segment for skip stripe and the 30 ft (9 m) gap between segments may vary plus or minus 1 ft (300 mm). The alignment of the stripe shall not deviate from the intended alignment by more than 1 in (25 mm) on tangents and on curves up to and including 1 degree (radius of 1745 m or greater). On curves exceeding 1 degree (radius less than 1745 m), the alignment of the stripe shall not deviate from the intended alignment by more than 2 in (50 mm).

Stop work when deviation exceeds the above dimensions, and remove the nonconforming stripe.

Section 653—Thermoplastic Traffic Stripe

868.3.06 Quality Acceptance

Segments of the thermoplastic traffic stripe that have been placed according to the Plans and Specifications may be accepted 30 days after the required work is complete in that segment.

If thermoplastic traffic stripe fails to meet Plan details or Specifications or deviates from stated dimensions, correct it at no additional cost to the Department. If removal of pavement markings is necessary, perform it according to Section 656 and place it according to this Specification. No additional payment will be made for removal and replacement of unsatisfactory striping.

868.3.07 Contractor Warranty and Maintenance

After segments are accepted, the Contractor will be relieved of maintenance on those segments.

868.4 Measurement

When stripe will be paid for by the square yard (meter), the actual number of square yards (meters) painted will be measured. The space between the stripes will be included in the overall measurement.

Linear measurements may be made by electronic measuring devices attached to a vehicle. Thermoplastic traffic stripe, complete in place and accepted, is measured as follows:

5. Solid Traffic Stripe

Stripe is measured by the linear foot (meter), linear mile (kilometer), or square yard (meter). Breaks or omissions in solid lines or stripes at street or road intersections are not measured for payment.

6. Skip Traffic Stripe

Skip stripe is measured by the gross linear mile (kilometer) as specified. The unpainted space between the painted stripes is included in the overall measurement if the Plan ratio of one to three (10 ft [3 m] segment and 30 ft [9 m] gap or other patterns as designated on the Plans) remains uninterrupted. Measurement begins and ends on a stripe.

7. Words and Symbols

Each word or symbol complete according to Plan dimensions is measured by the Unit.

868.4.01 Limits

General Provisions 101 through 150.

868.5 Payment

Payment is full compensation for the Work under this section, including:

Clearing and preparing surfaces

Furnishing all materials

Applying, curing, and protecting stripe

Protecting traffic, including providing necessary warning signs

Furnishing tools, machines, and other equipment necessary to complete the Item

Section 653—Thermoplastic Traffic Stripe

Measurement and payment for removing pavement markings will be according to [Section 656](#) when shown in the Proposal as a payment Item. Otherwise, removal will not be paid for separately, but will be included in the payment for other Work under this section.

Payment will be made under:

Item No. 653	Thermoplastic solid traffic stripe,_in (mm), (color)	Per linear foot (meter)
Item No. 653	Thermoplastic solid traffic stripe,_in (mm), (color)	Per linear mile (kilometer)
Item No. 653	Thermoplastic skip traffic stripe,_in (mm), (color)	Per gross linear foot (meter)
Item No. 653	Thermoplastic skip traffic stripe,_in (mm), (color)	Per gross linear mile (kilometer)
Item No. 653	Thermoplastic pavement markings, words, and symbols (color), type _____	Per each
Item No. 653	Thermoplastic traffic stripe	Per square yard (meter)

868.5.01 Adjustments

General Provisions 101 through 150.

END OF SECTION

Section 654—Raised Pavement Markers

654.1 General Description

This work includes furnishing and placing raised pavement markers according to the Plans or as directed by the Engineer. Use markers that conform to Plan shapes, dimensions, and tolerances.

654.1.01 Definitions

General Provisions 101 through 150.

654.1.02 Related References

A. Standard Specifications

- [Section 868—Bituminous Adhesive for Raised Pavement Markers](#)
- [Section 886—Epoxy Resin Adhesives](#)
- [Section 919—Raised Pavement Marker Materials](#)

B. Referenced Documents

- [QPL 74](#)

654.1.03 Submittals

General Provisions 101 through 150

Material	Section
Bituminous Adhesive	868
Epoxy Resin Adhesives	886
Pavement Markers	919

654.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

654.3 Construction Requirements

654.3.01 Personnel

General Provisions 101 through 150.

654.3.02 Equipment

Before beginning construction, clean marker replacement equipment and ensure that it is mechanically sound.

A. Containers and Stirring Devices

Clean containers and stirring devices (paddles, propellers for drills, etc.) before hand-

1. Cleaning

Clean the mixing head to the automatic epoxy mixing equipment after stopping work for any extended period of time. The length of down-time allowed depends on the pot life of the

2. adhesive system being used.

Mixing Ratio

3. Use an automatic mixing device that delivers separate components to the mixing head in a one-to-one ratio by volume.

Sample Valves

C. Bituminous Adhesive Equipment

Clean and maintain equipment for melting, stirring, and dispensing bituminous adhesive according to the bituminous adhesive manufacturer's requirements.

654.3.03 Preparation

General Provisions 101 through 150.

654.3.04 Fabrication

General Provisions 101 through 150.

A. Adhesive Types

Cement markers to pavement surfaces with a Type I-R Epoxy or Type I-S Epoxy (see [Section 886](#)), or with a bituminous adhesive (see [Section 868](#)). Space markers according to the Plans.

1. **Type I-R Epoxy.** Use Type I-R Epoxy when the pavement temperature is above 50 °F (10 °C), or when traffic conditions require a rapid setting system.
2. **Type I-S Epoxy.** Use Type I-S Epoxy when the pavement temperature is above 60 °F (15 °C) and traffic conditions permit a slower setting system.
3. **Bituminous Adhesive.** Use bituminous adhesive when the pavement temperature is above 40 °F

B. Handling and Applying Adhesives

Obtain an epoxy adhesive furnished as two separate components. Combine and use the

1. Immediately before use, thoroughly stir the individual components with separate paddles. Reject material permanently increasing in viscosity or showing settling of pigments, filler, or thixotropic additives that cannot be readily redispersed.
2. After stirring or agitating the two separate components, mix them in a one-to-one ratio and blend
3. thoroughly until obtaining a uniform color without streaks.
At time of mixing, ensure that the temperature of both components is 60 ° to 80 °F (15 ° to 27 °C). If necessary, heat components using indirect heat to avoid locally overheating and decomposing
4. the material. Do not heat adhesive above 120 °F (49 °C).
Place markers between the start of mixing the epoxy system and the termination of the pot life.
5. The Engineer will designate the allowable pot life based on environmental factors. Never use a partially set mixed system that does not readily extrude around the perimeter of the marker when
6. pressed to the roadway.
 - a. Heat the cubes in an oil-jacketed melting pot.
 - b. Maintain the bituminous adhesive at the manufacturer-recommended temperature during placement of the markers.
 - c. Discard bituminous adhesive heated above 450 °F (232 °C).

C. Placement of Markers

1. Surface Cleaning

Clean pavement of dirt, curing compound, grease, oil, paint, moisture, loose or unsound layers, or other material that would impair the bond between the adhesive and the roadway.

- a. Use either sand-blasting or grinding equipment to clean. Remove the dust before placing the marker.
- b. Provide cleaning equipment air lines with suitable traps to prevent oil or moisture from being redeposited on the road surface.

2. Placement Limits

- b. Do not place markers when pavement temperature is below 40 °F (4 °C).
 - c. When possible, wait 60 to 90 days before placing markers using epoxy adhesive on newly constructed asphaltic concrete pavements.
3. Marker Placement Using Epoxy Adhesives Place markers using epoxy
- a. Place enough adhesive on the cleaned pavement or the bottom of the marker to completely cover the contact area of the marker.
 - b. Press the marker firmly to the pavement.
 - c. Allow a slight bead of epoxy adhesive to extrude from under the marker edges.
 - d. Remove adhesive on the face of the marker or adhesive that obscures the marker. Do
4. Marker Placement Using Bituminous Adhesives
- a. Place enough bituminous adhesive on the cleaned pavement or the bottom of the marker to completely cover the contact area of the marker.
 - b. Press the marker firmly to the pavement.
 - c. Allow a slight bead of adhesive to extrude from under the marker
 - d. edges. Remove adhesive on the face of the marker or adhesive that obscures the marker.

654.3.06 Quality Acceptance

Refer to [QPL 74](#) for raised pavement markers that have met these requirements.

654.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

654.4 Measurement

The number of each type of installed and accepted pavement marker is counted separately for payment.

654.4.01 Limits

General Provisions 101 through 150.

654.5 Payment

Raised pavement markers will be paid for at the Unit Price for each Unit of each type. Payment is full compensation for furnishing and installing each marker.

Item No. 654	Raised pavement markers type _____	Per each
Item No. 654	Raised pavement markers type _____(recessed)	Per each

654.5.01 Adjustments

General Provisions 101

Section 802—Aggregates for Asphaltic Concrete

802.1 General Description

This section includes the requirements for fine and coarse aggregates used in asphaltic concrete.

