Virginia Department of Transportation

Post Construction Manual
(Imperial & Metric)

Prepared in the Office of the State Construction Engineer

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Introduction

Guidelines for the Review, Preparation, and Submittal of Final Estimates

The review and preparation of the project Final Estimate requires the coordinated effort of the Location Design, Scheduling and Contract, Fiscal, Internal Audit, Structure and Bridge, and Materials Divisions. However, it is the responsibility of the District Administrator to utilize the District Design Units and Contract Administration Office in completing, processing, and submittal of the Final Estimate. This responsibility was assigned to the District Administrators[1] in a joint memorandum (dated May 7, 1964) by the Director of Engineering and the Director of Operations.

The objective in preparing a Final Estimate is to determine that the records present a factual representation of the work performed by the contractor on a project. It is necessary to determine that all work was performed and paid for in accordance with the plans and specifications (including authorized changes), and that all required documentation of records is available and included in the Final Estimate package. It is the intent of these guidelines to establish uniformity in the review and preparation of each Final Estimate. As in every operation of this nature, there exists some variation in District operational procedures; however, these differences should not vary from the basic principle and flow as presented herein.

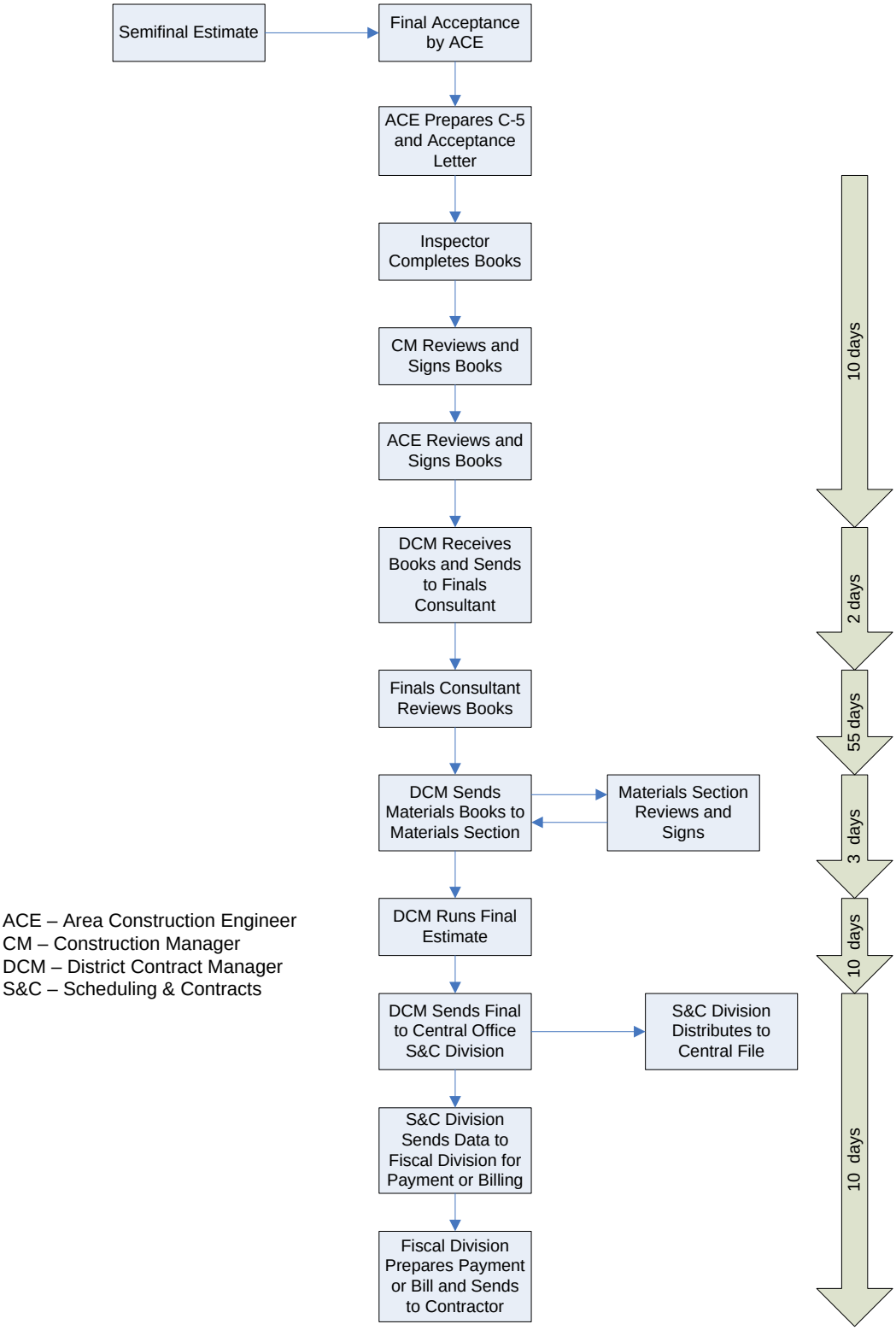
In certain instances, the nature of the project (complexity, size, or unusually large number of items included in the contract) will require some deviation from regular procedure in order to meet the date for final payment. Such deviations should occur only when the District Administration determines procedures outlined herein will cause an untimely delay, and then they must be evaluated to assure that the validity of the Final Estimate will not be jeopardized. Any deviation from prescribed procedures must be documented and included in the project files.

Pre Project Acceptance

Time is always a critical factor in the preparation, review, and submittal of the Final Estimate as final payment is due within ninety (90) days after project acceptance from the contractor. It is essential that every effort is made to complete as much final accounting of completed contract items as possible prior to VDOT's acceptance of the project.

[1] Formerly District Engineers

Post Construction Flow Chart



ACE – Area Construction Engineer
CM – Construction Manager
DCM – District Contract Manager
S&C – Scheduling & Contracts

After Final Project Acceptance

The Area Construction Engineer has the responsibility for the assembly, field review, verification and submission of all required project records (as listed in these guidelines) including additional information necessary for the proper computation or documentation of quantities.

This submission should be made as soon as possible after project acceptance; however the District Administrator shall establish the due dates for the District. Only with rare exception should the given time limit exceed **ten (10) days** after project acceptance.

Area Construction Office – Project Personnel

Primary Procedures of the Project Inspector

(1) Complete all books and reports maintained during construction. (as outlined in the Construction Manual)

(2) Make an inspection of the completed project.

(3) Prepare a letter listing the items that were accepted by visual inspection.

(4) Complete the semi-final estimate.

(5) Prepare a letter concerning the fulfillment of all Right of Way Agreements.

(6) Prepare Contractor Performance Evaluation (form C-36) Interim and initiate C-36 for completion by the Area Construction Engineer. Prepare C-36's for all subs that have not been previously prepared.[2]

(7) Initiate the preparation of form C-5.

(8) Prepare form M-20. Form M-20 is not required on projects not having pavement or surface course.

(9) Certify Books;

(10) Prepare Reasons For Differences

(11) Obtain signed disposal and borrow pit releases from the Contractor.

[2] Note that the form and process for Form C-36 is currently being revised to an electronic submission. This should be in effect August 2007.

All project books and records are to be delivered to the Construction Manager or to the Area Construction Engineer if no Construction Manager is assigned.

Primary Procedures of the Construction Manager

1. Review all project books and records for completeness;

2. Sign and date all project books;

3. Review semi-final estimate for completeness and accuracy;

4. Verify all asphalt adjustments

5. Verify form M-20 if applicable.

All project books and records are to be delivered to the Area Construction Engineer.

Primary Procedures of the Area Construction Engineer

1. Make final inspection of the completed project. Be sure to include the District Structures & Bridge Engineer in the final inspection and acceptance of all structures.

2. Complete Form C-5 (reporting completion of project). Form C-5 must be sent to the District office the day or no later than the day after the project is accepted.

3. Prepare a letter to the Contractor informing them of the acceptance of the project, addressing DBE goals / requirements **within five (5) days of acceptance**.

4. Prepare a letter to the Contractor requesting a letter certifying that materials, labor, equipment and supplies have been paid on unbonded projects, form C-50 and Certification of Compliance on use of domestic material (as applicable)

5. Complete Interim Contractor Performance Evaluation (Form C-36) as each subcontractor completes their work, not just at the end.

6. Verify Form M-20 (Pavement Management Information), if applicable.

7. Complete and distribute Form LD-433. (Design Quality Index Evaluation Form)

8. Check the Materials Notebook to verify the status of any outstanding test reports. For projects more than six (6) months in duration, a periodic review of the Materials Notebook by the Area Construction Engineer at least every three (3) months should be performed. The A.C.E. should request all test documentation for any outstanding items found during the periodic review. The A.C.E. should sign and date the Materials Notebook at the time of the review.

9. Review and approve semi-final voucher and any other data needed to complete the paper and / or book work **within 10 days of project acceptance**.

10. Submit the following data to the office of the District Administrator within ten(10) days of final acceptance. This submission should be made as soon as possible after project acceptance; however the District Administrator shall establish the due dates for the District. Only with rare exception should the given time limit exceed **ten (10) days** after project acceptance.

