

Highway Design Manual

Chapter 13 - Plans, Specifications, and Estimate

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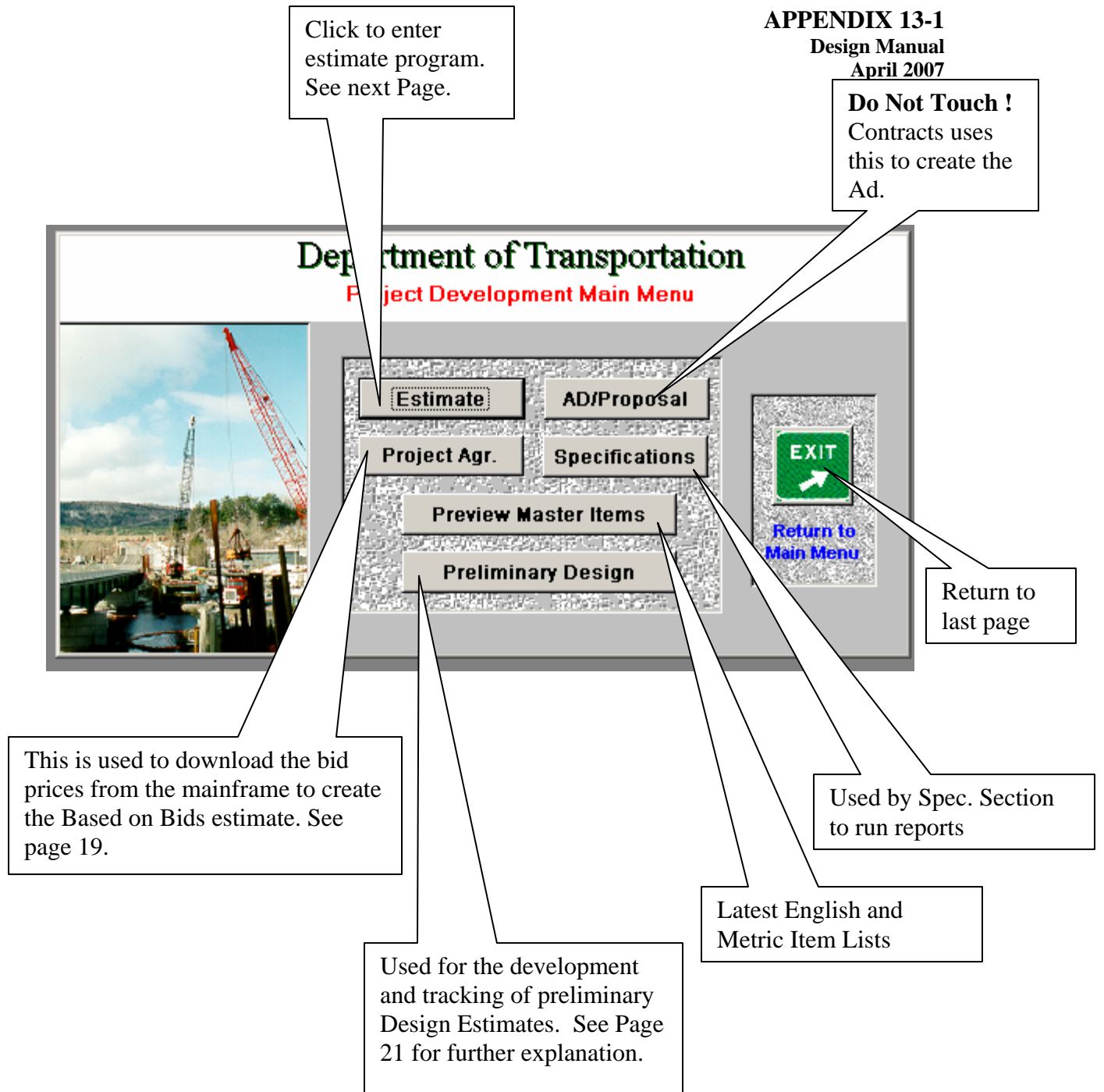
[Appendix 13-11: \(Sample\) Addendum for Revisions After Advertisement](#)