802.1.01 Definitions

Fine Aggregate: All aggregate passing a No. 8 (2.36 mm) sieve

Coarse Aggregate: All aggregate retained on a No. 8 (2.36 mm) sieve

802.1.02 Related References

A. Standard Specifications

[Section 800—Coarse Aggregate](#)

[Section 828—Hot Mix Asphaltic Concrete Mixtures](#)

B. Referenced Documents

AASHTO T 27

AASHTO T 96

ASTM C 295

[GDT 63](#)

GDT 76

802.2 Materials

802.2.01 Fine Aggregate for Asphaltic Concrete

A. Requirements

Use the appropriate type, group, class, and grade of fine aggregate.

1. Types

Use fine aggregate made of sharp, strong, angular material meeting the required performance characteristics when combined into a mixture.

a. Ensure that the aggregate meets the following requirements:

- Does not contain any deleterious substances.
- Natural sand is free of organic matter, roots, or twigs.
- Aggregate is manufactured from Class A or B crushed stone, gravel, slag, or synthetic aggregate that meets the requirements of [Section 800](#).
- A combination of natural and manufactured sands meets the requirements in [Subsection 802.2.01.A.3](#) and [Subsection 802.2.01.A.4](#) after being combined.

b. Do not use crushed alluvial gravel as virgin aggregate in any mixture.

2. Groups

Fine aggregate groups include:

- a. Group I—Limestone, dolomite, marble, or combination thereof
- b. Group II—Gravel, slag, granitic and gneissic rocks, quartzite, natural sand, or a combination thereof

3. Sand Equivalent

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Use these sand equivalent values:

Material	Sand Equivalent Value
Group I	At least 28

Group II	At least 40
Natural sand	At least 25
Blended sand*	Natural sand at least 20; combined blend at least 25
*Blended natural sands or natural sand blended with stone screenings that meet the Group I or Group II sand equivalent limits.	

4. Mica
 - a. Use fine aggregate with no more than 35 percent free mica in asphaltic concrete surface mixes.
 - b. When approved by the Engineer, use fine aggregate with more than 35 percent mica if blended with natural sand or sand manufactured from Group II aggregates. Ensure the blend has no more than 35 percent free mica and meets all other requirements of this Section, [Section 800](#) and [Section 828](#).
5. Aggregate for Stone Matrix Asphalt

Manufactured screenings will be considered as fine aggregate and shall contain no more than 20 percent by weight coarser than a No. 4 (4.75 mm) sieve.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test the fine aggregate as follows:

Test	Method
Aggregate gradation	AASHTO T 27
Sand equivalent	GDT 63
Mica content	GDT 76 or ASTM C 295

D. Materials Warranty

General Provisions 101 through 150.

802.2.02 Coarse Aggregate for Asphaltic Concrete

A. Requirements

1. Types

Ensure coarse aggregate meets the following requirements:

- Class A or B crushed stone, gravel, slag, or synthetic aggregate as in [Subsection 800.2](#).
- Have uniform quality throughout without any deleterious substances.
- Meet the required performance characteristics when combined into a mixture.

NOTE: Do not use alluvial gravel as virgin aggregate.

2. Groups

Coarse aggregate shall be one of either group below as specified in the composition Table in [Subsection 828.2.A.2](#):

- Group I—Limestone, dolomite, marble, or combination thereof
- Group II—Gravel, slag, granite and gneissic rocks, quartzite, or combination thereof

3. Aggregate for Stone Matrix Asphalt

Use coarse aggregate that meets requirements of this Section and [Section 800](#) except as follows:

Section 868—Bituminous Adhesive For Raised

- Use Class A aggregate only with percent wear of each individual size not to exceed 45 percent based on the B grading of AASHTO T 96
- Use aggregate which contains no more than 20 percent flat and elongated pieces (length greater than three times the average thickness) for that portion of the blend of all aggregate retained on the No. 4 (4.75 mm) sieve.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Coarse Aggregate	Subsection 800.2.01.C

D. Materials Warranty

General Provisions 101 through 150.

END OF SECTION

Section 814—Soil Base Materials

814.1 General Description

This section includes the requirements for soil base materials, including topsoil or sand-clay, soil-cement, sand for bituminous stabilization, and chert.

814.1.01 Related References

A. Standard Specifications

[Section 301— Soil-Cement Construction](#)

[Section 800— Coarse Aggregate](#)

[Section 810— Roadway Materials](#)

[Section 831—Admixtures](#)

B. Referenced Documents

AASHTO T 89

AASHTO T 90

[GDT 4](#)

[GDT 6](#)

[GDT 7](#)

[GDT 65](#)

[GDT 67](#)

814.2 Materials

814.2.01 Topsoil or Sand-Clay

A. Requirements

1. Use topsoil or sand-clay that is a natural or artificial mixture of clay or soil binder with sand or other aggregate.
 - Do not use a mixture that contains substances detrimental to the material.
 - Obtain the materials from sources approved by the Engineer.
 - Ensure that the aggregate retained on No. 10 (2 mm) sieve (coarse aggregate) is of hard, durable particles.
2. Sand and Binder
Use hard, sharp, durable, siliceous particles. Use binder made from quality clay.
3. Oversize
Remove particles with diameters greater than 2 in (50 mm) before depositing the topsoil or sand-clay on the road. Remove particles with screens or grizzlies, or by hand if few oversized pieces exist. You may crush the oversized pieces and use them.
4. Topsoil
Use a topsoil that is a natural, generally pebbly material occurring in shallow surface deposits on usually elevated areas.
5. Natural Sand-Clay
Use a natural sand-clay that is a mixture of natural material, largely sand and clay in proper proportions, occurring in deposits of considerable depth.
6. Artificial Sand-Clay
Use an artificial sand-clay that is largely a mixture of artificial sand and clay. You may make the mixture by combining clay or soil binder and sand or aggregate in the proper proportions.
7. Topsoil and Sand-Clay
Use topsoil and sand- clay with the following properties:

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Sieve Size	Amount
Passing 2 in (50 mm)	100% by weight
Passing 1-1/2 in (37.5 mm)	80-100% by weight
Passing No. 40 (425 µm)	Liquid Limit (LL) of 25 or less Plasticity Index (PI) of 9 or less

8. Ensure that material passing the No. 10 (2 mm) sieve meets the following requirements:

Sieve Size	Percent Passing by Weight
Passing No. 10 (2 mm) sieve	100
Passing No. 60 (250 µm) sieve	15-85
Passing No. 200 (75 µm) sieve	9-35
Clay	9-25
Volume change, max. percent	12
Maximum density, lb/ft ³ (kg/m ³)	110+ (1760+)

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department or Producer will test as follows:

Test	Method
Soil gradation	GDT 4
Volume change	GDT 6
Maximum density	GDT 7 or GDT 67
Liquid Limit	AASHTO T 89
Plastic Limit and Plasticity Index	AASHTO T 90

D. Materials Warranty

General Provisions 101 through 150.

814.2.02 Soil-Cement Material

A. Requirements

1. Ensure that the material for soil-cement base will:

- a. Meet the requirements of [Subsection 810.2.01](#) for Classes IA1, IA2, IA3, or IIB1 with the following modifications:

Clay content	4 to 25%
Volume change	18% maximum
Liquid Limit	25% maximum
Plasticity Index	10% maximum
Maximum dry density	95 lb/ft ³ (1520 kg/m ³) minimum

- b. Be friable and not contain large amounts of heavy or plastic clay lumps, organic material, roots, or other substances that would interfere with how the Portland cement sets, plant production, or the finished surface of

Section 868—Bituminous Adhesive For Raised

the base and meet the requirements of [Subsection 301.3.05.A.2, “Pulverization”](#) or [Subsection 301.3.05.B.1, “Soil”](#).

- c. Produce a laboratory unconfined compressive strength of at least 450 psi (3.1 MPa). To make the sample, mix in a maximum of 8 percent Type I Portland cement, moist-cure for 7 days, and test with [GDT 65](#).
2. Analyze the soil-cement design and create a Job Mix Formula for each Project where soil-cement base or subbase is specified. Have the Job Mix Formula approved by the Engineer before starting base or subbase construction.
3. You may use fly ash or slag that meets the requirements of [Subsection 831.2.03](#) as admixtures for poorly reacting soils when the blend of soil and fly ash, or slag, meets the design requirements in this Subsection.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Soil-Cement Design	GDT 65

D. Materials Warranty

General Provisions 101 through 150.

814.2.03 Sand for Bituminous Stabilization

A. Requirements

1. Submit the bituminous stabilization sand materials to the laboratory in advance. If the laboratory approves the material, use it in constructing the sand-bituminous base course.
2. Use hard, durable particles without organic impurities such as roots or trash that may prevent the bituminous material from bonding with the individual particles.
3. Grade the material as follows:

Size	Percent Passing by Weight
Passing 1 in (25 mm) sieve	100
Passing No. 10 (2.00 mm) sieve	80-100
Passing No. 200 (75 µm) sieve	0-25
Clay	0-16

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Soil gradation	GDT 4

D. Materials Warranty

General Provisions 101 through 150.

