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| <b>OFFICE OF STATE AID ROAD CONSTRUCTION</b>                       |                            |  | S.O.P. NO. SA II-1-48   |
| <b>STANDARD OPERATING PROCEDURES</b>                               |                            |  | Page 1 of 20  |
| Subject: S.O.P. ESTIMATES, MONTHLY AND FINAL, WITH SUPPORTING DATA |                            |  | Distribution<br>A, B, C, D, E                                   |
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**PURPOSE:** To Establish Uniform Minimum Requirements for Keeping Systematic and Accurate Records Essential to Work Performed and Computation of Amounts Earned.

**REFERENCE:** Section S-109 of the Standard Specifications.

1. GENERAL:

On a day-to-day basis during construction of the project, systematic and accurate notes, sketches and other records are to be kept as a basis for payments in order that as the work is completed, factually supported progress payments can be made, and there will not be any delay in forwarding final plans of completed work and Final Estimate to the State Aid Office after all work has been completed.

Should the instructions contained in this or related S.O.P.'s conflict with any provision of the contract, the provisions of the contract are to be followed. When the County Engineer is confronted with the question as to what proper assumption to make, he will usually find the answer in the Standard Specifications, the contract documents contained in the Contractor's proposal or in other S.O.P.'s.

Each pay item in the contract carries a "Method of Measurement." Should any problem or indication of conflict arise, the Office Supervisor should be contacted by letter, with a copy to the State Aid Engineer.

THE TIME TO START WORK ON THE FINAL PLANS COINCIDES WITH THE TIME THE FIRST ACTIVITY IS PERFORMED.

The project diary must be started the first day engineering activities begin. The first and subsequent field notes made are a part of the data supporting the Final Estimate. See S.O.P. No. SA II-1-39 for specific information to be recorded in the project diary.

Do not trust to memory, but write down each day conditions and events as they occur. In short, data for the final plans should be completed as the work on the project progresses. Complete and up-to-date records are essential to the preparation of accurate progress and final estimates.

All measurements and bases of payment are to be in strict accordance with the Standard Specifications unless superseded by Supplemental Specifications, Plans, Special Provision(s), Notice(s) to Bidders or Supplemental Agreements. (Ref. Subsection S-105.04 for order of controlling documents.)

2. FOR MONTHLY PAYMENT:

Subsection S-109.06 provides the conditions under which a partial (monthly) estimate is to be made as a basis for progress payment to the Contractor. Subsection S-109.07 provides the basis upon which advance payments may be made as progress payments for certain stored or stockpiled non-perishable materials.

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Monthly estimates should not be based on work anticipated to be performed, but shall be made on the basis of work, which on the final day of the estimate period, has actually been satisfactorily completed.

In preparing partial estimates, the County Engineer must exercise good judgment on those contract items where, due to the nature of the work, the quantities allowed will only be approximate. On other contract items, the County Engineer will be able to determine reasonably accurate quantities (subject to re-check) to be allowed on partial estimates. However, regardless of whether the quantities are approximate or reasonably accurate, a documented record must be kept in the project files, and subject to review, of the method, procedure, and basis for determining any quantity which is allowed on partial estimates.

No payment will be made for amounts in excess of \$3,000.00 above the contract estimate for a single pay item nor for amounts in excess of \$10,000.00 above the contract estimate for multiple pay items unless supported by a construction change request approved by the State Aid Engineer. Construction change requests should be submitted promptly to assure payment to the contractor for work performed.

3. FOR PARTIAL FINAL PAYMENTS:

Should circumstances beyond the County Engineer's control delay completion of the final estimate, a current estimate should be submitted, using checked final quantities. Such an estimate is to be supported by an approved Construction Change Request and/or Supplemental Agreement for those quantities that exceed the limits shown above.

4. FOR FINAL PAYMENT:

4.1. General: Do not submit a final estimate to the Office of State Aid until all work has been satisfactorily completed and accepted by the State Aid Engineer.

Finals must be submitted as soon as possible after acceptance or release of maintenance on the project. Thirty days is considered to be ample time for completing the final plans on the basis that final data was accumulated, calculated and posted as items of work are completed during construction.

From the beginning of the project, it should be kept in mind that all final and supporting data should be readily legible and accurate. It is preferable that supporting data, where practicable, be typed; however, do not type readily legible data which is in proper form merely to submit as typed data.

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READABILITY AND ACCURACY ARE PREFERRED TO PERFECT FORMATION.

Using pens with black ink, unless another color is specified for the various phases, will expedite the work. (Refer to Section 15 of this S.O.P. for final plans).