(1) All project books (diaries, workbooks, "as-built" roadway plans, materials books, the Inspector's (marked) bridge plans, and general notes book, and all electronic files);
(2) Letter from the Contractor certifying that materials, labor, equipment and supplies have been paid on un-bonded contracts;
(3) Letter from the Area Construction Engineer certifying all payrolls are up to date and on file in the Residency Office;
(4) Forms C-5, M-20, and C-36;
(5) ***Form C-50***[3] is required for federal aid projects that are on the National Highway System (NHS), except projects for which the total final construction cost of the roadway and bridge is less than $1,000,000.00 or projects consisting primarily of (1) the installation of protective devices at railroad grade crossings, or (2) highway beautification.
Form C-29 (Contractor's Certifications of Wage Rates and Job Classifications; Form C-29 is only required on federal aid projects which include Form FHWA 1316.
(6) All other necessary supporting data, such as Form TL102A's, weigh tickets, and invoices to substantiate pay quantities;
(7) Form FD-55 is no longer required by the Fiscal Division to close out the project.[4]
(8) Reasons for Differences or Awarded vs. Actual Quantities is required by the FHWA.
(9) A letter advising if a final survey is warranted and required.

All other project records are retained by the Area Construction Office.

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[3] ***The FHWA form 47 (formerly know as a "PR-47") and aka VDOT C-50, "Statement of Materials & Labor used by Contractors on Highway Construction involving Federal Funds", has been discontinued (at least by FHWA) as of May 22, 2007.***

[4] Biannual Meeting Handout – Hampton Roads 10/24/00

District Contract Manager Office

District Contract Manager Review and Estimate Preparation Procedures

The District Contract Manager shall be assigned the direct responsibility for the preparation of a final estimate. This individual and subordinates or consultant reviewer shall review the construction plans, including all revisions, contract documents, special provisions, supplemental specifications, work orders, FHWA inspection reports, Material Division depth checks, and non-compliance of material reports, and any correspondence or other reports affecting payment for work and materials on the project. Particular note shall be made of the edition of specifications and standards governing project construction.

The District Contract Manager shall be responsible for the necessary operations in the final review and estimate preparation process. Among the more significant are:

1. Review diaries for content and sufficiency of records as outlined in Appendix C of the Construction Manual. (CM)

2. Check the transfer of all items from diaries and/or "As-built" plans against the summaries or daily record of quantities. Check the totals of all summarized items.

3. Verify that documents of items paid for on a tonnage (metric ton) basis are in compliance with current procedures outlined in the CM-Appendix C and the Manual of Instruction Materials Division, Chapter VIII, (MOI-MD, Ch. VIII).

4. Check the depth measurement reports of pavement elements for compliance with specified tolerances. Verify deductions and adjustments in accordance with the Road and Bridge Specifications, Section 300, and CM-Division III. Reports for non-compliance should be completed within two weeks of project acceptance.

5. Check reports for non-compliance of materials and then compute price adjustments for non-compliance in accordance with the Road and Bridge Specifications, MOI-MD,MD, Chapter II, and contract special provisions.

6. Verify that the Materials Section has checked all material notebooks for evidence of sufficient test quantities to cover all materials being shown for payment to the Contractor. Reference material covering this topic can be found in the following: MOI-MD, Road and Bridge Specifications, and the Construction Manual.

7. Check all notebooks and records for certification by the Inspector, Construction Manager, and the Area Construction Engineer, as required by the CM-Appendix C, and MOI-MD, Chapter VIII.

8. Check weigh sheets, Form C-79, (Summary of Time, Theoretical and Other Measurements), diaries and "As-built plans (as applicable) for signatures in compliance with the CM-Appendix C, MOI-MD, Chapter VIII.

9. Prepare a draft of the final estimate.

10. Prepare the tabulation of final versus contract quantities, including work orders and revisions, and reasons for differences between the two.

11. Assemble all data and supporting documents relative to the results shown on the final estimate voucher for an independent review and check.

12. Verify quantities of work performed by State Forces and make certain that items are clearly separated from those performed by the Contractor.

Upon completion of the final estimate, the Contractor is to be notified that the Draft Final Estimate is available for review during the ten (10) day period specified in the Road and Bridge Specifications, Section 109. A copy of this notification should be forwarded to the Area Construction Engineer.

After review of the Final Estimate by the Contractor or upon notification of intent not to review, the final estimate will be signed by the District Administrator or his representative and forwarded to the Central Office Scheduling & Contracts Division.

The retention and disposition of construction files have been reviewed with Department personnel and the Federal Highway Administration. It has been concluded that it is in the Department's best interest to ***retain project records for three (3) years*** following payment of the final voucher by the FHWA. After the three year retention period records may be disposed of in accordance with the Records Retention and Disposition Schedule 101, Administrative Records for all State Agencies through their District Records Retention Designee. (Fiscal Division sends out a list of projects that have been vouchered by the FHWA). Any projects having litigation shall be retained for five (5) years from the date of reconciliation.

Based on the requirements of the comptroller and the regulations of the Federal Highway Administration, there are two (2) exceptions which are listed below.

1. Records required for pending, on-going or unresolved litigation, audits, or claims. These records must be retained until completion, resolution or settlement.

2. Toll facilities and revenue bond records must be retained for three (3) years subsequent to the date when the facility becomes operational on a toll free basis.

District Contract Manager – Review and Preparation Procedures

The District Contract Manager is normally assigned the responsibility of performing the following functions relating to the flow of the Final Estimate within the District Office.

1. Construction and Maintenance Contracts and Schedules

    a. Verify pay quantities are correct
    b. Verify that any manually computed asphalt pay adjustment worksheets are complete and correct.
    c. Verify that any adjustments in payment for rideability, material pay adjustments, incentive / disincentive, etc. are documented, computed correctly and included in the final estimate. Support documentation should be submitted to the Scheduling & Contract Division along with the Final Estimate
    d. Prepare the final estimate and review it with the contractor.

2. Prepare Final Assembly to Transmit to Central Office Scheduling & Contract Division:

    a. Prepare Form C-26 original and two (2) copies. (Three (3) copies for Federal Oversight projects)
    b. One copy of the C-5 with the starting date and one (1) copy with the starting and ending dates.
    c. Copies of all work orders
    d. Materials certification on Form TL-131 or TL-131-2 is received from the District Materials Engineer and included in the finals package forwarded to the Scheduling and Contract Division's Contract Section for subsequent distribution to the FHWA.
    e. Include two (2) copies of the Reasons for Differences Summary. (Two (2) additional copies for each additional Federal –Aid project number.) Note: Projects with Federal Oversight
    f. For contracts that are not covered by a payment bond, one (1) copy of the contractor's letter of certification regarding payment of bills, is required.
    g. Include a letter from the Area Construction Engineer certifying that payrolls are up to date and are on file in the Area Construction Office. (One (1) copy for all Federal Aid Projects)
    h. Prepare copies of the final estimate and present the entire final assembly to the District Administrator or his representative for review and signature.
    i. Copy of Letter from Area Construction Engineer accepting the project.
    j. Copies of all adjustments on the project including asphalt, rideability, incentives/disincentives, etc.

With respect to the Final Estimate, one copy of the Site Manager Detail / Summary to Contractor and one copy of the Estimate Summary (which shows change orders, liquidated damages and contract adjustment history) should be forwarded to the Scheduling and Contract Division with the Final Estimate Package. A cover letter should accompany the Final Estimate Package to the Scheduling and Contract Division identifying exactly what items are submitted as well as what items have been submitted directly to the FHWA. A standard cover letter indicating that items were submitted as applicable is not acceptable.

Before submitting the Final Estimate Package for contracts containing asphalt price adjustment, the District Contract Manager should check the asphalt adjustment worksheets for the following:

- The correct base price and current prices are used in the calculations.
- Make sure that the total asphalt quantity for which asphalt price adjustment is paid equals the total tonnage of asphalt concrete on the contract that was paid for and designated for asphalt price adjustment.

One copy of the Smart Report (or equal) identifying all contract adjustments paid on a given contract grouped and subtotaled by category should accompany the final estimate package.[5]

The above data is to be submitted to the Scheduling and Contract Engineer as soon as the final is completed, **but not less than ten (10) days prior to the due date for vouchering of the final estimate.**

One copy of the final estimate and one (1) copy each of Form TL-131 or TL-131-2 are to be sent to the State Materials Engineer.

[6]If the final estimate will not be completed and submitted for receipt by the Scheduling and Contract Division within (80) days following project acceptance, the District Contract Manager (DCM) should advise the Contractor in writing of any data required from the Contractor that has not been received. If money will be due the Contractor, the DCM also advises that payment of the Final Estimate will be delayed pending receipt of the data and that payment of interest in accordance with Section 109.09 of the Specifications will not apply. If money is due the Department, the Contractor is also advised that failure to furnish such data may result in the Contractor's removal from the list of qualified bidders. If data is not received within (15) days of this notification, the DCM should seek further guidance from the District Construction Engineer. Copies of letters to the Contractor are also forwarded to the Area Construction Engineer as well as the Contract Administration Engineer in the Scheduling and Contract Division.

[5] Post Construction Manual was revised on 1/28/09 to add paragraphs 1-3, page 11 with specific references to Site Manager and Smart Reports and the Final Estimate Package.
[6] The Post Construction Manual was revised on 11/13/07 to incorporate final payment details previously covered under CD-98-5.

Upon receipt of the required documentation for the final estimate package as outlined on page 11, the DCM completes preparation of the final estimate assembly. In the event any pay quantity is not adequately covered by test report or certification, as applicable, payment for such quantity is to be withheld from the final estimate. Upon receipt of acceptable test or certification within (60) days from the final estimate date as established in accordance with Section 105.16 of the Road and Bridge Specifications, payment is then to be made by Supplemental Final Estimate. The Supplemental Final Estimate should be completed and submitted to the Scheduling and Contract Division within (30) days of receipt of the data justifying payment.

Depending on the status of the final estimate, the DCM proceeds as follows.