814.2.04 Chert

A. Requirements

Use materials that are natural mixtures of binder and chert rock with the following characteristics:

- Ensure that the aggregate retained on the No. 10 (2 mm) sieve (coarse aggregate) is a hard, durable chert rock meeting requirements for Class A or B coarse aggregate (see [Subsection 800.2.01](#)).

Use aggregate sizes in the final mix that can be properly placed, compacted, and finished.

- Ensure that the portion of material passing the No. 10 (2 mm) sieve is sand and clay or another satisfactory bonding material.

1. Gradation

Grade the material as follows:

Size	Percent by Weight
Passing 1-1/2 in (37.5 mm) sieve	80-100
Passing No. 10 (2 mm) sieve	30-60
Material Passing No. 10 (2 mm) Sieve	
Passing No. 10 (2 mm) sieve	100
Passing No. 60 (250 µm) sieve	20-85
Passing No. 200 (75 µm) sieve (silt less clay)	5-25
Clay	15-50

Ensure that the material passing the No. 40 (425 µm) sieve has a Liquid Limit (LL) of 35 or less and a Plasticity Index (PI) of 10 or less.

2. Stockpiles

In all cases, stockpile the end product so that the material will be blended before any of it is loaded and delivered to the job.

- Make a stockpile big enough to uniformly blend the workable strata in the pit.
- The Engineer will determine the minimum volume of the stockpile. The Engineer will also be the sole authority as to the quality and workability of the various strata occurring in the pit.
- Maintain the minimum volume of the stockpile until the suitable material in the pit has all been stockpiled or until the material remaining in the stockpile is enough to complete the operation, as governed by haul limitations.

3. Equipment for Delivery

Use equipment that will mix the material again while the material is being loaded for delivery.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Soil gradation	GDT 4
Liquid Limit	AASHTO T 89
Plastic Limit and Plastic Index	AASHTO T 90

D. Materials Warranty

General Provisions 101 through 150.

END OF SECTION

Section 868—Bituminous Adhesive For Raised Pavement Markers

868.6 General Description

This section includes the requirements for bituminous hot-melt adhesive used to place raised pavement markers.

868.6.01 Related References

C. Standard Specifications

[Section 106—Certification of Materials](#)

D. Referenced Documents

AASHTO	ASTM	
T 48	C 430	D 1856
T 49	D 70	D 2669
T 53	D 1754	D 2712
T 202	D 1796	D 3407

868.7 Materials

868.7.01 Bituminous Adhesive

F. Requirements

1. Adhesive

Use an adhesive made of asphaltic material and a homogeneously mixed filler that meets the following physical requirements:

- a. Adhesive Properties: Use the asphaltic material with filler.

	Min.	Max.	Test Method
Softening point	200° F (95 °C)	—	AASHTO T 53
Penetration, mm 3.5 oz (100 g), 5 sec., 77 °F (25 °C)	10	20	AASHTO T 49
Flow	—	0.2 in (5 mm)	ASTM D 3407 (modified in Subsection 868.2.01.C)
Viscosity, 400 °F (204 °C)	—	75 Poises (7.5 Pa-s)	ASTM D 2669 (modified in Subsection 868.2.01.C)
Flash point, C.O.C.	550 °F (285 °C)	—	AASHTO T 48

- b. Asphalt Properties: Use the filler-free material derived from the extraction and Abson recovery process explained in [Subsection 868.2.01.C](#).

	Min.	Max.	Test Method
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Penetration, mm 3.5 oz (100 g), 5 sec., 77 °F (25 °C)	25	—	AASHTO T 49
Viscosity, 275 °F (135 °C)	12 Poises (1.2 Pa-s)	—	AASHTO T 202

Viscosity ratio, 275 °F (135 °C)	—	2.2	See Subsection 868.2.01.C
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- c. Filler Properties: Use the filler separation techniques described in [Subsection 868.2.01.C](#).

	Min.	Max.	Test Method
Filler content, percent by weight	50	75	See Subsection 868.2.01.C
Filler fineness, percent passing			
No. 325 (45 µm)	75		ASTM C 430 (modified in Subsection 868.2.01.C)
No. 200 (75 µm)	95		
No. 100 (150 µm)	100		

- d. Certification: Submit a certification from the manufacturer that includes the physical properties of the bituminous adhesives and that the material conforms with this Specification, as stated in [Subsection 106.05](#),

“Materials Certification”

2. Packaging and Labeling
 - a. Pack the adhesive in a self-releasing cardboard container of approximately 10 in (250 mm) that can be stacked properly.
 - b. Fill the containers with two 30 lb (13.5 kg) cubes that have a net weight of 60 lbs (27 kg).
 - c. Put the manufacturer, quantity, and batch number on the label.
 - d. Print “Bituminous Adhesive for Pavement Markers” on the label.

G. Fabrication

General Provisions 101 through 150.

H. Acceptance

1. Flow

Determine flow according to Section 6, Flow, of ASTM D 3407.

 - a. Set the oven temperature at 158 ° ± 2 °F (70 ° ± 1 °C).
 - b. Prepare samples according to Subsection 7.1 of AASHTO T 49.
2. Viscosity

Determine viscosity according to ASTM D 2669 using a spindle speed of 10 rpm.

 - a. Heat the adhesive to approximately 410 °F (210 °C) and then let cool.
 - b. Determine viscosity at 400 ° ± 1°F (204 ° ± 0.6 °C).
3. Asphalt Properties

Determine the base asphalt properties based on the material obtained from the following extraction and Abson recovery methods:

- a. Extract the asphalt by heating the adhesive to the point where it will easily flow.
 - b. Add 125 to 150 g of adhesive to 400 mL of trichloroethylene that has a temperature of 125 ° to 150 °F (51 ° to 66 °C).
 - c. Stir the mixture to dissolve the asphalt.
 - d. Decant the trichloroethylene-asphalt mixture.
 - e. Recover the asphalt using the Abson recovery method described in ASTM D 1856, except do not use the extraction methods of ASTM D 2712, and do not filter the solvent-asphalt mixture.
 - f. Centrifuge the extraction solution of trichloroethylene and asphalt for at least 30 minutes at 770 times gravity in a batch centrifuge.
 - g. Decant the solution into a distillation flask. Do not include any filler sediment.
 - h. Apply heat and bubble carbon dioxide slowly until the solution reaches a temperature of 300 °F (149 °C).
 - i. Increase the carbon dioxide flow to between 800 to 900 mL per minute.
 - j. Maintain the decanted solution temperature between 320 ° and 335 °F (160 ° and 168 °C) with this carbon dioxide flow for at least 20 minutes and until the trichloroethylene vapors are completely removed from the distillation flask.
 - k. Repeat the extraction-recovery method as necessary to obtain the desired quantity of asphalt.
 - l. Determine penetration, 275 °F (135 °C) viscosity, and viscosity ratio with the recovered asphalt.
4. Viscosity Ratio
Determine the 275 °F (135 °C) viscosity ratio by comparing the 275 °F (135 °C) viscosity on the base asphalt before and after the Thin-Film Oven Test.
- a. Perform the Thin-Film Oven Test as described in ASTM D 1754.
 - b. Determine the specific gravity with a pycnometer as described in ASTM D 70 for use in the Thin-Film Oven Test.
 - c. Calculate the 275 °F (135 °C) viscosity ratio by dividing the viscosity after the Thin-Film Oven Test by the original 275 °F (135 °C) viscosity.
5. Filler Material
Separate the filler material from the asphalt to determine filler content and filler fineness.
- a. Filler Content
 - 1) Determine the portion by weight of the adhesive that is insoluble in 1, 1, 1-trichloroethane by weighing 10.00 ± 0.01 g of solid adhesive into a centrifuge flask with a volume of approximately 100 mL, as specified in ASTM D 1796.
 - 2) Add 50 mL of 1, 1, 1-trichloroethane to the adhesive.
 - 3) Break the adhesive into small pieces to dissolve the solids.
 - 4) Place the sample flask in a balanced centrifuge and spin with a minimum relative centrifugal force of 150 (as determined in Section 6 of ASTM D 1796) for 10 minutes.
 - 5) Remove the sample flask and decant the solvent, without losing any solids.
 - 6) Repeat the application of solvent and centrifuging until the solvent is clear and the filler is visually free of asphalt.
 - 7) Dry the filler at 160 °, ± 5 °F (71°, ± 3 °C) to remove solvent and weigh the resulting filler.
 - 8) Filter the decanted solvent to verify that no filler was lost.
 - 9) Calculate the percent filler content as follows:

$$\text{Filler Content, \% by weight (g)} = \frac{\text{Filler Wt. (g)} \times 100}{\text{Original Adhesive Wt. (g)}}$$

b. Filler Fineness

- 1) Determine filler fineness according to ASTM C 430, using No. 325 (45 μm), No. 200 (75 μm), and No. 100 (150 μm) sieves.
- 2) Modify this method by using a water-soluble, non-ionic wetting agent, such as Triton X-100, to aid the wetting action. Use a surfactant solution that is approximately 1 percent by weight.
- 3) Thoroughly wet the 1-gram dry sample in the surfactant solution.
- 4) Soak the sample for 30 minutes.
- 5) Transfer the filler to the sieve cup.
- 6) Spray water on the filler for two minutes.
- 7) Add surfactant solution as needed and physically disperse clumped particles.
- 8) Dry the sample and handle as directed in ASTM C 430.