4.2. Supporting Data: Supporting data (indexed to expedite checking) for the final estimate is to include the submission to the Office of State Aid of the following for each project:

4.2.1. Final Plans of Completed Work (Reduced to ½ scale) - (1 set)

4.2.2. Computations for earthwork volumes, subbase and base materials (If requested).

4.2.2.1. Computed Volume, if used, showing balancing of earthwork--(1 set) (If requested)

4.2.2.2. Computed Volume, if any, for volumes of other pay items--(1 set) (If requested)

4.2.3. Sketches and Computations, Charts, Ticket Books, Computer Print Outs, Miscellaneous Computer quantities ----- (1 set ea.) (If requested)

4.2.4. Contract Time Data Form ----- (1 copy)

4.2.5. Overrun and Underrun Statement --- (1 copy)

4.2.5.1. Amounts in excess of \$3,000.00 above the contract estimate for a single pay item and in excess of \$10,000.00 above the contract estimate for multiple pay items must be supported by a construction change request approved by the State Aid Engineer. The final estimate will not be paid until the supporting documentation is on file.

4.2.5.2. The County Engineer shall indicate his approval of the overrun/underrun statement by signing the document.

4.2.6. Project Diary ----- (1 copy for each contract)

4.2.7. County Engineer's Certificate of Completion (signed and notarized) ----- (1 copy)

5. SECTION S-100 - GENERAL PROVISIONS:

5.1. Force Account Work: All extra work must be authorized PRIOR to proceeding, and every effort should be made to foresee extra work before it becomes an emergency. When possible to foresee such extra work, agreements for execution of and compensation for the work should be worked out with the Contractor, either on a unit price basis, which requires the execution of the Supplemental

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Agreement, or by Force Account when a unit price cannot be agreed on. The latter requires a written Force Account Agreement. These forms shall be executed by such parties and officials as indicated. Except in cases of emergencies, prior approval of Supplemental Agreement or Force Account Agreement shall be made before any extra work is started. In case of an emergency, verbal authority shall be obtained from the State Aid Engineer before starting the work. Force Account Agreements covering emergency work shall be prepared at once and the EMERGENCY so indicated; that is, the words "Emergency Work" shall be typed at the top of the page and the last sentence on the form modified to read, "The above proposal is hereby accepted for construction as verbally agreed to and authorized on date."

The County Engineer should prepare an estimate of the quantities and submit it to the Contractor for unit prices, or if the extra work is to be by Force Account, have him submit schedule of labor rates, unit prices of materials, and equipment rental rates. He should be certain that all classes of labor, types and rating of equipment, and kinds and prices of material are included.

If it is possible, but not certain, that some classes of labor or kinds of material and equipment will be used, they should be included.

Agreements for proposed force account work are to be submitted promptly with the Standard Construction Change Request, for by prompt submission, a decision can be reached before the proposed work becomes an emergency and thus avoid the necessity of special action.

Should conditions require classes of labor, material or equipment not previously covered, a supplemental form should be submitted for approval.

5.2. Force Account Statement: Force account statements and supporting documents shall be submitted promptly with the next current monthly estimate after the work covered in the Agreement has been completed. This form states "... as per agreement previously entered into in writing...." This form should be completed as follows:

5.2.1. Labor: Have the Contractor submit a time roster, showing names, classification, dates, hours worked, and rate per hour for all labor used. The names of employees, classifications, dates worked, and rates must agree with the Contractor's payrolls. The hours shall represent the actual time devoted to the item of work. No claim may be made for a superintendent's time. Time and one-half or overtime may be allowed only when it is essential and to the County's advantage. The County Engineer shall add and sign the following certificate to the Contractor's time roster:

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"I hereby certify that the foregoing has been checked against the Contractor's payrolls and find that the classification and rates as shown are correct, and that the hours shown hereon represent the actual time devoted by the respective individuals in performing the authorized Force Account Work; and that the overtime shown was necessary to complete the work promptly and was to the advantage of the County."

\_\_\_\_\_ County Engineer

When transferring labor charges from time rosters to the Force Account Statement, total the number of hours worked by the various classifications of labor and the various rates and show as follows:

Labor, Teams and Foreman

| <u>NUMBER AND KIND</u>  | <u>HOURS<br/>WORKED</u> | <u>HOURLY<br/>RATE</u> | <u>AMOUNT</u> |
|-------------------------|-------------------------|------------------------|---------------|
| 2 Foremen               | 17.5                    | \$12.00                | \$210.00      |
| 1 Sub-foreman           | 12.0                    | 9.40                   | 112.80        |
| 3 Skilled Laborers      | 32.0                    | 8.60                   | 275.20        |
| 2 Semi-Skilled Laborers | 19.5                    | 6.40                   | 124.80        |
| 2 Semi-Skilled Laborers | 20.0                    | 5.90                   | 118.00        |
| 14 Common Laborers      | 173.00                  | 5.15                   | 890.95        |

The rates shown for employees shall NOT exceed those shown on the Force Account Agreement although the Contractor may have to pay them a higher rate. Neither may the rates exceed those actually paid by the Contractor. In addition, fifteen percent of the total wages paid is allowable to cover overhead as per Subsection S-109.04.

- 5.2.2. Materials: All materials claimed must be supported by invoices or sworn statement substantiating the quantities and prices claimed. In NO EVENT shall the prices claimed exceed those agreed to on the Force Account Statement; neither shall they exceed the prices shown by the supporting invoices or sworn statements. It is the Contractor's responsibility to ascertain the price of materials prior to entering into the agreement. All prices must exclude the credit allowed for return material.