A. Money due to the Department

1. The DCM transmits the final estimate assembly to the Scheduling and Contract Division. Note: ***Submission of the final estimate package is not to be delayed pending receipt of data from the Contractor.***

2. If the submission of the final estimate assembly is late, the reason(s) for the delay is set forth in the transmittal letter and any delay attributable to the Contractor is identified.

3. Upon receipt of the delinquent data, the DCM submits the same to the Scheduling and Contract Division, if applicable.

B. Money due Contractor and the Contractor <u>Has Not</u> Furnished All Required Data;

1. The DCM holds the final estimate at the District Office until all data is received from the Contractor. <u>Exception:</u> If missing data is invoices, material certifications or other documentation for quantities paid, the affected quantities are to be removed from the final estimate and the final estimate then forwarded to the Scheduling and Contract Division. Removed quantities may be paid later on a supplemental final estimate within (60) days from the final estimate date as specified in Section 105.16 of the Specifications, once the required documentation is furnished.

2. Upon receipt of the delinquent data, transmit the final assembly to the Scheduling and Contract Division with explanation of cause of delay.

C. Money due Contractor and Contractor <u>Has</u> Furnished All Required Data

1. Transmit the Final Assembly to the Scheduling and Contract Division

2. If the final assembly is late, state the reason(s) for the delay in the transmittal letter and identify any delay attributable to the Contractor.

Scheduling and Contract Division – Central Office

The complete final assembly is forwarded by the District Contract Manager to the Contract Administration Section of the Scheduling and Contract Division. A general review is made of the assembly in order to determine whether the final estimate is ready to be processed. As part of this general review, the Scheduling and Contract Office contract file folder is pulled and reviewed for any correspondence which would affect the processing of the final estimate. The Contract Administration Section of the Scheduling and Contract Division performs the following operations during the processing of the final estimate.

1. Review the transmittal letter and assembly to determine that all data as listed and required has been submitted. Insure that the Final Estimate has been signed by the District Administrator or his / her authorized representative.

2. Make a detailed check of Form C-26, including verification of any assessment for liquidated damages.

3. Materials certification on Form TL-131 or TL-131-2 is received from the District Contract Administration office and is forwarded to the FHWA.

4. Check to see that extensions of contract time are authorized by work order or shutdown.

5. Enter key dates and data such as Final Voucher Date and Date Final Assembly Sent to Fiscal Division into *Site Manager*.

6. Prepare letter of transmittal to the Fiscal Manager for signature of the Contract Administration Engineer.

7. Verify that support data is provided and calculations are correct for contract adjustments including but not limited to the following items:

    a) Asphalt Price Adjustment
    b) Rideability
    c) Materials pay adjustments
    d) Incentive / Disincentive
    e) Fuel adjustment

8. Prepare letter of transmittal to the Federal Highway Administration for signature of the Contract Administration Engineer. Note that no submission is required to the FHWA for state funded or federal-aid projects with VDOT oversight.

9. Determine if any Notices of Intent to File a Claim exist. Continue to maintain the Division contract file if there is a Notice of Intent to File a Claim or other outstanding issues.

10. The Final Voucher Date for purposes of claim submission is set at twenty-eight (28) days after the finals package is distributed to the Fiscal Division. ***A certified mailing*** informing the Contractor of the Final Voucher Date for purposes of claim submission is signed by the Contract Administration Engineer and mailed promptly to the Contractor.

11. The Final data assembly for the Fiscal Manager is given to the Contract Administration Engineer for signature.

12. The Contract Administration Engineer reviews the assembly, and if found in order, signs the transmittal letter on behalf of the State Construction Engineer. The Contract Administration Engineer enters the Final Voucher date in *Site Manager* and approves the final voucher in *Site Manager* and subsequently in FMSII.

13. The Final Assembly is then distributed to the Fiscal Division.

Distribution to the Fiscal Division

As part of the processing of the final estimate, the following items should be distributed to the Fiscal Division from the Contract Section of the Scheduling and Contract Division.

1. Original of the transmittal letter to the Fiscal Manager;

2. Original signed copy of the Final Estimate; The Estimate should be signed by the District Administrator as well as the State Construction Engineer. (Or their authorized representatives)

3. One (1) copy of adjustment for non-compliance forms, asphalt price adjustment work sheets, and worksheets for any other manually computed contract adjustments;

4. Original and two (2) copies of Form C-26 with summary of shutdowns when applicable;

5. One (1) copy of the letter from the Contractor certifying that he has paid all bills for materials, labor and equipment for unbonded projects.

6. One (1) copy of the District Administrator's letter transmitting the final assembly to the Scheduling and Contract Division;

7. Letter from the Area Construction Engineer certifying that payrolls are up-to-date and are in file in his office; (Federal Aid Projects only)

Distribution to the Federal Highway Administration

1. Original of transmittal letter;

2. One (1) copy of Form C-26 with a summary of shutdowns.(Only required on Federal Oversight projects)

3. Two (2) copies of Reasons For Differences Summary[7]; (Only required on Federal Oversight Projects)

4. One (1) copy of the Final Estimate

No submission is required to the Federal Highway Administration for state or federal aid projects with VDOT oversight.

[7] Reasons For Differences Summary – Formerly VDOT Form C-55

Distribution to Central File

The following contract items shall be distributed to Central File by the Scheduling and Contract Division as part of the procedures in processing the final estimate.

1. One (1) copy of transmittal letter to Fiscal Manager;

2. One (1) copy of transmittal letter to FHWA; (when applicable)

3. Original of transmittal letter from the District;

4. Form C-55; (when applicable)

5. One (1) copy of Form C-26 with summary of shutdowns;

6. One (1) copy of adjustment sheets for non-compliance; (when applicable)

7. Letter from Area Construction Engineer certifying payrolls are up-to-date and are on file in the office of the Area Construction Engineer; (Federal-Aid projects only)

APPENDIX A - Pre Project Acceptance - Construction Activities that will Facilitate Finals Acceptance

Time is always a critical factor in the preparation, review, and submittal of the Final Estimate because final payment is due within ninety (90) days after project acceptance from the contractor. It is essential that every effort be made to complete as much work as possible prior to VDOT's acceptance of the project.

Consideration is to be given to the following:

1. Excavation:

    a. Payment on Plan Quantity Basis
    b. Upon receipt of Slope Stake Notebooks, the District Design Unit should check the Levels and Cross Section Notes for those locations to be covered by Final Cross Sections (i.e., entrances, channel changes, borrow pits, etc.) From there, the District Design Unit should plot and check sections and save the information for use when further data is available. It is noted that cross sections are usually taken today by the use of Digital Terrain Models. (DTM)
    c. Payment on Final Cross section Basis
    d. Upon receipt of the Slope Stake Notebooks, all centerline levels and cross section notes (in addition to those items outlined in A(1) above) should be checked. Plot and check cross sections when further data is available.

When possible, Final Cross Sections are to be taken as work progresses and it shall be the responsibility of the of the Area Construction Engineer to assure that the field notes on all items are transmitted to the District Office for checking and incorporation into the Final Estimate.

2. Bridges and Culverts

    "As-built" plans are needed for all bridge projects and special design box culverts. The project inspector shall prepare "as-built" plans or other records as designated, showing the dimensions of the parts of the structure that were changed during construction. This generally consists of documenting structure excavation, pile lengths, footing depths, column lengths, and the actual weight of all reinforcing steel used. The dimensions which differ from the plans should be converted into quantities (decrease or increase) by the inspector. The District Structure and Bridge Office will prepare "as-built" plans from the information and "as-built" plans furnished by the inspector.

    When bridges and box culverts are completed prior to other items of contract work, data should be promptly forwarded to the District Structure and Bridge Office. Upon receipt of this data, the District Structures and Bridge Engineer should proceed

immediately to have items verified in accordance with current directives listed within these guidelines.

3. TL-102A's

   The project inspector and designated review team are responsible for ensuring that the TL-102A's represent information contained in the recorded delivery tickets. The TL-102A's may be examined in connection with the performance of planned internal audits. The TL-102A is processed in the following manner:

   The TL-102A is distributed after the inspector has verified that it represents the material received on the project. The original copy and all other data is processed up to the finalization state and filed, since it will be the certified record of material delivered to the project. The TL-102A may be handwritten and delivered in person or electronically generated and e-mailed for acceptance of materials being shipped. (MD 281-06 / CD-2006-3)

4. Miscellaneous

   Bridges may be complete except for minor items of finish work not affecting the tabulation of final pay quantities. In these situations virtually all detail checking can be completed without having to be redone after contract acceptance. It will be the responsibility of the Area Construction Engineer to advise the District Administrator of any circumstance requiring accelerated operation.

APPENDIX B – Procedures for Checking Individual Pay Items

Procedures for determining the final pay quantity on projects with Regular Excavation are outlined in the following.

1. Determine whether regular excavation is to be paid by plan quantity or by cross section.

2. Check the grading summary in the plans for the total plan quantity. If a project is not to be paid on a plan quantity basis, then obtain the slope books and final level books. Check the computations and plot the cross sections.

3. Check the plans for revisions of the plan quantity (increase or decrease) items.

    a. Compute a revised plan quantity and obtain the total quantity of topsoil removed from fill areas; from excavation notes; Inspector's cross sections or road design cross sections.

    b. On "Minimum or No Plan " projects, extra excavation should be verified using either haul counts from the Inspectors records or actual computation of volumes from field measurements.

    c. Total the regular excavation summary.

4. Check computations on entrances, excavation below subgrade, drainage ditches and channels against the entries listed in the regular excavation (measured) summary. Total the quantity in the regular excavation (measured) summary.