The Department will reject any bituminous adhesive if it meets all requirements of this Specification but fails in actual use.

I. Materials Warranty

General Provisions 101 through 150.

END OF SECTION

Section 870—Paint

870.1 General Description

This section includes the requirements for all paints, including pigments, vehicles, and the compositions of prepared paints for all purposes specified.

870.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150

B. Referenced Documents

QPL 46

SOP 14

AASHTO M 69

Military Specifications MIL-E-698 B

MIL-P-23236 or US Corps of Engineers Specification C-200

Federal Test Methods, Standard No. 141

Federal Specifications		ASTM			
TT-E-489	TT-P-791a	D 209	D 476	D 768	D 3021
TT-P-103b	TT-P-1952B	D 211	D 600	D 822	D 3721
TT-P-104b	TT-R-266	D 234	D 602	D 1199	D 4462
TT-P-320c	TT-T-291	D 235	D 604	D 1648	E 97
TT-P-460	TT-V-119	D 263	D 605	D 2805	G 23
		D 324	D 711		

870.2 Materials

A. Requirements

1. Ingredients

The Engineer shall approve all paint ingredients. Mix the paints in the proportions specified in this section for each kind of paint. The formulas given represent the proportions by weight of the materials to be used.

2. Condition of Mixed Paints

Ensure that mixed paints do not liver or curdle, and that the pigments remain in suspension to a reasonable degree satisfactory to the Engineer.

3. Filling and Packaging

The manufacturer shall strain paints before filling the containers. The manufacturer also shall ship paints in strong, substantial containers (according to QPL 46) plainly marked with the paint name and number, color, volume, manufacturer name and address, date of manufacture, and the manufacturer's lot number on every package. The inspection stamp on the paint container will be evidence of approval.

Traffic line paint manufactured for the Department shall be delivered in 55 gallon (208 L) drums. The manufacturer shall stencil on the head of each drum the kind of paint, requisition number, purchase order number, and gross and net weights. Ensure that the drums are the removable head types.

4. Finished Paints

Section 886—Epoxy Resin Adhesives

886.1 General Description

This section includes the requirements for all epoxy adhesives used in highway construction or maintenance.

886.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO T 237

ASTM 2240

Federal Hazardous Products Labeling Act

GDT 58

QPL 15

886.2 Materials

886.2.01 Epoxy Resin Adhesives

A. Requirements

1. Use the types of epoxy adhesives below:
 - a. Type I-R: Rapid-setting marker adhesive for bonding raised pavement markers to pavement.
 - b. Type I-S: Standard setting marker adhesive for bonding raised pavement markers to pavement.
 - c. Type II: Epoxy adhesive for bonding plastic concrete to hardened concrete.
 - d. Type III: Epoxy adhesive for bonding hardened concrete to hardened concrete, or for bonding miscellaneous materials such as metals.
 - e. Type IV: Epoxy adhesive for creating an epoxy mortar for use with clean concrete or mortar sand.
 - f. Type V: Epoxy adhesive for repairing cracks in concrete by intrusion grouting.
 - g. Type VI: Epoxy adhesive for a complete application or as a component in the application of a skid resistant or protective coating on hardened Portland cement concrete or asphaltic concrete.
 - h. Type VII: Discontinued.
 - i. Type VIII: Epoxy adhesive used for anchors and dowel bar implants. Either mix this epoxy by machine to the proper ratio or package it in a two-component cartridge with a mixing nozzle that thoroughly mixes the two components as they are dispensed. Use a nozzle at least 8 in (200 mm) long.
2. Furnish the epoxy adhesive as two separate components.
3. Viscosity

Ensure that the viscosities of the separate components are similar and conducive to easy blending of the epoxy adhesive system.

 - a. Submit the viscosity for the epoxy adhesive system to the Engineer.
 - b. Ensure that the viscosity of the mixed system is compatible with the intended use of the system.
4. Labeling

Clearly label each container of the separate components of an epoxy adhesive system with the following information:

Section 919—Raised Pavement Markers

868.8 General Description

This section includes the requirements for raised pavement marker materials for use in reflective, ceramic, and channel markers.

868.8.01 Related References

E. Standard Specifications

General Provisions 101 through 150.

F. Referenced Documents

ASTM C 424

ASTM C 373

ASTM D 2240

ASTM D 4280

Federal Method TT-T-141, Method 4252

868.9 Materials

J. Requirements

Do not use any marker materials until the laboratory approves it.

1. Use raised pavement marker sources as listed in [QPL 76](#).
2. Use raised pavement markers of the type shown in the Plans or specified in the proposal. This Specification references markers as follows:

Type	Description
1	One-way, one-color, 4 x 2 in (100 mm x 50 mm), reflective
2	Two-way, one-color, 4 x 2 in (100 mm x 50 mm), reflective
3	Two-way, two color, 4 x 2 in (100 mm x 50 mm), reflective
4	Round white, yellow or black ceramic, non reflective
5	Oval white, yellow or black ceramic, non-reflective
6	Oval white or yellow ceramic, reflective
7	White or yellow ceramic jiggle bar, non-reflective
8	White or yellow ceramic jiggle bar, reflective
9	White or yellow channel, non-reflective
10	White or yellow channel, reflective
11	Two-way, one-color, 4 x 4 in (100 mm x 100 mm), reflective
12	One-way, one color, 4 x 4 in (100 mm x 100 mm), reflective

13	Two-way, two color, 4 x 4 in (100 mm x 100 mm), reflective
14	Two-way, one color, flexible reflective
15	One-way, one color, flexible reflective

3. Definitions

- a. Angle of Incidence: Formed by a ray from the light source to the marker, and the normal to the leading edge of the marker face.
- b. Angle of Divergence: Formed by a ray from the light source to the marker and the return ray from the marker to the measuring receptor.
- c. Specific Intensity: The mean candela of the reflected light at a given incidence and divergence angle for each lux at the reflector on a plane perpendicular to the incident light.

4. Sampling

The Department will select at random the required number of markers for initial tests for each shipment or lot, as follows:

Reflective Markers	Ceramic Markers	Channel Markers
50	25	5

5. Certification

Submit a certification to the Engineer from the manufacturer showing the physical properties of the markers and their conformance to this Specification.

6. Packaging

Pack shipments in containers that are acceptable to common carriers.

- a. Pack the containers to ensure delivery in perfect condition.
- b. Clearly mark each package of pavement markers with the size, color, type, and lot number.
- c. You are liable to replace any damaged shipments.

7. Acceptance

The Department will give conditional approval to raised pavement markers evaluated by the National Transportation Product Evaluation Program (NTPEP), the Georgia Department of Transportation, or other Department-approved test facilities and place them on [QPL 76](#).

All white raised pavement markers must meet the requirements of this Specification and the following field performance requirements.

- a. Conditional [QPL](#) Placement: The Department may add markers on a conditional basis to [QPL 76](#). These markers must maintain an average Coefficient of Retroreflected Luminous Intensity of 1.5 candles per footcandle (cd/fc)* after a one-year field evaluation period through at least one of the test facilities specified above.
- b. Final Acceptance or Rejection: The Department will accept or reject markers based on the marker maintaining an average Coefficient of Retroreflected Luminous Intensity of 0.5 candles per footcandle (cd/fc)* after a two-year field evaluation period through at least one of the test facilities specified above.

NOTE: Measure the coefficient of retroreflected luminous intensity at the 0 degree incident angle and 0.2 degree divergence angle.

868.9.01 Reflective Pavement Markers

F. Requirements

Plastic reflective pavement markers are types 1, 2, 3, 11, 12, and 13 (rigid plastic reflective) and types 14 and 15 (flexible reflective).

4. Rigid Plastic Reflective Markers

- a. Use prismatic markers made with a methyl methacrylate or acrylonitrile butadiene styrene, a high-impact plastic shell filled with a mixture of inert thermosetting compound and filler material.
 - 1) Ensure that the exterior shell surface is smooth and contains one or two prismatic faces, molded to reflect incident light from a single direction or from opposite directions.
 - 2) Ensure that the shell is one color or a combination of two colors that will be the same as reflective elements and shall match the size and shape in the Plans.
- b. Use two basic sizes—a standard (a base of 4 x 4 in [100 mm x 100 mm]) or a low-profile (a base of 4 x 2 in [100 mm x 50 mm]).
 - 1) Ensure that reflective raised pavement markers have one or two lens surfaces that meet the requirements of ASTM D 4280, designation H—a marker with a hard, abrasion-resistant lens surface.
 - 2) Ensure the marker base is clean and has no gloss or substance that may reduce the adhesive’s bond. The Department will reject the marker if it has a soft or resin-rich film on the base.