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Where manufacturers, jobbers, or materials dealers, whether wholesale or retail, allow a discount on invoices for materials purchased if payment is made by a specified date or within a specified time, the discount shall be deducted from the invoice, even though the Contractor fails to take advantage of this discount.

Sales tax may be claimed by the Contractor on materials and freight provided that the Contractor paid sales tax on these items. However, the 15% allowable on Materials as provided in part (3) of Subsection S-109.04 is to be charged on the net amount of invoices and NOT on the cost of materials or freight plus the sales tax.

- 5.2.3. Rentals: The rates for equipment shown shall not exceed that shown on the Force Account Statement, which rate shall include fuel, oil, grease, etc., but not the operator. List on the time roster the hours each piece of equipment was used on the respective dates.
- 5.2.4. Insurance: The rate of insurance shown shall not exceed that agreed to on the Force Account Statement; insurance is to be charged on the net amount of labor cost (not labor cost plus 15%).
- 5.2.5. Extensions: When making extensions of Force Account Statements ALL FRACTIONS of cents shall be dropped.
- 5.2.6. Bond Premium and Contractor's Sales Tax: Two and one-half percent and one and one-half percent respectively, may be allowed on the total amount for Bond Premium and Contractor's Sales Tax.

6. CONVERSION FACTORS:

- 6.1. Small volumes designed for payment by "Final Measure" (F.M.) may be measured loose in the vehicle (L.V.M.) and converted to contract measurement by multiplying the loose measure by 0.80.
- 6.2. Small volumes designated for payment by "Loose Vehicle Measure" (L.V.M.) may be measured by the average end area method and converted to contract measurement by multiplying the F.M. Measure by 1.25.
- 6.3. When requested by the Contractor and approved by the Engineer, in writing, materials specified to be measured by volume may be weighed, and such weights converted to the unit of volume indicated in the contract, or materials specified to be measured by weight, may be measured by volume and such volume converted to the unit of weight indicated in the contract. Factors for conversion from weight measurement to volume measurement or from volume measurement to weight measurement, as the case may be, will be determined by the Engineer and shall be agreed to by the Contractor in

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writing before such method of measurement of pay quantities is used.

- 6.4. In order to have uniformity in regard to decimals for listing quantities in the Final Reports and Final Estimates, please conform to the following table: (Computations, however, should be carried an additional decimal point for each item but rounded off as listed below when recorded in the Final Report or Final Estimate).

| <u>ITEM</u>  | <u>CARRY DECIMALS TO NEAREST</u> |                                       |
|--|----------------------------------|---------------------------------------|
| Additional Construction Signs                      |                                  | square foot                           |
| Aggregate (Cover and Stabilizer)                   |                                  | cubic yard                            |
| Bituminous Material                                |                                  | gallon                                |
| Bridge Railing                                     | 0.1                              | foot                                  |
| Castings and Gratings                              |                                  | pound                                 |
| Cement   | 0.1                              | ton                                   |
| Clearing and Grubbing                              | 1.0                              | percent                               |
| Clearing and Grubbing                              | 0.1                              | acre                                  |
| Concrete (Except Cl. "C", see "Paved Ditch" below) | 0.01                             | cubic yard                            |
| Curb and Curb & Gutter                             |                                  | foot                                  |
| Driveways and Sidewalks                            | 0.1                              | square yard                           |
| Embankment   |                                  | cubic yard                            |
| Excavation (L.V.M. or F.M.)                        |                                  | cubic yard                            |
| Excavation (Structure or Foundation)               |                                  | cubic yard                            |
| Fertilizers  | 0.01                             | ton                                   |
| Fertilizer (Agricultural Limestone)                | 0.1                              | ton                                   |
| Geotextile Fabric                                  |                                  | square yard                           |
| Granular Material                                  |                                  | cubic yard                            |
| Granular Material                                  |                                  | ton                                   |
| Ground Preparation                                 |                                  | square yard                           |
| Guard Rail   | 0.1                              | foot(multiple of 12.5 ft. increments) |
| Lime   |                                  | ton                                   |
| Loading Tests                                      |                                  | each                                  |
| Masonry  | 0.1                              | cubic yard                            |
| Mixing (Soil-Cement, Soil-Lime, etc.)              |                                  | square yard                           |
| Paved Ditch (Cl. "C" Conc.)                        | 0.1                              | cubic yard                            |
| Pavement (Concrete)                                | 0.1                              | square yard                           |
| Pavement (Hot Plant Mix)                           | 0.1                              | ton                                   |
| Piling   | 0.1                              | foot                                  |
| Pipe (Conc.)                                       |                                  | foot (multiple of joints)             |