5. Total the regular excavation summary quantity and the regular excavation (measured) quantity to obtain the total pay quantity.

6. Check the Inspector's regular excavation summary items against the Inspector's excavation notes.

7. Check the total pay quantity against the regular excavation quantity and change the actual quantity to the pay quantity if they are different.

    At the discretion of the Design Unit Supervisor, the cross sections (both slope stake and final) can be checked and plotted utilizing electronic data processes. Excavation quantities can also be obtained by this method for analysis by the final review unit.

    In the event that this data is to be obtained in this manner the procedures indicated in other sections of this manual are to be followed.

***Procedures for determining the final pay quantity on projects with Borrow Excavation are outlined in the following.**

1. Check the levels and cross sections in the original and final level books on borrow pit cross sections.

2. Plot and check the original and final ground lines. **

3. Check areas. **

4. Compute and check the yardage or cubic meters. **

5. Check for any disallowed fill on the borrow pit cross sections and mainline cross sections.

6. Check areas; Compute and check the yardage or cubic meters of all disallowed fill.

7. Subtract item (6) from item (4) to obtain the pay quantity on borrow excavation

* Note that these procedures are not applicable on "Minimum or No Plan" projects.
** Also note that certain elements of these steps will be accomplished by means of Line Remote Tele-processing terminals.

Procedures for determining the final pay quantities on projects with Box Culverts are outlined in the following.

1. Description should include the station, length, size, standard and degree of skew, height of cover, and type of wings.

2. Quantities for both concrete and steel are to be computed using the applicable values for box culverts as indicated in the contract designated edition of Standard Bridge Designs.

3. Note that when a box culvert structure is completed without the necessity of altering either the length, size, or number of reinforcing bars detailed on the plans, the Department will pay for the plan estimated quantity for reinforcing steel, provided the plan and shipping invoice quantities agree within plus or minus (1) percent.

4. In the event that an alteration was made in the structure which affected the quantity of reinforcing steel, or in the event that the plan and shipping invoice quantities do not agree within plus or minus one (1) per cent, payment must be made for the actual quantity used (as determined by the Project Inspector). (Total length of each size bar multiplied by its theoretical unit weight). The weight of the reinforcing steel used for lapping will not be allowed.

5. Computations should indicate any additional concrete and steel required in both the headwall and curtain wall due to the skew of the structure.

6. The transfer of quantities from the diary to the summary should be checked and all totals verified.

Procedures for Pipe Culverts

1. Check the length of pipe, the size of pipe, the type of pipe, the number of joints and the length of each, and the number and type of endwalls.

2. The number of joints times the individual length should equal the total pay length of pipe. Payment for partial joints should be in accordance with the Construction Manual.

3. Check the amount of concrete used for endwalls against the standard quantities for diameter and type of pipe used.

4. Check the transfer of quantities from the diary to the summary and check the totals.

5. A Materials Technician should check the total quantity to ascertain that the total quantity used has been tested.

6. Note that in order to properly index and inspect the Department's many structures, all structures which are incorporated in a highway project and which exceed 36 square feet (3.3 square meters) in opening, shall be brought to the attention of the appropriate District Structures and Bridge Engineer in order that a structure number may be assigned or appropriate revision to the Structure Inventory System be made.(HTRIS) This includes new structures, replacing, improving or otherwise altering an existing structure by the Structures and Bridge and / or the Location and Design Divisions

Review Procedures on Work Orders (60" (1,500 mm) Pipe Used as Example)

1. Before making a final review of drainage items, review all work orders to ascertain that all work orders apply to drainage items.

2. Check the Inspector's alignment against the alignment notes under the corresponding station number

3. Check all notes in the diary against the applicable pipe summary. (separate summary shown for each work order)

4. Verify the total quantity by adding the items in pipe summary or the work order summary.

5. Check the total pay quantity from the pipe summary or the work order summary against the actual quantity listed in the "Reasons for Differences" and then indicate the actual quantity used to the total pay quantity, if different.

6. Upon completion of the Road Design Final of all items, a Materials Technician shall visit the Road Design Section at which time he is furnished with the final quantity from the pipe summary or work order summary for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials Technician shall indicate the actual quantity in agreement with the final quantity shown in the pipe summary or work order summary.

Review Procedures for End Sections

1. Check the diary for all drainage items. Check the inspector's alignment sketch against the alignment notes under the corresponding station number.

2. Check the alignment notes in the diary against the end section summary.

3. Verify the total quantity by adding the end section summary.

4. Check the total pay quantity from the end section summary against the actual quantity in "Reasons for Differences" and change the actual quantity used to the total pay quantity, if they are different.

5. Upon completion of the Road Design Final Review, a Materials Technician shall visit the Road Design Section at which time he is furnished with the final pay quantity from the End Section Summary for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials Technician indicates the actual quantity used in the Materials Notebook in agreement with the final pay quantity in the End Section Summary.

Review Procedures for Drop Inlets

1. Check the diary for all drainage items.

2. Check the inspector's alignment sketch against the alignment notes under the corresponding station number.

3. Check the alignment notes in the diary against the drop inlet summary. Compare the plan height to the actual height and apply payment adjustment as outlined in Section 302.04 of the Specifications if necessary.

4. Verify the total quantity by adding the drop inlet summary.

5. Check the total pay quantity from the drop inlet summary against the actual quantity in "Reasons For Differences"[8] and change the actual quantity used to the total pay quantity, if they differ.

Procedures for Curbing, Combination Curb & Gutter, Sidewalk, etc.

1. Notation should include the beginning and ending stations, description and the length or full dimensions as required. Examine the standards to determine if the dimensioning is adequate, and, if not, question the Inspector. **These items are now usually designated as plan quantity items in which case detailed measurements would not be necessary.**

2. Check the transfer of quantities from the diary to the summary and check the totals.

Procedures for Linear Foot (Meter) Measured Items

1. Notation in the diary should include beginning and ending stations, and sufficient dimensions necessary for determining the actual length used.

2. Check the transfer of quantities from the diary to the summary and check totals.

Procedures for Retaining Walls

1. Notations in the diary should include beginning and ending stations, type of wall, and sufficient dimensions for determining the actual volume of concrete or reinforcing steel used. **Standard retaining walls (RW-2 & RW-3) are now plan quantity items.**

2. Check the transfer of quantities from the diary to the summary and check the totals.

Procedures for Steps

1. Notations in the diary should include the station, width and number. If standard, the pay quantities may be obtained from the tables in the Book of Standards. If not standard, the full dimensions must be given and computations shown for the concrete and reinforcing steel quantities.

2. Check the transfer of quantities from the diary to the summary and verify the totals.

[8] Awarded Quantity vs. Final Quantity

Procedures for Fencing

1. Notation in the diary should include the beginning and ending stations, type, length, location and number of line and corner braces, and the number, type and size of gates.

2. Check the transfer of quantities from the diary to the summary against the workbook and verify the totals.

3. Check the summary total against the total shown in the Inspector's "Reasons for Differences." **It is noted that fencing is usually listed as a plan quantity item and as such detailed measurements would not be necessary.**

Procedures for Guardrail

1. Check the stations and the lengths shown for guardrail in alignment sketches and notes against the entries in the summary.

2. Check the summary total.

3. Check the summary total against the total shown in the Inspectors "Reasons for Differences."

4. Check with the Materials Division to confirm that the quantities tested or certified lots equal or exceed the pay quantities.

Procedures for Standard and Radial Curb

1. Check the stations and the lengths of curbing included in the alignment notes and sketches against the Inspector's summary.

2. Check the summary total.

3. Check the summary total against the total shown in the Inspector's "Reasons for Differences." **It is noted that this item is normally listed as a plan quantity item and as such detailed measurements would not be required.**

Procedures for Concrete Class A-4 (Class 30) Bridge Approach Slab

1. Review the roadway plans to determine which bridges have bridge approach slabs Concrete Class A-4 or Class 30. When the bridge approach slabs are on the bridge contract, bridge plans must be reviewed.

2. Check the alignment sketches in the diary against the applicable bridge approach plan sheet to determine if bridge approach slabs were built.

3. Check the bridge approach slab Concrete Class A-4 or Class 30 summary to determine if the Inspector certified that the subject bridge approach slabs were built according to the plans.

4. Using roadway plans, total the quantities shown on the bridge approach slab sheets, and check the bridge approach slab Concrete Class A-4 or Class 30 summary against the total quantity.

5. Check the total pay quantity from the Bridge Approach Slab Summary against the actual quantity in the "Reasons for Differences" in the summary sketchbook.

6. Upon completion of the Road Design Final Review of all items, a Materials Technician assigned to the audit of Materials Notebooks and final records shall visit the Road Design Section, at which time he is furnished the final quantities from the Bridge Approach Slab Summary (Concrete Class A-4 or Class 30 and reinforcing steel) for checking against the total quantity tested in the Materials Notebook.

Procedures for Paved Ditch

1. Check the stations, length, type and depth shown in the alignment sketches and notes against the computation of square yards (square meters) and their entry in the summary.

2. If the Inspector indicates (by note) that the field measurements show that the paved ditch dimensions are in accord with those shown in the standard, it will be satisfactory to determine the square yards (square meters) of surface area by utilizing values found in the Road Design and Standards.

3. Check the summary total.

4. Check the summary total against the total shown in the Inspector's "Reasons for Differences." **It is noted that this item is normally listed as a plan quantity item and as such detailed measurements would not be required.**

Review Procedures for Allaying Dust

1. Check the diary entries against the daily entries on Form C-79.

2. Verify the total quantity.

3. Check the total pay quantity on Form C-79 against the actual quantity in "Reasons for Differences" and change the actual quantity used to the total pay quantity if they differ.