5. Flexible Reflective Markers (Type 14 and 15)

Use markers manufactured by extruding plastic into an “L” shape, with nominal dimensions of 4 in (100 mm) long x 2 in (50 mm) high (vertical face) x 1 in (25 mm) wide (base leg). Ensure that the markers have the following:

- A pressure-sensitive adhesive with a paper release liner to the bottom of the base leg.
- Strips of metallized acrylic reflective sheeting on either one or both sides of the vertical face.
- A clear plastic cover to protect the reflective strip. Ensure that the cover withstands a chip-seal operation and is easily removed after the operation.

6. Color

Use clear, yellow, or red raised reflective pavement markers, as required. If the reflection is off-color, the Department will reject the markers.

7. Specific Intensity

Ensure that the specific intensity of each reflective surface, when tested at 0.2 degree angle of divergence, has at least these values:

Incidence Angle	Clear	Yellow	Red
------------------------	--------------	---------------	------------

0°	3.0	1.50	0.75
20°	1.2	0.60	0.30

Calculate the intensity as

$$\text{follows: } SI = \frac{R_L}{D^2} \times I_L$$

Where:

SI = Specific Intensity

I_L = Incident Light

R_L = Reflected Light

D = Test Distance

G. Fabrication

General Provisions 101 through 150.

H. Acceptance

The Department will accept markers based on the results of the physical tests and on the manufacturer's certification showing the physical properties of the markers and their conformance to this Specification.

The Department will conduct the following tests:

- Specific Intensity
- Compressive
- Strength Impact
- Temperature Cycle
- Shore A Hardness (Type 14 and 15 only)

1. Specific Intensity

- a. Place markers so the center of the reflecting face is 5 ft (1.5 m) from a uniformly bright light source. Use a source with an effective diameter of 0.21 in (5 mm).

If using a test distance other than 5 ft (1.5 m), modify the source and receptor in the same proportion as the test distance.

- b. Use a photocell receptor 0.5 in (13 mm) wide. Shield it to eliminate stray light.
- c. Place the center of the light source aperture 0.2 in (5 mm) from the center of the photocell.
- d. Use the following table to determine if the markers pass the tests (except the strength test), unless otherwise specified.

Markers that Pass	Department Action
48 of 50	Accept the lot.
44 or less of 50	Reject whole lot; no retest allowed.
45-47 of 50	Contractor can request a retest on 100 markers. The Department will pass each marker through all tests except the strength test.

96 of 100 retested	Accept the whole shipment
95 or less of 100 retested	Reject the whole shipment

2. Compressive Strength

Test for compressive strength as follows:

Standard Raised Markers 4 x 4 in (100 x 100 mm)	Low-Profile Markers 4 x 2 in (100 x 50 mm)
1. Select three random markers for the test.	
2. Center the base of the marker over the open end of a hollow, vertically positioned metal cylinder (1 in (25 mm) high, internal diameter of 3 in (75 mm), wall thickness of 0.25 in (6 mm)).	2. Position the marker on its base at the center of a flat, steel plate that has a minimum thickness of 0.5 in (13 mm).
3. Apply a load to the top center of the marker with a 1 in (25 mm) diameter solid steel plug at a rate of	
0.2 in (5 mm) per minute.	0.03 in (0.75 mm) per minute.
4. The marker fails if it breaks or deforms at a load less than	
2,000 lbs (8.9 kN)	4,000 lbs (17.8 kN)
Or if the shell and the filler material significantly delaminate, regardless of the load required to break the marker.	
8. If any of the 3 samples fail, the Department will test 6 additional samples.	
9. If any of the 6 additional samples fail, the Department will reject the entire lot.	

3. Impact Test

- a. Condition all prismatic reflective faces that meet the requirements of ASTM D 4280, designation H, before the impact test.
- b. Choose at random 20 markers for each test.
- c. Condition the markers in an oven at 130 °F (54° C) for one hour.
- d. While at this temperature, drop a 0.42 lb (0.2 kg) dart fitted with a 0.25 in (6 mm) radius spherical head from

18 in (450 mm) above the reflective face.

- e. Drop the dart perpendicularly onto the center of the reflective surface. The cracks in the impact area shall appear generally concentric.
- f. The Department will reject the marker if more than two radial cracks longer than 0.25 in (6 mm) appear, or if radial cracks extend to the edge of the reflective face.
- g. Use the following table to determine if the markers pass the tests.

Markers that Pass	Department Action
18 of 20	Accept the lot.
16 of 20	Reject the lot.
17 of 20	The Contractor may request a retest. The Department will test 20 additional lenses.

19 or less of 20 retested	Reject the lot.
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4. Temperature Cycle

- a. Subject the same markers used for impact testing to 3 cycles of 140 °F (60 °C) for 4 hours followed by 20 °F (–7 °C) for 4 hours.
- b. The Department will reject the markers if they crack or delaminate after this test.
- c. Use the following table to determine if the markers pass the tests.

Markers That Pass	Department Action
18 of 20	Accept the lot.
16 of 20	Reject the lot.
17 of 20	The Contractor may request a retest. The Department will test 20 additional lenses.
19 or less of 20 retested	Reject the lot.

5. Hardness (Type 14 or 15 only)

- a. Select five random markers.
- b. Use ASTM D 2240 to determine the Shore A hardness.
- c. Measure the hardness. The Department will reject markers whose body and clear protective cover hardness is less than 80.

I. Materials Warranty

General Provisions 101 through 150.

868.9.02 Ceramic Pavement Markers

A. Requirements

Ceramic pavement markers are types 4, 5, 6, 7, and 8.

- 1. Use ceramic pavement markers made from a heat-fired, white, vitreous, ceramic base and a heat fired, opaque, glazed surface to produce the properties required in these Specifications.
 - a. Do not place glaze on the marker bottom where it connects to the road surface.
 - b. Thoroughly and evenly mature the markers. Ensure that they have no defects that affect appearance and serviceability.
 - c. Use reflective ceramic markers that meet the specific intensity of each reflective surface according to

[Subsection 919.2.01.A.4.](#)

- d. Ensure that the mean thickness of the glazed surface is at least 0.005 in (0.13 mm) when measured at least 0.25 in (6 mm) from the edge of the marker.
- e. Ensure that the water absorption of the ceramic markers does not exceed 2 percent of the original dry weight when tested according to ASTM C 373.
- f. Ensure that the glazed surface does not craze, spoil, or peel when passed through one cycle of the Autoclave test at 250 psi (1724 kPa) (ASTM C 424).

2. Use the designated colors for the white and yellow markers.
 - a. Ensure that the colors are uniform.
 - b. Ensure that black matches Federal Color No. 595-27038.
 - c. Determine the color by visually comparing each marker with calibrated standards having CIE Chromaticity Coordinate limits. Determine the limits with Federal methods of test TT-T-141, Method 4252, using a rectangle with the following corner points:

	1		2		3		4		(90MGO)
White	.290	.316	.310	.296	.330	.320	.310	.344	80 min.
Yellow	.435	.485	.445	.435	.544	.456	.516	.484	50 min.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

1. Use a random sample of five markers for each of the required tests in [Subsection 919.2.01.C.3](#) to [Subsection 919.2.01.C.4](#), and [Subsection 919.2.01.C.5](#). Use the Compressive Strength Test in [Subsection 919.2.02.C.3](#).
2. Use the following table to determine if the markers pass the tests.

Markers that Pass	Department Action
5 of 5	Accept the lot.
3 or less of 5	Reject the lot; no resample allowed.
4 of 5	The Contractor may request a retest. The Department will retest an additional 25 random markers in the test or tests where the original sample failed.
20 of 25 retested	Accept the lot.
19 or less of 25 retested	Reject the lot; no resample allowed.

3. Compressive Strength Test
 - a. Center the markers with the base down over the open end of a vertically positioned hollow metal cylinder. Use a cylinder 1 in (25 mm) high with an internal diameter of 3 in (75 mm) and a wall thickness of 0.25 in (6 mm).
 - b. Apply a load at 0.2 in (5 mm) per minute to the top of the markers through a 1 in (25 mm) diameter solid metal cylinder centered on the top of the markers.
 - c. Apply the load until the marker breaks.
 - d. The markers pass if the average compressive load of all five markers is at least 1,500 psi (6.7 kN). No individual marker shall be less than 1,200 psi (5.3 kN).

D. Materials Warranty

General Provisions 101 through 150.

868.9.03 Channel Pavement Markers

A. Requirements

Channel pavement markers are type 9 and 10 markers only.