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| Pipe (Corrugated Metal)                        |                       | foot                                    |
| Precast Bridge Components                      |                       | unit                                    |
| Preformed Pile Holes                           |                       | foot                                    |
| Price Adjustment Factors (C and Final Factors) | 0.0001 (0.01 percent) |   |
| Removal of Pavement and Sidewalk               |                       | square yard                             |
| Riprap   |                       | square yard                             |
| Riprap   | 0.1                   | ton                                     |
| Seeding  | 0.01                  | acre                                    |
| Solid Sod and Sprigging                        |                       | square yard                             |
| Steel (Reinforcement and Structural)           |                       | pound                                   |
| Stripe (Skip)                                  | 0.001                 | mile                                    |
| Stripe (Continuous and Detail)                 |                       | foot                                    |
| Stripe (Legend)                                |                       | square foot                             |
| Test Piles                                     |                       | each                                    |
| Timber   | 0.001                 | M.B.F.M.                                |
| Topsoil for Slope Treatment                    |                       | square yard                             |
| Topsoil for Slope Treatment                    |                       | cubic yard                              |
| Vegetative Materials for Mulch                 | 0.1                   | ton                                     |
| Conc. Riprap in Bags & Slope Paving            | 0.1                   | cubic yard Bag Count<br>& Cement Factor |

7. SECTION S-200 - MOBILIZATION AND EARTHWORK ITEMS:

7.1 Mobilization

7.1.1. Measurement for payment of Mobilization is fully defined in Subsection S-200.02.1 of the Standard Specifications.

7.2. Clearing and Grubbing:

7.2.1. Lump Sum Basis: No computations will be necessary for this item unless an increase or decrease was made in the project right of way after the contract was awarded. If a change is made in the right of way area after the contract is awarded, it will be necessary to make an adjustment in the payment for this item. In the event the contract carries a pay item for Clearing and Grubbing, Area Basis, the increase or decrease, as applicable, for payment is to be made by computing the area of the change and multiplying by the unit price bid, Area Basis.



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In the event there is no unit price bid, Area Basis, it will be necessary to compute an increase or decrease in the Lump Sum measurement as provided for in Section S-201.

7.2.2. Area Basis: On an additional sheet the size of the plan-profile sheets of the final plans plot the gross areas of all areas involving payment of Clearing and Grubbing, Area Basis, including any adjustment as indicated above. Within each area shade or cross mark with colored crayon the area actually cleared and grubbed of small and large trees, giving necessary dimensions and angles, or bearings. Beside each area, show computations, indicating the net acreage within each shaded area.

7.3. Removal of Structures and Obstructions. When payment is to be made on a unit basis (square yard, foot, etc.) all pertinent information (date, station, dimensions, inspector's initials, etc.) are to be recorded in a bound field book. The length of pipe of each size, if specified, removed will be determined by multiplying the number of pieces of pipe by the standard length of each piece.

7.4. Excavation and Embankment:

7.4.1. Plan Measurement (P.M.): Excavation quantities to be paid for by this method will be taken from the contract document as bid provided no grading changes were made during construction operations. In the event changes were made during grading operations, the quantities will be revised according to the requirements of Subsection S-203.12.2 of the Standard Specifications.

All original or revised cross-section sheets used to arrive at the final pay quantity will be filed in the office of the County Engineer and, if requested, submitted with the Final Documents to substantiate final quantities.

If computers are used to calculate earthwork quantities, the printout sheets will be treated the same as cross-section sheets.

7.4.2. Final Measurement (F.M.): Excavation quantities to be paid for by this method will be documented by cross-section sheets, field notes, etc., on file in the office of the County Engineer, and in such form as would allow them to be quickly and easily submitted for review if requested.

All three-dimensional measurements for F.M. quantities not included in the regular roadway cross-sectional quantities will be recorded in a single notebook; clearly labeled; and filed with the regular roadway F.M. quantities.

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7.4.3. Loose Vehicular Measure (L.V.M.): The procedure to be used involving this method of measure is fully explained in S.O.P. No. SA II-1-45. Field books containing hauling vehicle measurements and original tickets should be filed together, properly labeled, and be retained in a manner that would promote quick submission if such is requested.

8. SECTION S-210 - ROADSIDE DEVELOPMENT:

Prior to performing Roadside Development items, the County Engineer should prepare bound field notebooks such that all source information required to be recorded may be properly and systematically entered into the book to serve as final data or to be transferred to required forms for final data. Columnar headings, etc., are to be made in the field book as necessary, such as those indicated in S.O.P.'s covering Roadside Development items.

In instances such as those cited in the referenced S.O.P's, the bound field books, as source data, are to be retained in the project files for inspection until final payment to the Contractor has been made. Should a question arise during checking of the final quantities, the Office of State Aid may request the bound field book, in which case the County Engineer will submit such field book(s) as a supplement to the final data. Certain other field notebooks, as indicated for the respective items, are required to be submitted as final data only if requested.

8.1. Topsoil: If Topsoil is to be measured by the cubic yard (L.V.M.), S.O.P. No. SA II-1-45 will apply. However, any excess topsoil placed, computed in accordance with the requirements of Subsection S-211.03.4, is to be deducted as specified. If topsoil is specified by the square yard, actual measurements of each area and depth are to be recorded in a bound field notebook(s) and areas computed and shown thereon. Area and depths are to be computed in accordance with Subsection S-211.03.4 and deductions made, if any, as provided therein. Field books, containing all measurements, capacities and computations, all tickets and computer listings are to be retained as final data.