Review Procedures for Liquid Asphalt Material

1. Verify by adding the total quantity in the Liquid Asphalt Material Summary.

2. Add net gallons (already adjusted to 60ºF (15ºC) on the invoice) to obtain the total quantity shipped.

3. Verify that the total quantity shipped as shown on the invoices equals or exceeds the total quantity shown in the Liquid Asphalt Material Summary.

4. Check the total quantity from the liquid Asphalt Material Summary against the actual quantity in the "Reasons for Differences" and change the actual quantity used to the total pay quantity, if they differ.

5. Upon completion of the Road Design Final Review of all items, the Materials Technician assigned to audit Materials Notebooks and final records shall visit the Road Design Section, at which time he will be furnished with the final quantity from the Liquid Asphalt Material Summary for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials Technician shows the actual quantity used in the Materials Notebook in agreement with the final quantity in the Liquid Asphalt Material Summary.

Review Procedures for Asphalt Concrete Courses

1. Check the total quantity TL-102A.

2. Check the deductions that are required because they are outside allowable tolerances and check the transfer of deductions against the Summary (where applicable).

3. Check the total pay quantity from the Asphalt Concrete Summary against the actual quantity in "Reasons for Differences" and change the actual quantity used to the total pay quantity if they differ.

4. Upon completion of the Road Design Final Review of all items, the Materials Technician assigned to audit Materials Notebooks and final records shall visit the Road Design Section, at which time he will be furnished with the final quantity from the Asphalt Concrete Summary (prior to application of over-depth quantity deduction) for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials Technician should show the actual quantity used in the Materials Notebook in agreement with the final quantity in the Asphalt Concrete Summary.

Procedures for Crusher Run Aggregate

1. Check the total quantity of tickets against TL-102A.

2. Check the summary total.

3. Check the summary total shown in the Inspector's "Reasons for Differences."

4. Check the Materials Division to confirm that the quantities tested equal or exceed pay quantities.

Review Procedures for Sub-Base Course and Aggregate Base Material

1. Check the total quantity added each day against Form TL-102A.

2. Compute the reduction in quantity for over-depth on sub-base course aggregate base and apply it as a deduction to the total quantity in the summary.

3. Verify the total pay quantity after applying the above quantity adjustment in Step 4.

4. Check the total pay quantity from sub-base course aggregate base summary against the actual quantity in "Reasons for Differences" and change the actual quantity used to the total pay quantity if they differ.

5. Upon completion of the Road Design Final Review of all items a Materials Technician assigned to audit Materials Notebooks and final records shall visit the Road Design Section, at which time he will be furnished with the adjusted final quantity from the Sub-base Course and Aggregate Base Summary (prior to the application of over-depth quantity deduction) for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials Technician shows the actual quantity used in the Materials Notebook in agreement with the final quantity in the Sub-base Course and Aggregate Base Summary.

Procedures for Reduction in Price on Items for Non-Compliance

1. Upon completion of the final review of all items, remove all memorandums for price reduction for non-compliance from the Road Design Correspondence folder and the District Administrator's General correspondence folder. Only after this stage can a draft of the final estimate be prepared.

2. Contact the Materials Technician assigned to audit Materials Notebooks and final records in the materials Division to confirm that all memorandums for price reduction for non-compliance have been issued on the project.

3. Compare all memorandums for price reduction for noncompliance obtained from the Road Design Correspondence Folder to the ones obtained from the General Correspondence Folder to determine if all the above memorandum issued have been received.

4. Separate (by item) all memorandums for price reduction for non-compliance.

5. Compute the price reduction (for each individual memorandum) on each memorandum. (Tons or metric tons represented on the memorandum x price per ton or metric ton on the contract x penalty points percentage = price reduction)

6. Total all price reductions for each item to obtain the total dollar deduction for aggregates and bituminous concrete.

7. Transfer the price adjustment for non-compliance to the final estimate.

Procedures for Fertilizer & Lime

1. Total the invoices by adding the "total shipped" on the invoices.

2. Check the total tons or metric tons shipped on the invoices against the total tons or metric tons shown in the Summary to verify the total tons or metric tons shipped equals or exceeds the total quantity used.

3. Check for any changes in fertilizer type and make adjustments for the ratio used.

4. Check the total pay quantity in the Summary against the actual quantity shown in the "Reasons for Differences."

5. Upon completion of the Road Design Final Review of all items, a Materials Technician assigned to audit Materials Notebooks and final records shall visit the Road Design Section, at which time he will be furnished with the final quantity from the Summary for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials Technician assigned to audit Materials Notebooks and final records should show the actual quantity in agreement with the final quantity shown in the Summary.

Procedures for Seeding

The inspector should document regular seeding (which includes mulch) or over-seeding (which does not include mulch) on Form C-79 and in the summary of quantities used on the project. This documentation will serve as a record of the quantity of seed used and when completed, the tag on the bag of seed may be disposed of.

Procedures for Concrete Class A-4 (Class 30)

1. Check the applicable sheets in the Structure Diary to obtain the total quantity. The quantity in the Structure Diary should be checked against the total in the Summary. Check the General Notes Section for the Inspector's certification that the superstructure was constructed in compliance with plans and that plan quantities are allowed. The deck probe depths should be shown in the general notes. The Bridge Section will compute the allowable over-depth quantity.

2. Check the bridge plans to obtain the total pay quantity for Concrete Class A-4 (Class 30)

3. Check the total plan quantity on the bridge plans against the Concrete Class A-4 (Class 30) total quantity shown in the Summary. The Bridge Section then adds the total computed over-depth quantity to the total quantity shown in the Summary to obtain the final pay quantity.

4. Check the total pay quantity from the Summary against the actual quantity shown in "Reasons for Differences." The Bridge Section then adjusts the total quantity in "Reasons for Differences' to reflect the final pay quantity from the Summary.

5. Upon completion of the L & D Review of all items, a Materials Technician assigned to audit Materials Notebooks and final records shall visit the L & D Section, at which time he will be furnished with the final quantities from the Summary. This is to be used for checking against the components tested (cement, fine aggregate, course aggregate) shown in the Materials Notebook to determine if the total quantities of components tested equals or exceeds the final pay quantity.

Procedures for Reinforcing Steel

1. Check the plans for revisions.

2. Check the correspondence and the Inspector's General Notes for any authorized adjustments to plan quantity.

3. Check for a notation that the superstructure or substructure was constructed in accordance with the plans and plan quantities allowed.

4. If there are no revisions or adjustments, then pay for the plan quantity.

5. If there are revisions or adjustments, apply these to the plan quantity to equal the pay quantity.

6. Check the total in the Summary against the total shown in the Inspector's "Reasons for Differences."

7. Check with the Materials Division to confirm that the quantities tested equal or exceed the final pay quantity.

Procedures for Piles

1. Check the information on the pile driving records against the entries in the summary.

2. Total the pay length columns to check the Inspector's total.

3. Check the entry of the total in the Summary.

4. Check the total in the Summary to confirm that the total in the summary was transferred to the Inspector's "Reasons for Differences."

5. Check with the Materials Division to confirm that the quantities tested equal or exceed the pay quantities.

Procedures for Structure Excavation

1. Check the Inspector's Original Ground Notes in the Bridge Diary for accuracy of extensions. (H.I. – Rod Reading = Original Ground Elevation)

2. Review the Bridge or Structure Plans for bottom of footing elevations.

3. Verify the cut depths in the Original Ground Notes in the Bridge or Structure Diary by subtracting the bottom of footing elevation from the original ground elevation.

4. Verify the cut depths (measure to nearest 0.1' or 0.05 meter) with the Inspector's sketches in the Bridge or Structure Diary.

5. Verify that the dimensions in the Inspector's sketches are no more than 18" (450 mm.) outside the neat lines shown on the bridge or structure plans.

6. Verify the Inspector's computations.

7. Total the quantities by adding each section's total quantity in the Structure Excavation Notes in the Bridge or Structure Diary.

8. Verify the total quantity for each substructure unit in the Structure Excavation Notes in the Bridge or Structure Diary with the total quantities in the Summary.

9. Verify the total quantity by adding the structure excavation in the General or actual Quantity Summary.

10. Check the total pay quantity from the Summary against the actual quantity in the "Reasons for Differences." **It is noted that this item is now usually listed as a plan quantity item, and as such no measurement would be required.**

District Survey Review and Preparation Procedures

Borrow Pits

Borrow pits must be cross-sectioned or DTM, prior to top-soiling the borrow pit, using the same base line stations and bench marks used in staking out the borrow pits. Cross sections must be taken which insure an accurate computation of the volume of the material removed. If it becomes necessary to take a final cross section or DTM at a point not covered by an original ground section, an original ground section must be interpolated and shown in the proper space in the Original Level Notebook or ASii file format. The actual beginning and ending of the excavation must be shown. In the case of more than one borrow pit, the pits must be numbered to correspond with the number used in staking them out.

On projects requiring small amounts of borrow material and where actual measurements are difficult to obtain, payment may be made for as "load count measurement" as indicated in Section 109.01 of the Specifications. This applies, in particular, to "Minimum or No Plan" projects.

Also in accordance with Section 109.01 of the Specifications and when approval is given by the Engineer in writing, material specified to be measured by the cubic yard may be weighed and such weights converted to cubic yards for payment purposes. Factors for conversion from weight to volume measurement will be determined by the Engineer and shall be agreed to by the contractor before they are used.