1. Use channel pavement markers made of either a heat-fired, white, vitreous, ceramic base with a heat-fired, opaque, glazed surface, or a 9 gauge (3.9 mm) steel body with a heat-fired porcelain finish.
 - a. Ensure both ceramic and steel channel markers have no defects that affect appearance and serviceability.
 - b. Ensure that the mean thickness of the glazed surface of ceramic channel markers is at least 0.005 in (0.13 mm) when measured at least 0.25 in (6 mm) from the edge of the marker.
 - c. Ensure that mean thickness of the porcelain finish on the steel channel markers is at least 0.030 in (0.76 mm).
 - d. Ensure that the water absorption of the ceramic markers does not exceed 2.0 percent of the original dry weight when tested according to ASTM C 373.
 - e. Ensure that the surface of the markers do not craze, spoil, or peel when passed through one cycle of the Autoclave test at 250 psi (1724 kPa) (ASTM C 424).
2. Use the designated colors for the white and yellow markers.
 - a. Ensure that the colors are uniform.
 - b. Determine the color by visually comparing them with calibrated standards having CIE Chromaticity Coordinate limits. Determine the limits with Federal methods of test TT-T-141, Method 4252, using a rectangle with the following corner points:

	1		2		3		4		(90MGO)
White	.290	.316	.310	.296	.330	.320	.310	.344	80 min.
Yellow	.435	.485	.445	.435	.544	.456	.516	.484	50 min.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

1. Ensure that Type 10 markers meet the specific intensity of each reflective surface according to [Subsection 919.2.01.A.4](#)
2. Use a random sample of five markers for each of the required tests in [Subsection 919.2.01.C.2](#), [Subsection 919.2.01.C.3](#), [Subsection 919.2.01.C.4](#), and [Subsection 919.2.01.C.5](#).
3. Select two of the five markers and subject them to all the required tests.
4. Use the following table to determine if the markers pass the tests.

Markers that Pass	Department Action
2 of 2	Accept the lot.
0 of 2	Reject the lot; no resample allowed.

1 of 2	Retest the three remaining markers.
3 of 3 retested	Accept the lot.
2 or less of 3 retested	Reject the lot; no resample allowed

D. Materials Warranty

General Provisions 101 through 150.

END OF SECTION

General Notes:

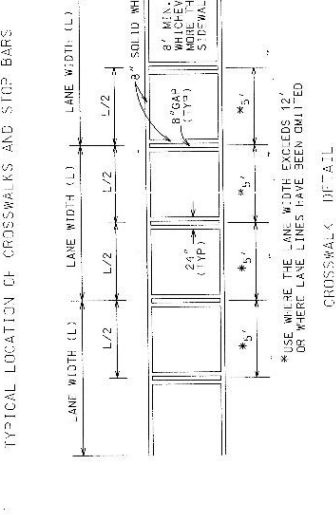
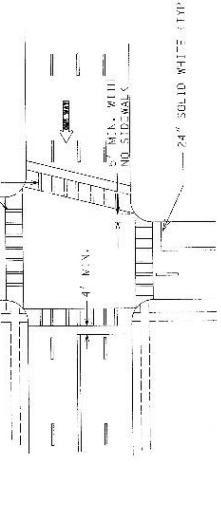
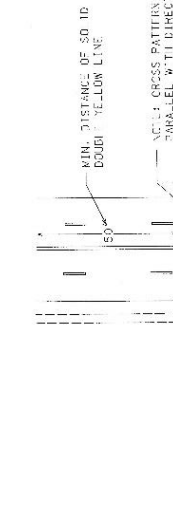
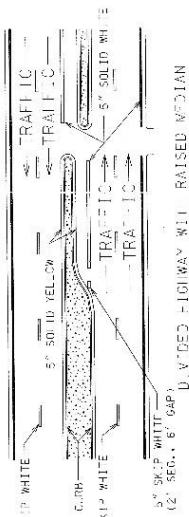
1. The contractor shall verify all utility locations prior to construction, by calling the Utility Protection Center.
2. The contractor will be responsible for coordinating any utility relocations before work begins on said affected roadways.
3. The contractor shall be responsible for furnishing all labor, material; equipment and incidental items needed to provide adequate construction signing, barricades, traffic control devices and other related items for the project area, during the construction period.
4. The contractor shall provide reasonable access to residential, commercial and public properties in the project area. During construction, traffic may be restricted to local traffic, only with approval of the Traffic Engineer.
5. Any surplus excavation shall become the property of the contractor, and disposal shall be the contractor's responsibility at no additional cost.
6. The contractor shall backfill behind replaced curbs as needed.
7. The contractor shall level all disturbed areas with topsoil and hand rake to a uniform appearance.
8. All work shall be done according to the Macon Bibb County provided specifications.
9. Contractor shall be paid at unit bid prices unless otherwise designated.
10. All patches shall be milled to a depth of 5" below grade, compacted and filled with 12.5mm Superpave asphalt.
11. Small patches shall be compacted by use of slide tamp or by hand tamping. Vibratory roller shall be used on larger patches.
12. Macon-Bibb County reserves the right to delete any street from this contract.
13. Some streets may have concrete, brick or cobble stone under the existing asphalt.
14. As time is of the essence the contractor agrees to begin work immediately upon receipt of the "Notice To Proceed" and keep work in progress until the completion of said contract.
15. For patches deeper than 5", contractor shall fill in the patch with G.A.B.C., compact with adequate compacting device to 98% dry density and install 5" 12.5mm Superpave asphalt. Extra G.A.B.C. shall be paid by the unit bid price only.
16. Milling asphaltic concrete pavement, measured as specified, will be paid for at the Contract Unit Price bid per ton. The price bid for this item includes the credit value of all Reclaimed Asphalt Pavement (RAP) recovered, and no adjustment in the unit price for this item or other items will be considered for variations in the amount of RAP actually recovered. Payment is full compensation for furnishing equipment, milling, hauling, stockpiling milled material, and satisfactorily performing the work.
17. The contractor shall obtain permission for all storage on private property. Materials

stored on Macon-Bibb County right of way must be permitted by the appropriate authority (Macon-Bibb Engineering & Macon-Bibb Sheriff's Offices).

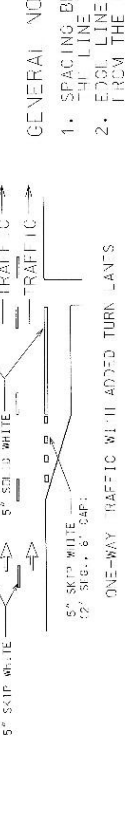
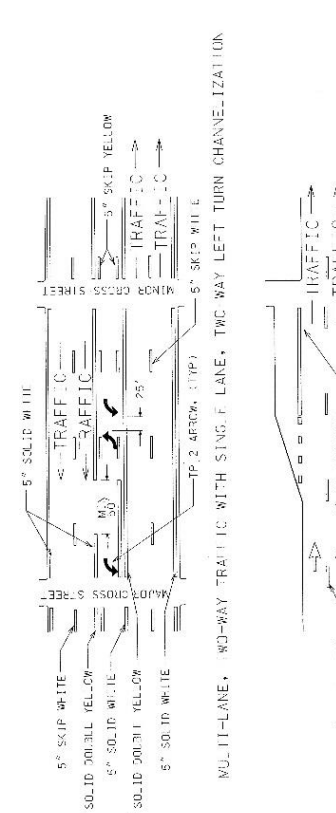
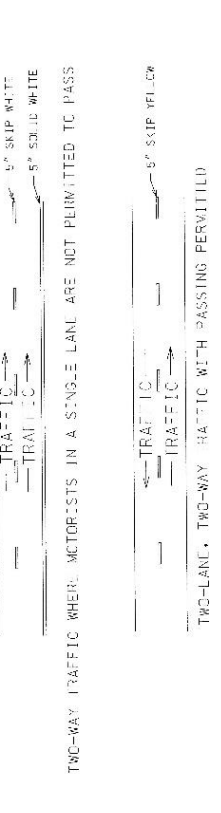
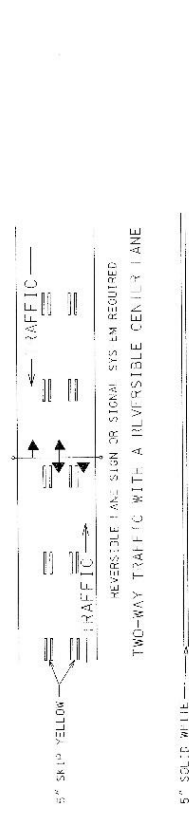
18. Macon-Bibb County will not incur any liability for any of the contractor's stolen or damaged property while stored on public right of way.
19. The contractor will be responsible for the replacement of any traffic loops damaged during the execution of this contract. See attached loop installment detail.

END OF SECTION

STATE	PROJECT NUMBER	DISTRICT NO.	SHEET NO.
GA.			