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ESTIMATE GUIDELINES

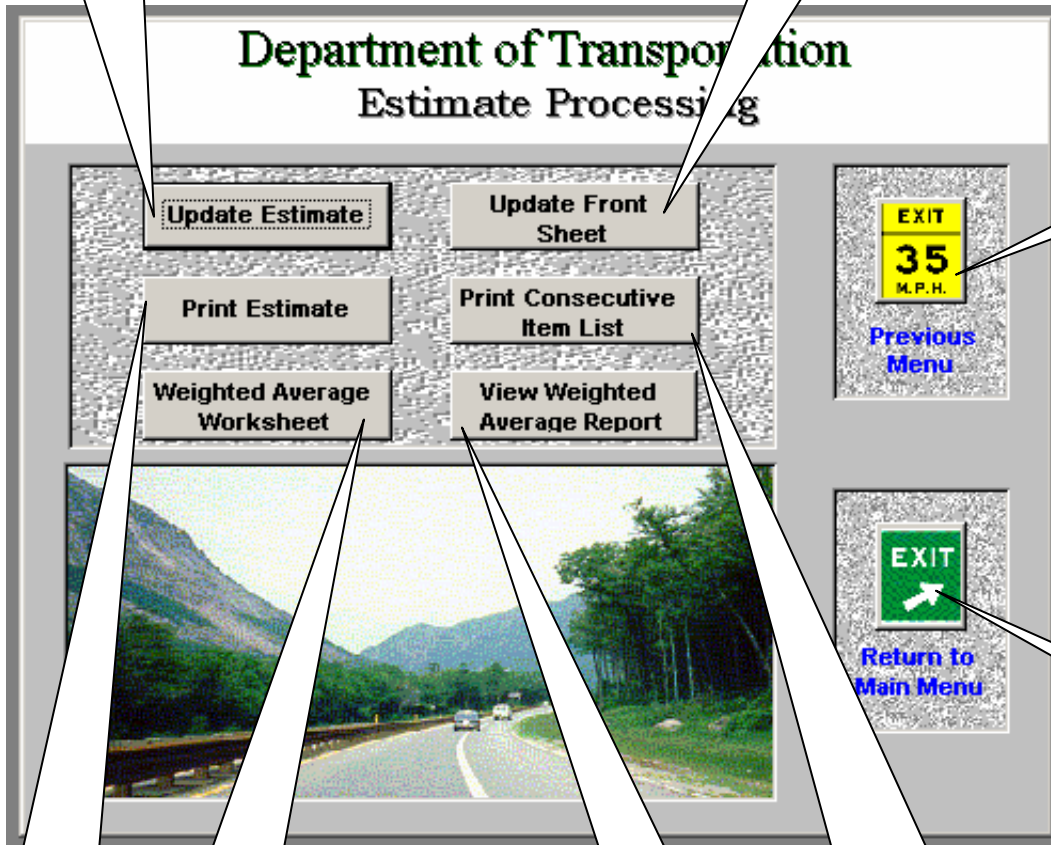
Estimates are prepared in a database located in **G:/database/bur34/Estwork32.mdb**.
The following is a guide on using the database and preparing an estimate.





Click to create or update the body of the estimate. This includes entering or changing items, funding codes, and project information. (See next page).

Click to create or update an estimate front sheet in Excel, (see page 11).