Contract Surveying

The Contractor's field books as noted in the surveying special provision are to be turned in to the Project Inspector prior to making 100% payment for construction surveying.

APPENDIX C – District Section Review Steps

Procedures for Computing Final Quantity Excavation by Data Processing Methods

1. As noted in Location & Design IIM-LD 152.6, it has been determined by the Department that there is little or no justification for taking digital terrain or cross sections on plan quantity projects at the time of construction stakeout. Please refer to this instructional and informational memorandum for guidance. If additional cross sections are required, please be guided as follows.

2. Original cross sections will be used in lieu of slope stake cross sections whenever possible. However, when it is necessary to take slope stake cross sections, the Transportation Engineer in charge of the survey will make the notebooks or electronic files available to the Transportation Engineering Programs Supervisor upon completion of the slope stake survey.

3. After reviewing the cross sections for completeness, the data will then be processed by the District Design Unit.

4. The District Designer will request edited cross section data and a digital listing showing error indications.

5. The District Design Unit will correct the listing and resubmit any corrections or update of files. If applicable, survey files at that time will be returned to the Transportation Engineer.

6. A corrected digital cross section listing will be obtained. Should plotted original cross sections be desired at this time, these will be requested by the District Design Unit and plotter information will be developed and supplied by the Richmond Central Office Information Technology Division. (This will be necessary for urban and certain other projects which will use these plotted sections for developing further final data by manual methods)

7. District design personnel will prepare electronic computer input data for the development of theoretical digital roadway design base on the slope stake survey. This will require the following:

    a. Reviewing and updating previously coded data which was used for original design purposes.

    b. Complete coding of input data for projects which did not use computer methods in original design.

This work should be accomplished as soon as possible after the corrected cross section information is available to the District Office.

7. The District Design Unit will develop and maintain roadway design information in their computer files using slope stake survey and input controls as mentioned above.

8. When the final survey is completed, the survey files will be received by district design personnel for processing and editing.

9. The District Design Unit will process and edit final cross section data and obtain a digital cross section listing showing the errors.

10. The District Design Unit will make the necessary corrections to the cross section listing.

11. The District Design Unit will compute earthwork areas and volumes using slope stake and final cross sections.

12. The Design Unit will prepare plotter data and furnish plotted cross section information to the District Design Unit for the following:

    a) Original cross section and/or slope stake cross section (as applicable)
    b) Final "As Built" Survey
    c) Theoretical design

In certain urban and other projects the theoretical design cannot be plotted by electronic means and must be added manually. Steps 10-12 above should be completed and data returned to the District Design Unit within thirty (30) days of receipt of the final cross section survey.

13. Upon receipt of the data indicated in Item 12, the final review unit will proceed to verify the actual final pay quantities as indicated.

Procedures for the Review and Preparation of Bridge Finals by the District Structures and Bridge Office

Before final acceptance, the bridge should be inspected by the District Structures and Bridge Engineer for general conformity to the contract, plans and specifications, and then accepted as complete after any necessary corrections have been made by the Contractor.

The following steps should be followed by personnel preparing bridge finals after the project is completed and accepted:

1. Receive the "as-built" plans, diaries, delivery tickets, pile driving records, summary of quantities, Reasons for Differences and a copy of the Construction Workbook Data Disk from the District Contract Administrator.

2. Obtain the project folder from the District Contract Administrator to review the contract and all work orders.

3. Obtain approved shop drawings from reviewing authority (VDOT/Consultant)

4. Verify that the inspector has marked in red any changes on the BW prints such as elevations, dimensions, footing depths (showing average depths in feet and to the nearest tenth of a foot), etc. The inspector should provide sketches of pile layouts consisting of pile locations, test piles, north arrow, and identification number of each pile to correspond to the pile driving records and show all information on BW prints that is necessary for computation of final quantities.

5. Verify that alterations in construction are minor and reasonable or in accordance with general notes, specifications, work orders or as directed by the Engineer. Call in the Project Inspector (if needed) to explain any discrepancies or answer questions that the checker may have.

6. Check the inspector's computations of quantities in red with light marks near the inspector's figures. When computations disagree with those of the inspector, mark corrections nearby, making the computations as brief as possible. Never erase, mark over, or alter any of the inspector's recorded data. The names of the checker and rechecker shall be noted on the front cover of the document being checked, along with the date and the function performed, with the same color pencil used while performing the function. Project records shall not be submitted for filing without appropriate signature.

7. Check delivery tickets, form C-79, and diaries for proper signatures and authorization in compliance with the Construction Manual – Appendix C and the Manual of Instruction – Materials Division, Chapter VIII.

8. For bridge projects included in roadway contracts, prepare the final estimate and combine it with the roadway final estimate for the contractor's review.

9. For bridge only contracts, contact the District Materials Section to verify that the contract items are covered by tests/certifications/approved lists/etc. and consequently eligible for payment. Bridge projects are typically handled the same as other projects, just that the Bridge Section checks the final records. Prepare the final estimate and transmit along with a copy of the District Materials Division letter of approval to the District Contract Administrator for the contractor's review. After the contractor's review of the final estimate, complete the draft of the final estimate and return it to the District Contract Administrator.

10. If a contract is for a federally funded project greater than $5,000,000.00 or the project has Federal Oversight, complete a Reasons for Differences Summary (Formerly Form C-55) and submit it with the final estimate after the Contractor's review.

11. Bridge and structure projects with plans, both contract and state forces work, shall be marked for the "as-built" condition upon completion of the work. This shall include, but not be limited to bridges, retaining walls, box culverts, demolition plans if separate from structure plans and any other plan that requires the posting of finals by the Structure and Bridge Division or which will be filed within Structure and Bridge files for future reference. Appropriate entries on the "as-built" plans shall be provided to maintain an accurate permanent record of completed construction. The "as-built" plan preparation should be considered as important as the checking of any other project documentation that serves to support the authorization and payment of final quantities on the final estimate. Prepared correctly and thoroughly, the "as-built" plans provide a permanent record of the actual structure features which may influence or affect future work at the project site.

    As soon as the construction field information is received from the District Contract Administrator, the original drawings for all project structures shall be requested by plan number in writing from the Central Office Structure and Bridge File Room.

    Since the final quantities have been approved for payment, the original drawings shall be marked for the "as-built" condition. Items to be noted shall include, but not limited to, the actual quantities for field measured items, the pile lengths, field revised dimensions, voided sheets, types of materials actually used when options are shown on the plans, specifics concerning types of paint systems and any departures from the original plans.

    The title sheet shall be marked "AS BUILT" in large, bold letters next to the title block. Also, the drawings shall be marked "Finals posted by (name) district on (date posting)" near the original plan date. "Bridge built by (contractor's name)" shall be shown. Small projects or projects not requiring revisions may be marked "Bridge / Structure built according to the plans, (date of posting)".

The word “ESTIMATED” in the Estimated Quantities block shall be deleted by marking through it with a single line and writing the word “ACTUAL” immediately to the left of it. “As-built” quantities and dimensions shall be shown by marking through the original figure with a single line and writing the revised figure either above or beside the original figure. Complete views shall be voided by diagonal hatch lines on the back of the drawing when applicable. The entire sheet shall be voided, where applicable, by writing the word “VOID” in large, bold letters across or near the title block. An additional sheet may be drawn to replace an original drawing or to document a major structural feature not provided for in the original drawings.

When the number of piles in a substructure element is ten (10) or less, each pile length shall be noted above or beside the individual pile location on the drawing. When the number of piles in a substructure element exceeds ten, note only the maximum and minimum lengths of piles above or beside the individual pile locations which satisfy the criterion. A plan view of the footing outline with pile locations and lengths shall be sketched on the drawing if not otherwise shown. The average length of piles in the substructure element shall be shown by writing “The average length of piles is ____ linear feet (meters) near the pile location sketch.

Unusual utility items or other subsurface features such as old footings, etc. which may influence future work at the project site should be noted.

Sheets marked “File with Plan No. ___ until finals are posted” or similar wording, shall be withdrawn at this time from the original drawings and discarded.

Upon completion of the “as-built” plans, the original drawings shall be transmitted back to the Central Office Structure and Bridge File Room for filing and eventual archiving. The preparation and transmittal of the “as-built” plans should be considered a routine task within the scope of the finals posting process and performed in an expeditious manner in order to ensure an accurate permanent file record.

12. Bridge and structure projects without plans (i.e. SAAP projects) will require a Maintenance Data Sheet to include the name of contractor, types of work performed, location of work, actual quantities, pertinent sketches from SAAP contracts and types of materials such as expansion dams and paint systems or other special items used.

    The Maintenance Data Sheet shall be marked “Finals posted by (name) District on (date of posting)” near the title block.

    Upon completion of the Maintenance Data Sheet it shall be transmitted to the Central Office Structure and Bridge File Room for filing and eventual archiving.

The preparation and transmittal of the Maintenance Data Sheet should be considered a routine task within the scope of the finals posting process and be performed in an expeditious manner in order to ensure an accurate permanent file record.

13. Shop drawings shall be transmitted to the Structure and Bridge File Room for archiving. Cut sheets shall be archived as directed by the District Structure and Bridge Engineer.

14. The final records are then sent to the District Location and Design Section for filing.

15. Posting Final Quantities – Tabulate and index final quantities in the inspector's summary for all pay items shown in the contract (including work orders) following the order shown on the plans. Substructure items are listed first and totaled before superstructure items are summarized.

16. The records are then cross-checked, and the estimate and reasons for differences assembly is then sent to the District Design Unit.