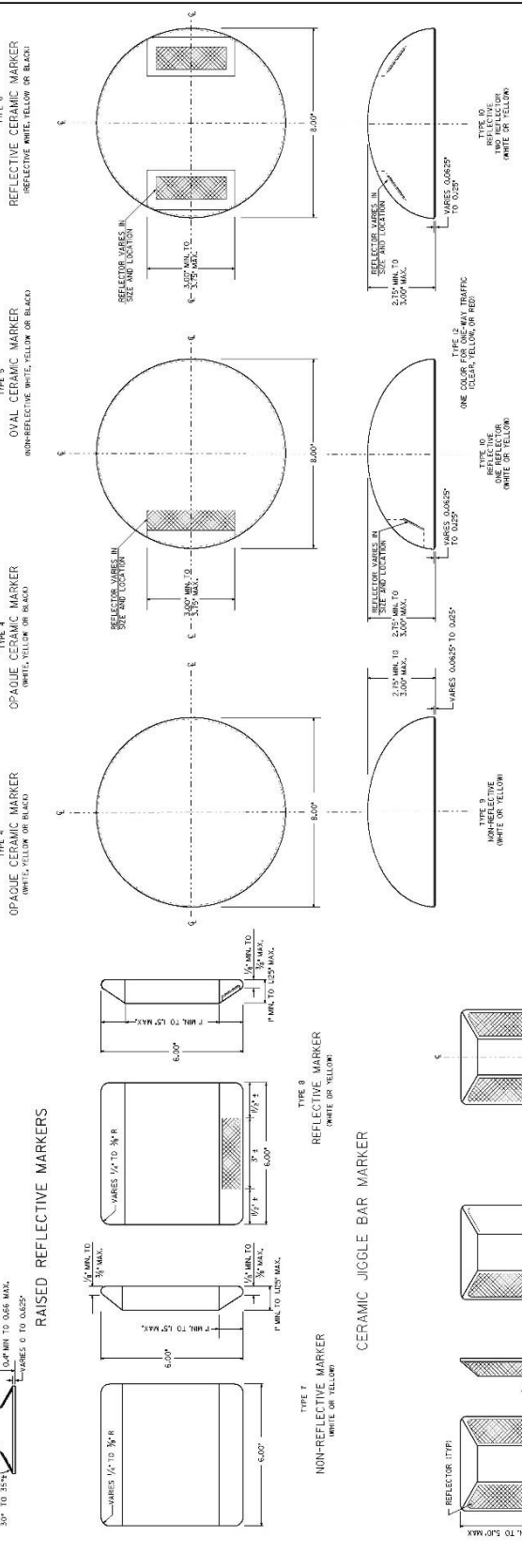
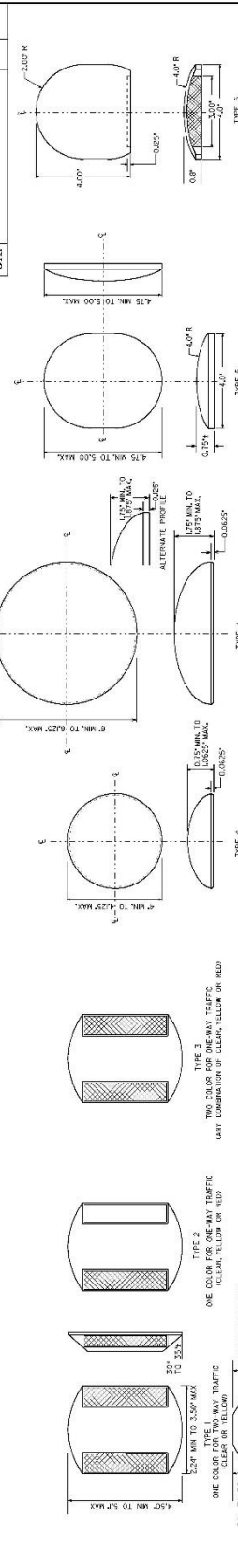
DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF RAFFIC SAFETY & DESIGN
		DETAILS OF PAVEMENT FOR LIMITED ACCESS ROADWAY
		NO SCALE
		JANUARY 2000



GENERAL NOTES:

1. SPACING BETWEEN DOUBLE LINES SHALL BE EQUAL TO THE LINE WIDTH.
2. EDGE LINES SHALL BE PLACED A MINIMUM OF 4 INCHES FROM THE NORMAL EDGE OF PAVEMENT.

STATE	PROJECT NUMBER	DESIGN NUMBER	SHEET NO.	TOTAL SHEETS
G.A.				



CERAMIC CHANNEL MARKER

TYPE 11
NON-REFLECTIVE MARKER
(WHITE OR YELLOW)
VARIES 1/2" TO 3/4" R
6.00" MIN. TO 1.5" MAX.
1/4" MIN. TO 3/8" MAX.

TYPE 12
ONE COLOR FOR ONE-WAY TRAFFIC
(CLEAR, YELLOW OR RED)
VARIES 1/2" TO 3/4" R
6.00" MIN. TO 1.5" MAX.
1/4" MIN. TO 3/8" MAX.

ALTERNATE RAISED REFLECTIVE MARKERS

TYPE 13
ONE COLOR FOR ONE-WAY TRAFFIC
(CLEAR, YELLOW OR RED)
VARIES 1/2" TO 3/4" R
6.00" MIN. TO 1.5" MAX.
1/4" MIN. TO 3/8" MAX.

TYPE 14
ONE COLOR FOR ONE-WAY TRAFFIC
(CLEAR, YELLOW OR RED)
VARIES 1/2" TO 3/4" R
6.00" MIN. TO 1.5" MAX.
1/4" MIN. TO 3/8" MAX.

GENERAL NOTES:

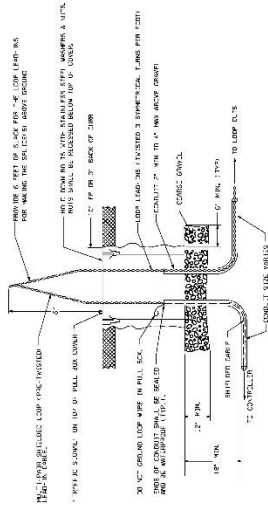
- SPECIFICATIONS GEORGIA STANDARD, CURRENT EDITION, AND SUPPLEMENTS THERE TO.
- THE CONTRACTOR SHALL USE PASSED PATENT MARKER SOURCES AS LISTED IN O.P.S.
- COLORS FOR REFLECTIVE MARKERS SHALL BE EITHER CLEAR, YELLOW, OR RED AS SPECIFIED.
- THE SHAPE OF THE REFLECTIVE MARKERS SHALL BE OF ONE COLOR OR OF A COMBINATION OF TWO COLORS WHICH SHALL BE THE SAME AS THE REFLECTIVE ELEMENT.
- THE SURFACE OF OPAQUE CERAMIC MARKERS SHALL BE GLAZED AND OF THE COLOR SPECIFIED IN THE PLANS WITH A WHITE, VITREOUS GLOSS FINISH.
- COLORS FOR ALL RAISED PAVEMENT MARKERS SHALL BE AS SPECIFIED IN THE PLANS.

DATE	REVISIONS
12/27/11	REVISED PER GEORGIA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2011 EDITION, SECTION 310.01

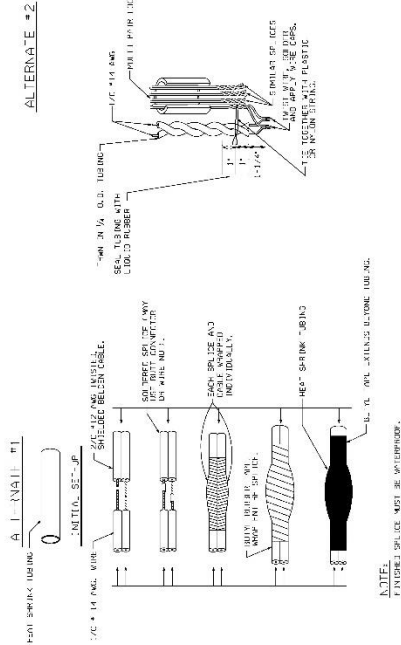
GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF TRAFFIC SAFETY & ACTION
DETAILS OF RAISED PAVEMENT MARKERS
NO SCALE
JANUARY 2000

STATE	CAL.	COUNTY	PROJECT NUMBER	SHEET	TOTAL SHEETS
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PULL BOX-SPLICE DETAILS



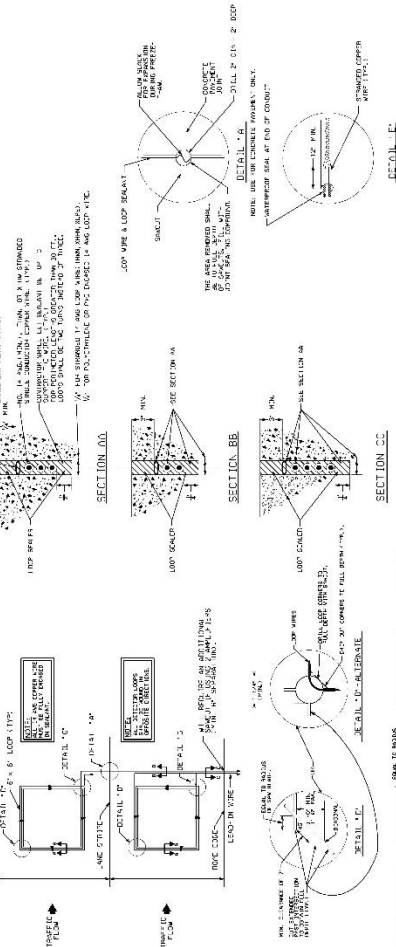
SPLICE DETAILS



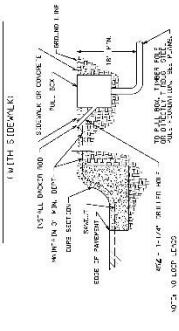
DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA	
TRAFFIC SIGNAL DETAIL	DETAIL NUMBER
INDUCTIVE-LOOP	TS-01
DETECTOR INSTALLATION	
REV. 07/10	APRIL 2010
	REVISED DETAIL NUMBER