8.2. Ground Preparation: Actual measurements of these areas are to be recorded in a bound field notebook(s) and areas computed and shown therein. Field books are to be retained as final data.

8.3. Fertilizer: Records of fertilizers are to be kept in accordance with S.O.P. No. SA II-1-73. The original of Form SA-203 is to be submitted as final data.

Agricultural Limestone is to be weighed in tons in accordance with Section S-109, as follows:

8.3.1. By competent personnel on accurate approved scales furnished by the Contractor and set at locations approved by the Engineer on or in the vicinity of the project.

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8.3.2. By competent personnel on approved commercial scales at locations approved by the Engineer, including approved scales at the point of loading, in which case a weigh ticket showing gross, tare and net weight and signed by a responsible representative of the supplier is to accompany each load of material and is to be received by the inspector on the project.

In either of the two cases, should there be any question by the Engineer as to the correctness of the weights shown on the weigh ticket for a particular load(s) the Engineer will require that the weight of such load(s) be verified on scales furnished by the Contractor or suitable scales approved by the Engineer.

Should there be any appreciable difference between weights as recorded on the initial weigh ticket and the weights obtained by the Engineer or his representative as check weights, those obtained as check weights shall be used as the determining measurement.

In either case, the weight of each load is to be documented in the field notebook and retained to support the tabulation of the applied quantities recorded on Form SA-203. The documentation is to be initialed by the inspector.

8.4. Seed: The records of seed of each type required and used are to be made in accordance with applicable S.O.P.'s. In weighing seeds and for determination of application rates, suitable scales are to be used for weighing small quantities. The Project Engineer should determine that seeds are weighed by competent personnel using scales that are accurate and approved by him. Periodic checks of such scales by testing with known weights in the range of use should be made and entries made in the bound field book as to such scales checks. The original of Form SA-723 is to be submitted as final data.

8.5. Vegetative and Bituminous Materials for Mulch. Each truck load of vegetative material should be weighed on approved scales provided by the Contractor or on approved commercial scales. An average weight per bale may be determined by either of the following two methods:

8.5.1. The net weight of the mulch on the truck may be divided by the number of bales on the truck to establish an average weight per bale to be used in determining the quantity applied.

8.5.2. A sample of approximately ten (10) bales designated at random by the Engineer or inspector may be taken and weighed collectively or individually and the total weight divided by the number of bales in the sample to obtain an average weight to the nearest pound per bale to be used for the truckload from which the sample was taken.

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In either case, all bales received in that particular truckload must be isolated until used, and the average weight per bale applied thereto.

The total net weight of each load of material and the average weight per bale are to be recorded by date and time in the bound field book, along with other data as required in S.O.P.'s covering Roadside Development items.

8.5.3. To be sure of the amount of vegetative material used from the truck, one of the following methods should be used:

8.5.3.1. Keep the truck under surveillance until all of the material is used.

8.5.3.2. Actually count and record in the field book the bales as they are used, or

8.5.3.3. Count and record the number of bales on the truck before beginning each application and the number of bales left on the truck each time it leaves the application site.

Measurement of bituminous material for mulch is to be made as for other bituminous materials. Emulsions are to be measured while they have the water content specified in Section S-702 and before additional water, if any, is added. Distributors or other tanks in which measurement is made are to be calibrated in accordance with Subsection 10.2.2. of this SOP.

- 8.6. Solid Sodding: Solid Sodding will be measured in place with sketches and computations recorded in a field book, signed and retained as final data.
- 8.7. Excelsior Blanket: Excelsior blanket will be measured in place (surface area covered) with locations, sketches and computations recorded in a field book, signed and retained as final data.
- 8.8. Paved Ditches: Location, sketches of typical section(s), lengths and computation are to be entered in a field book, signed and retained as final data.
- 8.9. Fiber Glass Roving: Fiber Glass Roving will be measured by the pound in accordance with Subsection S-230.04. Bituminous material will be measured by the gallon in accordance with Subsection 10.2.2 of this SOP.
- 8.10. Erosion Control Fabric: Erosion control fabric will be measured in place (surface area covered). No payment will be allowed for material required for overlaps, anchor slots or for overwidth of strips.

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- 8.11. Geotextile Fabric Stabilization: Fabric will be measured by the square yard of surface area covered. Overwidth of material installed and additional material required for laps or sewing will not be measured.
- 8.12. Miscellaneous Items: All field books, tickets, sketches, computations, etc., necessary to substantiate final measurement as set out in the contract for miscellaneous items are to be signed and retained as final data.

9. SECTION S-300 - SUBBASE AND BASES:

- 9.1. Bituminous Base Course, Granular Courses, Stabilizer Aggregates, Stone Base, etc. The procedure to be used for items requiring measurement by weight or volume is fully explained in S.O.P. No. SA II-1-45. If requested, field books showing computations for vehicle capacities should be submitted with the original tickets and computer listings as final data.