17. If the contract was for a bridge project only, the final records are cross checked. Notify the Area Construction Engineer by letter, advising of the time limit that the final estimate can be reviewed by the contractor. After the Contractor's review of the final estimate, complete the draft copy of the final assembly.

18. Send the final estimate and project folder to the District Contract Administrator. The final records are then sent to the Design Unit for filing.

19. Mark the original structure plans for "As-built" conditions and transmit them to the Central Office for archiving in accordance with instructions.

District Materials Engineer – Review Procedures

Operations and Procedures in the District – For more detailed instructions on acceptance, reporting, and certification of materials, refer to the Manual of Instructions for the Materials Division.

1. Materials Notebooks are received from the District Design Unit or District Contract Administrator by cover letter.

2. Materials records, test reports, and certifications are obtained from project files for checking.

3. If the project is a Special Project (Minimum or No-Plan, As-Built, Safety, Signalization, etc.) refer to Sections 207 and 208, Manual of Instructions, for documentation procedures.

4. The title sheet of the Materials Notebook is checked. Check the proper posting of Estimated Quantity of Materials, Work Orders, or any special handling of material quantities. Check to see if the notebook has been signed by the Area Construction Engineer, the Construction Project Manager and the Project Inspector.

5. Each item in the Materials Notebook is checked in red pencil denoting that the material meets VDOT specifications and that a test report, certification, etc. has been issued. All items should be summarized. The summary is then checked against the section column showing the total tested quantity. Quantities of tested materials must equal or exceed quantities of used materials.

6. All transfers of materials are cross-checked as being released from and received on a project for the applicable items.

7. Price adjustment data on specifications for central mixed aggregate, asphalt concrete, and any other materials on which price adjustment may have been applied, is checked. Standard deviation for variability (statistical specifications) from each source is checked and sent out, if this applies. Test reports and materials notebook are cross-checked with Form TL-102A to see if they agree.

8. If a Federal-Aid project is involved, the necessary number of Independent Assurance Samples are checked, as well as the comparison with applicable acceptance samples and documented reasons for differences if necessary. (See Sections 202 and 206 of the Material's Division Manual of Instructions)

9. Verify all depth and density reports.

10. Verify Form TL-136 reports for Independent Assurance depth and density tests, if required.

11. The Finals section and the District Design unit are contacted to check for price adjustment data before computing the quantities for the final estimate on central-mixed aggregate and concrete. After computation of pay quantities for the final estimate, a review is then made to see that tested quantities equal or exceed actual pay quantities for the final estimate.

12. If a shortage of tested materials exists at the time of final checking, every effort is made to secure to secure the necessary test or certification coverage for the item in question before releasing the final estimate. If coverage cannot be obtained at this time, an explanation of the documentation is made.

13. If everything is in order, certification is attached to the Materials Notebook and signed by the District Materials Engineer.

14. The District Materials Engineer then prepares a materials certification on Form TL-131 or TL-131-2 for the District Administrator and for transmittal to the Federal Highway Administration. The certification states that the appropriate reports covering tests or certifications as to the conformity with specifications of materials on the project are on file by project numbering in the office of the District Materials Engineer. Currently, price adjustment data is not sent to the F.H.W.A. The form TL-131 reports only whether or not the amount of proper testing was performed and whether or not all materials meet specifications. Materials not meeting specifications are listed along with explanations justify their use on the project. Price adjustments are done within specifications and therefore are not listed.

    The Materials Certification Letter shall only be sent to the FHWA on projects that are on the National Highway System and receive federal aid.

    This document should be forwarded to the District Contract Administrator, and included in the finals package that is then forwarded to the Scheduling and Contract Division's Contract Section.

    Price adjustment sheets for any materials that are accepted outside of specification limits, and showing to the extent to which they do not meet the specifications are to be attached to the certification.

16. This assembly is then forwarded to the District Design Unit Finals Section / District Contract Administrator by cover letter for issuance of the certification to the Federal Highway Administration.

17. One (1) copy of the certification (TL-131 or TL-131-2) with attachments noted under Item 15 is sent to the Federal Highway Administration, before final payment can be made on a Federal-Aid project.

One (1) copy of the certification with attachments noted and one (1) copy of the estimate are sent to the State Materials Engineer.

18. The Materials Notebook may be retained by the District Contract Administrator's Office, Materials Office or the District Administrator's Designee, until notification is received to purge / archive files. The Materials Notebook, prior to purging, will be subject to further review and audit (on a random basis) by the office of the State Materials Engineer. (See "Materials Division – Operations and Procedures – Central Office" herein for additional details.)

19. The Materials Section has forty –five (45) days from the time of receipt to check the notebook.

Regional Traffic Engineer – Procedures for Recordkeeping

The Following steps should be followed by the Regional Traffic Engineering Section when a project is completed and accepted.

1. Receive the “As Built” Traffic Control Device plans and other records related to the installation of traffic control devices which are the responsibility of the Department for maintenance purposes.

2. File the applicable shop drawings for signal poles, lighting poles, overhead sign structures, other traffic control device structures and foundation designs for such with the “As Built” Traffic Control Device Plans received in Item 1.

3. Retain shop drawings until such structure is removed and no longer utilized. Retain “As Built” Traffic Control Device Plans and other records until new construction provides new “As Built” Traffic Control Plans and other records.

4. Modify “As Built” Traffic Control Device Plans when minor changes are made in the field by state forces or others and new “As Built” Traffic Control Plans are not required.

5. The Regional Traffic Engineer should dedicate a specific location for these files to be retained in their office. In order to conserve space, archiving of all data is allowable.

Materials Division – Central Office Personnel

The following guidelines should be followed by the Central Office Section of the Materials Division when processing project finals.

1. After the receipt of the final estimate and TL-131, the Central Office Materials Division will randomly select projects to audit / review. Generally, 10 percent of the projects will be selected or a minimum of one (1) per month per District. The District Contract Administrator will be notified which projects have been selected, and will forward the Materials Notebook to the Central Office Materials Division for review. (See “Operation and Procedures in the District” herein.)

2. The book is then reviewed and checked by the Central Office Materials Division using similar procedures, as outlined for the District Materials Engineer in a previous section.

3. Central Files are checked against the Materials Notebook to determine that they contain all necessary test reports, etc. Any missing reports are obtained. These files are then maintained for the required retention period.

4. After determining that the Materials Notebook is in order, the Central Office Materials Division will return it with a transmittal letter to the District Contract Administrator for retention. If any discrepancies have been found during review, these will be noted in the transmittal letter together with any corrective measures necessary.

Internal Audit Division
Review Procedures – Central Office

The project inspector and designated review team are responsible for ensuring that the TL-102A's represent information contained in the recorded delivery tickets. The TL-102A's may be examined in connection with the performance of planned internal audits. The TL-102A is processed in the following manner:

The TL-102A is distributed after the inspector has verified that it represents the material received on the project. The original copy and all other data is processed up to the finalization state and filed, since it will be the certified record of material delivered to the project. The TL-102A may be handwritten and delivered in person or electronically generated and e-mailed for acceptance of materials being shipped. (MD 281-06 / CD-2006-3)

The District process is as follows:

1. The Project Inspector processes and reconciles the delivery tickets and the TL-102A as set forth in the above paragraph.

2. The District Design Unit or other designated review team confirms that the TL-102A does represent the material used on the project as evidenced by the delivery tickets.

3. During the performance of planned audits, the Internal Audit Division will:

    a. Review the reasonableness of TL-102A's during the performance of planned audits.

    b. Review a sample of the delivery tickets and compare the same to applicable TL-102A's during the performance of audit test-work.

    c. Report exceptions noted during the review of delivery tickets and TL-102A's to the appropriate authority.

    d. Recommend appropriate corrective action to resolve noted exceptions.

List of Accuracy Required on Contract Items

Daily Entries, Monthly Estimates and Finals

Item	Imperial	Metric
Aggr. Base Material	0.01 Ton	0.01 MTon
Aggr. Base Material Cem. Stab.	0.01 Ton	0.01 MTon
Aggr., Cover Mat'l	0.01 Ton	0.01 MTon
Aggr., Cr. Run	0.01 Ton	0.01 MTon
Allaying Dust	0.5 Hr.	0.5 Hr.
Backwall Reconstruction	0.1 L.F.	0.05 M
Bearing Plates	LB.	0.5 KG
Bedding Mat., Aggr.	0.01 Ton	0.01 MTon
Bedding Mat., Local	0.1 C.Y.	0.1 CuM
Bridge Deck Grooving	S.Y.	SqM
Bridge Drainage Apron & Chute	0.1 S.Y.	0.1 SqM
Cement Conc., Latex Portland	0.1 C.Y.	0.1CuM
Cement, Hydraulic	0.01 Ton	0.01 MTon
Channelizing Device	Day	Day
Chloride, Calcium or Sodium	0.01 Ton	0.01 MTon
Clearing and Grubbing	0.05 Acre	0.02 HA
Cofferdam	Each	Each
Conc. Cl.	0.1 C.Y.	0.1 CuM
Conc. Entr. Pave	0.1 S.Y.	0.1 SqM
Concrete Cribbing	Cu. Ft.	0.03 CuM
Concrete Parapet	0.1 L.F.	0.05 M
Concrete Superstr. Surface Repair	0.1 SY	0.1 SqM
Concrete Substruct. Surface Repair	0.1 S.Y.	0.1 SqM
Conductor Cable	0.1 L.F.	0.05 M
Conduit	0.1 L.F.	0.05 M
Crack Repairs	0.1 L.F.	0.05 M
Curb & Gutter Pl. & Rad.	0.1 L.F.	0.05 M
Curb - Removal	0.1 L.F.	0.05 M
Dampproofing	S.Y.	SqM
Directional Island Curb	0.1 L.F.	0.05 M
Disposal of Excess Material	C.Y.	CuM
Drilled Holes (for drilled-in caissons)	0.1 L.F.	0.05 M
Elastomeric Expansion Dam	0.1 L.F.	0.05 M
Electronic Arrow	0.5 Hr.	0.5 Hr.
Embankment	C.Y.	CuM
Emergency Response	Each	Each
Equipment	0.01 Dol	0.01 Dol
Expansion Joint, All Types	0.1 L.F.	0.05 M
Expansion Joint, Removal	0.1 L.F.	0.05 M
Expansion Joint, Reconstruction (HES)	0.1 L.F.	0.05 M
Epoxy Resin Coating	S.Y.	SqM
Erosion Control Treatment	0.01 Ton	0.01 MTon
Excavation, Borrow	C.Y.	CuM
Excavation, Extra	C.Y.	CuM
Excavation, Minor Structure	C.Y.	CuM
Excavation, Regular	C.Y.	CuM