**INDUCTIVE LOOP VEHICLE DETECTOR WIRE
USING STRANDED COPPER WIRE**

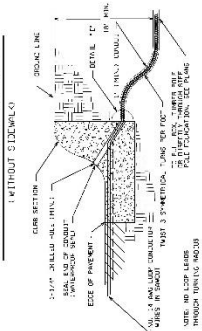
PLAN VIEW OF STANDARD LOOP SAW CUTS



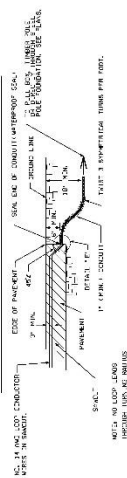
TYPICAL CURB DETAIL WITH SIDEWALK



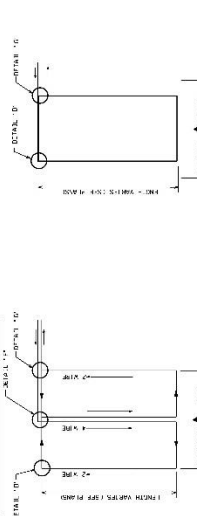
TYPICAL CURB DETAIL WITHOUT SIDEWALK



DETAIL WHERE NO CURB EXISTS



PLAN VIEW OF STANDARD LOOP WIRE CONFIGURATION



NOTES:
1. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
2. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
3. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
4. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
5. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
6. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
7. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
8. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
9. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.
10. THE LOOP WIRE SHALL BE INSTALLED AS SHOWN.

2023 General Fund Paving Projects for Macon-Bibb County

(Roadway Repair and Resurfacing)

Bid Schedule – Main Streets

The quantities listed below are an approximate estimate of the materials required to complete the roadway repair and resurfacing projects for the Main Streets list. The “Total Base Bid Price” is the bid amount which shall be used to award the 2023 General Fund Paving contract to the successful bidder.

Prior to beginning contract paving work on the main streets, the successful bidder will also be required to contact Mike Beard, with the Macon Water Authority, at (478) 256-9382, regarding locating / marking sanitary manholes. Also, contact Willie Sidney, with the Macon Water Authority, at (478) 256-9400, regarding locating / marking water valves.

The successful bidder must also contact Marvin Land or Monte Tolleson with the Macon Water Authority Storm Water Utility office, at (478) 738-6520, regarding locating / marking storm water manholes.

The 150-day contract period will proceed upon the successful bidder receiving the “Notice to Proceed” from our Procurement Office.

Please note that the bituminous tack quantity and the count of manholes and water valves, below, is provided only as information for bidders. The bidder is to include the cost of these items in his overall bid price. Do not include a subtotal cost for these items, below.

PROJECT BID: (MILLING, PATCHING AND RESURFACING):

Main Streets – Franklin Street Lane, Willow Street, Willow Street, Franklin Street, Derby Lane, Carrington Circle, Carriage lakes Court, Carriage Way, Hunter’s Hill Court, Saddle Run Court, Lee Lane, Jennifer Way, Rivoli Ridge Drive, West Breckinridge, North Wellington, East Breckinridge, Casablanca Drive, Hubbard Road, Weaver Road, Andrea Drive, Lawrence Court, Trudie Lane, School Road, Liberty Church Road, Susan Way, Wilson Way, Swymer Drive, Oney Drive, Sunset Drive, Sorrell Drive, Sandy Drive, Whippoorwill Drive, Bobby Court, Bobby Drive, Tiffin Court, North Pine Knoll Court, Ann Place, Atwood Drive, Atwood Drive, Hawkins Place, Carlo Avenue, Virgil Place, Evers Place, Atwood Circle, Chadwick Court, Chadwick Trail, Eastwick Court, Eastwick Place, Wray Place, Belmont Avenue, Jasmine Avenue, Winship Street, Pio Nono Lane, Bethel Drive, McKay Drive, Walker Road, Adkins Avenue, Chestney Street, Glen Hill Court, Rogers Road, Rogers Road, Presidential Parkway

Quantity	Unit	Item	Unit Price	Total
9,016	TONS	Milling	_____	_____
7,897	GAL	Bituminous Tack	N/A	N/A
13,162	SY	Roadway Patching	_____	_____
9,016	TONS	9.5 mm Superpave Asphalt	_____	_____
178	EA	Adjust Storm and Sanitary Sewer Manholes & Water Valves, as Needed	__N/A__	__N/A__
0	CY	GABC as needed for additional sub-grade excavation	_____	_____
5	EA	Traffic Control loop	_____	_____
8.95	MILE	Striping (paint)	_____	_____
49	EA	Pavement markings (Arrows, thermoplastic)	_____	_____
789	LF	Pavement markings (Cross walks, thermoplastic)	_____	_____
438	LF	Pavement markings (Stop bars, thermoplastic)	_____	_____
54	LF	Pavement markings (Hatching, thermoplastic)	_____	_____
0	MILE	Raised pavement markers	_____	_____
Total Base Bid Price				_____

Road Name	From	To
Franklin Street Lane	Riverside Drive	Willow Street
Willow Street	Spring Street	Spring Street Lane
Willow Street	Franklin Street Lane	Spring Street
Franklin Street	Walnut Street	Riverside Drive
Derby Lane	Lake View Drive North	Cul-De-Sac
Carrington Circle	North Wellington	Cul-De-Sac
Carriage Lakes Court	Lake View Drive North	Cul-De-Sac
Carriage Way	Lake View Drive North	Rivoli Chase
Hunter's Hill Court	Lake View Drive North	Cul-De-Sac
Saddle Run Court	Lake View Drive North	Cul-De-Sac
Lee Lane	Witman Way	Cul-De-Sac
Jennifer Way	Witman Way	Cul-De-Sac
Rivoli Ridge Drive	Witman Way	Heritage Court
West Breckinridge	North Wellington	Cul-De-Sac
North Wellington	Forsyth Road	Cul-De-Sac
East Breckinridge	North Wellington	Cul-De-Sac
Casablanca Drive	Ronald Avenue	Hubbard Road
Hubbard Road	Weaver Road	2265 Address
Weaver Road	Hubbard Road	Lanier Heights Road
Andrea Drive	Hawkinsville Road	Dead End
Lawrence Court	Lawrence Drive South	Cul-De-Sac
Trudie Lane	School Road	William Way
School Road	Lawrence Drive South	Trudie Lane
Liberty Church Road	Vinson Road	White Pine Drive
Susan Way	Wilson Way	Jones Road
Wilson Way	Susan Way	J Drive South
Swymer Drive	Sunset Drive	Swymer Drive
Oney Drive	Matt Drive	School Road
Sunset Drive	School Road	Swymer Drive
Sorrell Drive	Sandy Circle	Cul-De-Sac
Sandy Drive	Sandy Circle	Cul-De-Sac
Whippoorwill Drive	Sandy Circle	Swymer Drive
Bobby Court	Cul-De-Sac	Cul-De-Sac
Bobby Drive	Hartley Bridge Road	Bobby Court
Tiffin Court	Tiffin Circle	Cul-De-Sac
North Pine Knoll Court	North Pine Knoll Drive	Cul-De-Sac
Ann Place	Atwood Drive	Cul-De-Sac
Atwood Drive	Evers Place	Hawkins Place
Atwood Drive	Brice Circle	Stacy Drive
Hawkins Place	Atwood Drive	Cul-De-Sac
Carlo Avenue	Hartness Street	Atwood Drive
Virgil Place	Carlo Avenue	Cul-De-Sac

Evers Place	Summerhill Drive	Atwood Drive
Atwood Circle	Atwood Drive	Atwood Drive
Chadwick Court	Chadwick Drive	Cul-De-Sac
Chadwick Trail	Bowman Road	Chadwick Drive
Eastwick Court	Chadwick Drive	Cul-De-Sac
Eastwick Place	Chadwick Drive	Cul-De-Sac
Wray Place	Moore Street	Cul-De-Sac
Belmont Avenue	Virginia Avenue	Oakland Avenue
Jasmine Avenue	Ninadel Drive	Oakland Avenue
Winship Street	Pio Nono Lane	East Dead End
Pio Nono Lane	Bethel Drive	Dunns Terrace
Bethel Drive	Pio Nono Avenue	Pio Nono Lane
McKay Drive	Williamson Road	Walker Road
Walker Road	McEvoy Drive	West Dead End
Adkins Avenue	Tamplin Terrace	Walker Road
Chestney Street	Mitchell Street	Dead End
Glen Hill Court	Forest Hill Road	Cul-De-Sac
Rogers Road	Repair at 5757 Rogers Lift 1	
Rogers Road	Repair at 5757 Rogers Lift 2	
Presidential Parkway	U.S. 80 to Log Cabin Dr.	5044 ft

Note: Shading in the above Roads table indicates roads within the same neighborhood.