9.2. Lime, Portland Cement, and Lime-Cement Treated Courses:

- 9.2.1. The procedure to be used for the measurement of lime and cement is that explained in S.O.P. No. SA II-1-45. In addition, in any section, if the spread of cement or lime exceeds the 5% allowable tolerance, the amount to be deducted should be shown beside the quantities for the applicable ticket number(s). The adjusted total of the listing should then equal the total of the net amounts for pay shown on the daily reports.

- 9.2.2. In addition to the ticket listing(s), if requested, the original copies of the Engineer's daily record of Lime Stabilization or Cement Stabilization will be submitted as final data. Each daily record should have attached to it all the tickets for lime or cement used that day. On each of these records, show the amount of waste, if any, under the provision of Section S-307 or Section S-308, as applicable. Each of the records must show any deduction for application on any section in excess of 105% of the ordered amount. The Contractor is not entitled to pay for material wasted outside of the spreading limits by contending that it should be allowed under the five (5) percent spreading tolerance permitted within the spreading limits.

Excess material due to waste or over-application, or both, must be determined and deducted for each section such that the daily reports will show the net amount for payment.

9.2.3. Spread Calculations:

- 9.2.3.1. The area to be processed must be determined before the lime or cement is spread

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on a section. This area is necessary so that the correct amount of lime or cement can be ordered for the mixing item for which the Contractor is to be paid. Thus, it can be seen that irregular areas should be measured and computed before the spread of lime or cement begins.

9.2.3.2. The areas of irregular sections may be computed by applicable mathematical formula or methods. Sketches and computations of areas are also to be retained as final data.

9.3. Mechanically Stabilized Courses:

9.3.1. Items to be measured for payment on a square yard basis should be handled as set out in the preceding Subsections 9.2.3.1 and 9.2.3.2 of this S.O.P.

9.3.2. The procedure to be used for the measurement of commercial stabilizer aggregates by volume or by weight is to be that set forth in S.O.P. No. SA II-1-45. In the event there is any waste of stabilizer aggregates, the amount to be deducted should be shown beside the quantities for the applicable ticket number(s) on the listing. The adjusted listing should then equal the total of the net amounts due for payment. The corrected original of the listing and the original of the haul tickets will be submitted as final data if requested.

9.3.3. Although a contract will seldom, if ever, contain a requirement for local stabilizer aggregates to be measured by the cubic yard, original position measurement, in the event such is the case, measurement, computations and submission of final data are to be made as for excavation. (See Subsection 7.4.2 of this S.O.P.).

10. SECTION S-400 - BITUMINOUS PAVEMENTS:

10.1. Plant Mix Courses. Plant mix courses are normally measured for payment on a weight (ton) basis. The procedure to be followed is fully explained in SA II-1-45.

Adjustment of weights will be subject to Subsection S-403.05.

10.2. Surface Treatments:

10.2.1. Cover and seal aggregates will be measured for payment in accordance with S.O.P. No. SA II-1-45. The quantity of aggregate spread for each shot of asphalt cement should be recorded on Form SA-724 (see S.O.P. No. SA II-1-92). The quantity for payment cannot exceed the quantity ordered plus five percent regular areas, or plus fifteen percent for irregular areas where hand spraying is required (see Section S-410 of the Standard Specifications).

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10.2.2. Liquid asphaltic materials or tars will be measured for payment by the gallon. Unless otherwise indicated, the distributor tank measurement will be used. Temperature corrections are to be made in accordance with Section S-702. Tables for conversion are shown in S.O.P. No. SA II-3-11.

Measurements and volume determinations are to be recorded on Form SA-724 (Surface Treatment- Report of Materials Applied).

The Contractor is required to have the distributor calibrated by an agency and in a manner approved by the Mississippi Department of Transportation. Prior to a distributor being used on the project, the Engineer must determine that the distributor is properly calibrated as evidenced by an approved calibration chart identified for the particular distributor.

Forms SA-724 are to be filled out for all bituminous materials when paid for on a per gallon basis. The original copies of the Form SA-724 will be submitted with the final data if requested.

Some pertinent points relative to using the distributor measure method for payment are:

A certified calibration chart shall be on hand before the Contractor can use the distributor.

Watch for foaming of material to be measured in the distributor tank.

Foaming of bituminous material usually presents no problem, but it is desirable to watch for it when measuring A.C. or cutbacks, particularly when a distributor has just been loaded. Any foam on the measuring stick is an indication that the asphalt is contaminated, and can cause an appreciable error.

At the time any field measurements are made, the distributor should be on level ground.

Thermometers on the distributor should be checked for accuracy against thermometers of known accuracy.

Meters or gauges on distributors are not to be used for determining pay quantity, nor quantity left in the distributor after an application is made.

The calibration point from which all measurements are made should be clearly identified.

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The certified chart furnished for a distributor is based on the unit at the time the calibration was made. Any subsequent change or alteration made in the unit which would change the "liquid level" or calibrated capacity in the distributor tank will void the original calibration, and the distributor must be recalibrated before further use.