Excavation, Siltation Control		C.Y.	CuM
Excavation, Special Minor Struct.		C.Y.	CuM
Excavation, Structure	(Bridge)	0.1 C.Y.	0.1 CuM
Excavation, Temp. Dive. Channel		C.Y.	CuM
Excavation, Temp. Sediment Basin		C.Y.	CuM
Excavation, Trench		C.Y.	CuM
Excavation, Undercut		C.Y.	CuM
Fence, Chain-Link		0.1 L.F.	0.05 M
Fence, Pedestrian		0.1 L.F.	0.05 M
Fence, Reset		0.1 L.F.	0.05 M
Fence, Silt		L.F.	0.30 M
Fence, Temporary Silt		L.F.	0.30 M
Temp. Filter Barrier		L.F.	0.30 M
Fence, Wire		L.F.	0.30 M
Fertilizer		0.01 Ton	0.01 MTon
Field Office		Month	Month
Filter Cloth		S.Y.	SqM
Flagger Service		0.5 Hr.	0.5 Hr.
Flowable Backfill		0.1 C.Y.	0.1 CuM
Furnish Latex or Silica Fume Hyd.Cem.Conc.		0.1 C.Y.	0.1 CuM
Guardrail (Rad.)		L.F.	0.30 M
Guardrail (Std.)		L.F.	0.30 M
Guardrail, Removal		L.F.	0.30 M
Guardrail, Terminal GR-6		L.F.	0.30 M
Guardrail, Terminal GR-7		Each	Each
Guardrail, Terminal GR-9		Each	Each
Gutter, Cem. Conc.		0.1 S.Y.	0.1 SqM
Gutter, Entrance		0.1 S.Y.	0.1 SqM
Gutter, Grouted Rubble		0.1 S.Y.	0.1 SqM
Handrail		0.1 L.F.	0.05 M
Herbicide Spraying (Units=3,785 Liters;or 1000 Gal.)		0.01 Unit	0.01 Unit
Latex or Silica Fume Hyd. Cement Concrete		0.1 CY	0.1 CM
Labor		0.5 Hr.	0.5 Hr.
Lime		0.01 Ton	0.01 MTon
Liquid Asphalt Mat.		Gal.	L
Lumber, Treated		0.01 MFBM	0.01 CuM
Lumber, Untreated		0.01 MFBM	0.01 CuM
Manhole		0.1 L.F.	0.05 M
Manipulation		S.Y.	SqM
Materials		0.01 Dol	0.01 DOL
Median Barrier		0.1 L.F.	0.05 M
Median Barrier Service (Conc.)		0.1 L.F.	0.05 M
Median Strip		0.1 L.F.	0.05 M
Mowing		0.5 Hr.	0.5 Hr.
Mulch	(Unit=10 SqM)	0.1 Unit	0.1 Unit
Obscuring Roadway	(Unit=100 SqM)	0.1 Unit	0.1 Unit
Overhaul		Sta. C.Y.	Sta. CuM
Patching, Type		0.1 S.Y.	0.1 SqM
Patching, Type D		Gallon	L
Paved Ditch		0.1 S.Y.	0.1 SqM
Paved Flume		0.1 S.Y.	0.1 SqM
Pavement, Asphalt Concrete		0.01 Ton	0.01 MTon

Pavement Conc		0.1 S.Y.	0.1 SqM
Pavement, Demolition		S.Y.	SqM
Pavement, Street Conn		0.1 S.Y.	0.1 SqM
Pavement Planning	(FLEX. & RIGID)	S.Y.	SqM
Pavement Restoration		0.01 Ton	0.01 MTon
Pavement Marking		L.F.	0.30 M
Pavement Marking, Dotting		0.01 Mile	.01 KM
Piling		0.1 L.F.	0.05 M
Piling, Sheet		S.F.	0.1 SqM
Pilot Truck		0.5 Hr.	0.5 Hr.
Pipe, Jacked		0.1 L.F.	0.05 M
Pipe Culvert		0.1L.F.	0.05 M
Pipe, Str. Plate		0.1 L.F.	0.05 M
Pipe Water Main		0.1L.F.	0.05 M
Place Latex or Silica Fume Hyd.Cem.Conc.		S.Y.	SqM
Plant Laboratory		Month	Month
Pneumatically Applied Mortar (Shotcrete)		S.F.	0.1 SqM
Pole, Sign		0.1L.F.	0.05 M
Pole, Signal		0.1L.F.	0.05 M
Porous Backfill		C.Y.	CuM
Post, Sign		0.1L.F.	0.05 M
Preformed Elastomeric Joint Sealer		0.1 L.F.	0.05 M
Prest. Conc. Panel		S.F.	0.1 SqM
Protective Covering		S.Y.	SqM
Railing		0.1 L.F.	0.05 M
Reinf. Steel		LB.	0.5KG
Removal of Asphalt Conc. Overlay		S.Y.	SqM
Retaining Structure		S.F.	0.1 SqM
Retaining Wall		0.1 C.Y.	0.1 CuM
Riprap, Conc. Slab		0.1 S.Y.	0.1 SqM
Riprap, Conc. In Bags		0.1 C.Y.	0.1 CuM
Riprap, Dry		0.01 Ton	0.01 MTon
Riprap, Dumped		0.01 Ton	0.01 MTon
Riprap, Erosion Control		0.01 Ton	0.01 MTon
Riprap, Erosion Control Treatment		C.Y.	CuM
Riprap, Grouted		0.01 Ton	0.01 MTon
Riprap, Mortared		S.Y.	SqM
Riprap, Stone		0.01 Ton	0.01 MTon
Riprap, Bedding		S.Y.	SqM
Riprap, Ditch Liner		S.Y.	SqM
Rubble, Dry Masonry		0.01 Ton	0.01 MTon
Rubble, Mortar Masonry		C.Y.	CuM
Saw Cut		0.1 L.F.	0.05 M
Sealing Cracks		0.1 L.F.	0.05 M
Seeding, Over		LB.	0.5KG
Seeding, Regular		LB.	0.5KG
Selective Tree Removal, Trim & Cleanup		0.05 Acre	0.02 HA
Sidewalk, Asphalt Concrete		0.01 Ton	0.01 MTon
Sidewalk, Saw Cut		0.1 L.F.	0.05 M
Sidewalk, Cement Conc.		0.1 S.Y.	0.1 SqM
Sign		S.F.	0.1 SqM
Silt Barrier, Baled Straw		0.1 L.F.	0.05 M
Slope Protection, Conc. Block		0.1 S.Y.	0.1 SqM

Slope Protection, Conc. Slab	0.1 S.Y.	0.1 SqM
Sodding	S.Y.	SqM
Span Wire	0.1 L.F.	0.05 M
Steel Grid Floor	S.F.	0.1SqM
Superstr. Surface Repair, Concrete	0.1 S.Y.	0.1SqM
Superstr. WID/Repair Clean Bridge Deck	S.Y.	SqM
Substr. WID/Repair Clean Bridge Seats	S.Y.	SqM
Superstr. WID/Repair Expansion Joint Preparation	0.1 L.F.	0.05 M
Superstr. WID/Repair Replace Concrete Posts	Each	Each
Superstr. WID/Repair Replace Conc. Rails-Typ. A	0.1 L.F.	0.05 M
Superstr. WID/Repair Replace Conc. Rails-Typ. B	0.1 L.F.	0.05 M
Superstr. WID/Repair Silicone Joint Sealant	0.1 L.F.	0.05 M
Superstr. WID/Rep. Ty A Milling, 1/2"or13mm	S.Y.	SqM
Surface Preparation Cl	S.Y.	SqM
Temporary Detour	0.1 L.F.	0.05 M
Topsoil	0.10 Acre	0.04 HA
Traffic Barrier Service	0.1 L.F.	0.05 M
Trainees	0.5 Hr.	0.5 Hr.
Truck Mounted Attenuator	0.5 Hr.	0.5 Hr.
Underdrain	L.F.	0.30 M
Wall, Sound Barrier	S.F.	0.1 SqM
Warning Lights	Day	Day
Watering (Unit=3,785 Liters)	0.1 Unit	0.1 Unit
Waterproofing	S.Y.	SqM
Welded Wire Fabric	LB.	0.5KG

Revisions

The Post Construction Manual was revised on 11/13/07 to incorporate final payment details previously covered under CD-98-5. (Pages 12 -13)