It is suggested that when any doubt arises as to the capacity of the distributor it should be checked for total capacity. Should the total capacity not check within reasonably close conformity with that shown on the calibration sheet for the unit, the distributor must be completely recalibrated.

11. SECTION S-500 - BLANK:

12. SECTION S-600 - INCIDENTAL CONSTRUCTION:

- 12.1. Structural Concrete: Some of the Standard Plans have the following note: "The quantities shown will be used as the basis for final payment unless this plan is modified". If applicable, these quantities will be used to determine final pay quantities. If Standard Plans or Tables do not contain quantities for a particular structure or if a standard structure has been modified it will be necessary to develop detail sketches and computations to be retained as final data.
- 12.2. Reinforcement: The part of the above paragraph pertaining to Standard Plans also applies to reinforcement. Otherwise, the bar list(s) will be prepared in accordance with governing S.O.P.'s. Computations using Standard Plan quantities and bar lists will be submitted as final data if requested.
- 12.3. Pipe Culverts, Storm Drains, and Under-drains: These items will be measured by the foot as set out in Section S-603 and S-605 of the Standard Specifications. The locations and lengths of each type and size pipe are to be shown on the final plans. Field books showing this information and date of installation and initials of the inspector who witnessed the installation will be retained as final data.
- 12.4. Sidewalks and Concrete Driveways: These items will be measured for payment by the square yard. Quantities will be supported by accompanying sketches and computations where necessary. Sidewalks should be listed by station limits, showing the number of square yards in each section. Driveways should be listed by station and the square yards in each.
- 12.5. Curb, Gutter, and Curb and Gutter: These items are to be measured along the face of the curb. Develop field notes showing final data, including location, length, dates and name (initials) of the inspector.



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- 12.6. Brick Masonry: This is to be measured by the cubic yard or by the thousand. If measured by the cubic yard, mortar joints are to be included in the volume. If applicable, Standard Plans will be used for determination of quantities. Develop sketches and computations to retain as final data. Also, retain invoices for brick if measurement is by the thousand, accounting for any brick shown on the invoices and not used in the work.
- 12.7. Right of Way Markers: On the final plans, check (✓) in green ink those markers placed in accordance with the plans. Cross out those not placed and draw in showing plus and distance from stationing line those placed at locations not indicated on the plans.
- 12.8. Pressure Grouting Items: Measurement will be in accordance with Subsection S-612.04.
- 12.9. Traffic Stripe: Measurements showing station limits and lengths of each type stripe should be developed and retained as final data.(Carefully review method of measurement - Subsection S-619.10)
- 12.10. Miscellaneous Items: All field books, tickets, sketches, computations, invoices, statements, etc., necessary to substantiate final measurement as set out in the Specifications should be signed and retained as final data.

13. SECTION S-700 - MATERIALS AND TESTS:

- 13.1. General: The various sections of the 700 Section of the Standard Specifications must be closely coordinated with the applicable sections of the general provisions and construction sections.

From time to time field personnel should review General Subsection S-700.01 and the subsections referred to therein.

All field personnel should be thoroughly familiar with the glossary of terms and definitions described in Subsection S-700.02. Particular attention is directed to the definition of the terms "Frame," "Increment," "Lot," "Sample," "Specified Value," "Test Portion," "Test Result," "Test Value," "Unit of Deviation," and "Verification Test." It has been noted that sometime the term "Test Result" has been used as "Test Value" and vice versa. These terms are not interchangeable and should be used only in the sense intended.

- 13.2. Statistically Based Acceptance Plan: Subsection S-700.04 provides quantitative values for the determination of reasonably close conformity, and, supplemented by certain special provisions contained in the contract, provides a formula for an automatic price adjustment of work or materials beyond reasonably close conformity. Field personnel should be thoroughly familiar with this subsection of the Specifications, and it should be used precisely as stated in the Standard Specifications and other contract documents.

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14. SECTION S-800 - BRIDGES AND STRUCTURES:

- 14.1. Excavation: Measurement and payment shall be as set out in Subsections S-801.10 and S-801.11 of the Standard Specifications. Sufficient measurement of depths of each excavation are to be made to determine an accurate average depth to be used in final computations. Sketches and computations are to be submitted as final data if requested.
- 14.2. Piling and Loading Tests: Forms PR-3, PR-3(D), TP-100, and TP-100(D), as applicable, and PS-3 are to be submitted as final data for bearing piles. Number, dimensions and computations of areas are to be submitted as final data for sheet piling. Heat numbers for steel piling are to be recorded on test and bearing pile forms.
- 14.3. Concrete: If no modifications are made in the bridge details and if the County Engineer does not have reason to recompute the quantities, the computations and quantities shown on the plans should be the final quantities. If modifications were made, or the fillets or buildups over beams vary from those indicated on the plans, sketches, dimensions and computations of such authorized changes and the adjusted final quantities are to be attached to the plan sheets and submitted as final data.
- 14.4. Reinforcement: Bar lists should be prepared and submitted to the Bridge Engineer. The listing, when verified, will be used as a basis for final payment. The listings and bar list are to be retained as final data.
- 14.5. Structural Steel: Structural steel is to be measured for payment in accordance with Subsection S-810.04 of the Standard Specifications.
- 14.6. Steel Grid Flooring: Sketches showing dimensions and computations are to be submitted as final data.
- 14.7. Railing: Submit a tabulation of rail lengths according to nominal measurements shown on the span details, between beginning and ending of railing at abutments, as indicated on the plans.
- 14.8. Beams: The length shown on the plans for each particular beam will be used as a basis for final measurement for payment. Tabulations of these lengths should be submitted as final data.
- 14.9. Timber: Timber is to be measured for payment in thousand board foot measure, nominal dimensions. A tabulation showing nominal dimensions and lengths should be submitted as final data.
- 14.10. Slope Paving and Concrete Riprap in Bags: These items are to be measured for payment by the theoretical yield and the number of bags of cement used, based on batch count and the cement factor of the design mix. Unless otherwise provided in the contract, other methods of measurement are not acceptable.

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14.11. Miscellaneous Items: Final quantities for miscellaneous items not otherwise indicated herein are to be supported by field books, tickets, sketches, statements, invoices, etc., necessary to substantiate final measurement, as set out in the specifications, and which are to be submitted as final data if requested.

15. PREPARATION OF FINAL PLANS OF COMPLETED WORK:

A set of reduced prints bearing a hand-stamped "FINAL PLANS OF COMPLETED WORK" will be submitted by the County Engineer along with other final documents. These plans MUST be in a neat condition since they are the Permanent Records showing exactly how the project was constructed.

The data shown on the Final Plans must agree with that recorded on the Final Report Form and the quantities on the Final Estimate Forms.

15.1. Title and Layout Sheet:

15.1.1. The names of the Contractor and the County Engineer, the County Engineer's signature, the date work started, and date work accepted are to be recorded in the hand-stamped block near the upper right-hand corner. If final data is submitted before final acceptance of the project, leave blank the space for: "Date Work Accepted."

15.1.2. Project data such as equations and length shown on the left side of the sheet are to be corrected so as to conform to actual construction.

15.2. Quantity Sheet: Under the heading "Summary of Quantities," in the column designated as Final Quantities, list the total final quantities for the project. If any items were added after construction was begun, show the items and quantities. DO NOT REDRAW THE QUANTITY SHEET. NOTE: An (X) is to be drawn across all of the other boxes listing individual structures, as the details on these items are to be shown on the plan profile sheets and the Final Report.

15.3. Typical Section Sheets: Retain the typical section sheets in the assembly, indicating authorized changes, if any.

15.4. Plan and Profile Sheets:

15.4.1. Plot actual finished centerline elevations and ink in grade line and final elevations using green ink for all types of projects. The final elevations need only be shown at even stations, V.P.C.'s, V.P.I.'s and V.P.T.'s, and in addition at 100 yard intervals on vertical curves of paving projects. Revise the percent of grade if changed.

It will not be necessary to take final profile elevations on surface treatment and pavement

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projects on which the granular material has been placed on previous contracts, and which have been constructed in accordance with the plans, provided a statement is added on each plan profile sheet to the effect that "the final profile grade as constructed conforms very closely to the theoretical grade, except where final profile grade elevations have been noted on this sheet."

- 15.4.2. Check (green ink) or correct the flow line, (giving up-stream and downstream elevation) station, size, length, and type of drainage structure actually constructed.

Structures that were not built are to be crossed (XXX) out, with an appropriate explanation. When locations of structures and ramps are changed, use green ink to plot the new location indicating direction of flow at structures.

- 15.4.3. Check or correct (green ink) all Bench Mark locations and elevations and equations.

- 15.4.4. Check (green ink) all R.O.W. markers that were placed according to the original plans, cross out the ones that were shifted and with green ink plot the new location with correct station and distance from centerline.

The final R.O.W. is that shown on the R.O.W. diagram prepared by the County Engineer after all the right-of-way was acquired. If the diagram was not prepared, the County Engineer should prepare one. All markers are to be placed in accordance with the diagram, and the diagram is to be used in computing increase or decrease, if any, in the Lump Sum item of Clearing and Grubbing. Using green ink, plot right-of-way changes, crossing out the original lines. Do not submit separate sketches unless revisions cannot be clearly shown on Plan Profile Sheet. If sketches are required, submit on additional sheets the size of the Plan Profile Sheets.

- 15.4.5. Plot all changes in alignment (green ink).

- 15.4.6. Correct (green ink) excavation and embankment quantities. When computer tabulations of earthwork are used, the values obtained from balancing the project on the computer tabulation sheets are to be transferred to the plan profile sheets of the final plans.

- 15.4.7. Show the final total excavation for each plan-profile sheet in the lower right corner of the sheet. On the last plan-profile sheet show the totals of the project.

- 15.4.8. The County Engineer's signature is required in the upper right-hand corner of each sheet of the final plans.