Return to previous page

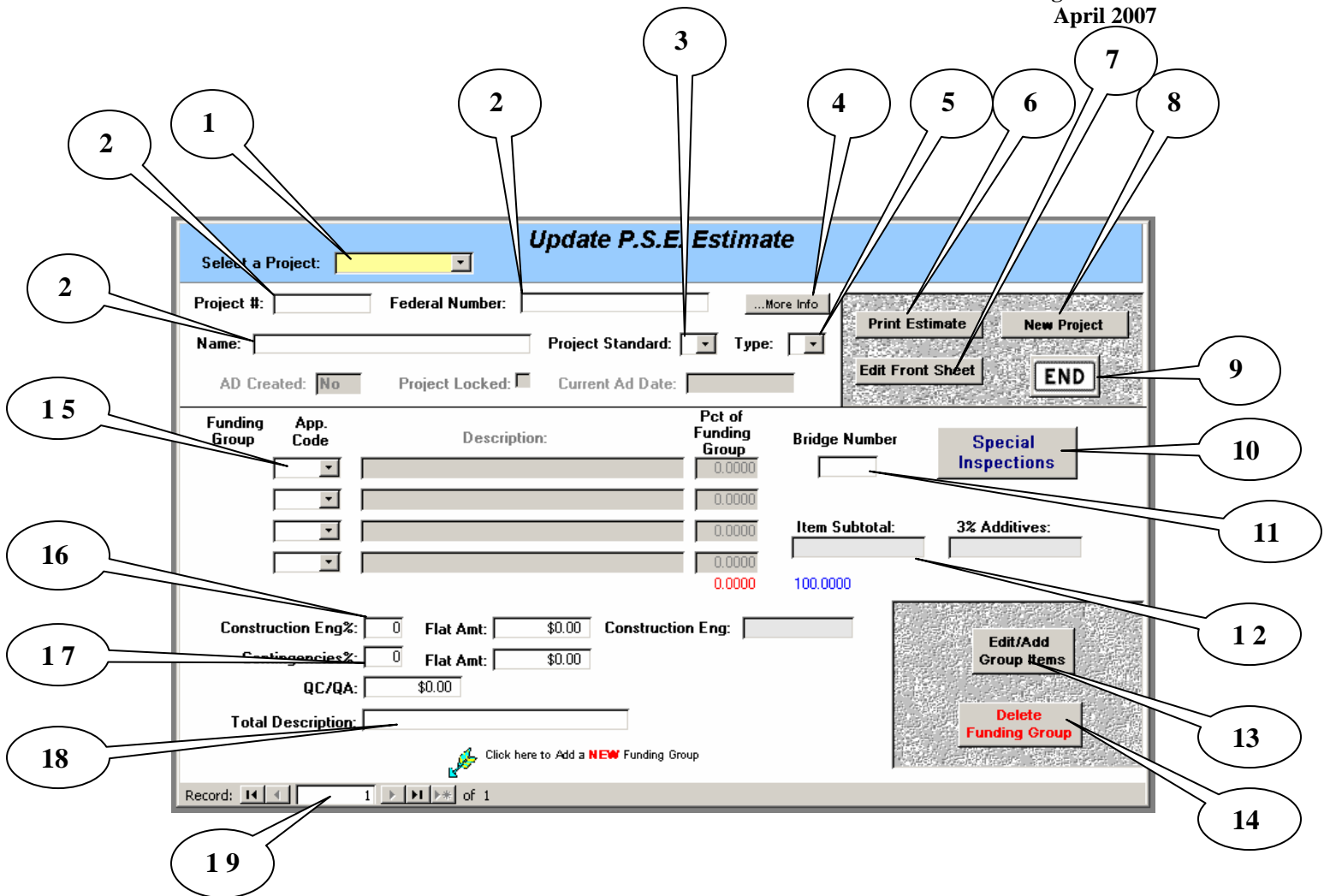
Return to first page

Click to print or print preview the body of any estimate

Use this worksheet to research prices. (See page 9 for further info).

Used by construction to evaluate Gas and Diesel usage.

Quarterly weighted average reports



1. Select a project from the list to start or update an estimate. When the Project Authorization (project slip) is processed by Project Programming, the project is added to this menu. When starting a new estimate for a project, sections 1-5 will need to be filled in prior to using the remainder of the form.
2. These boxes will be filled in automatically from the information provided on the project slip when the project is initiated.
3. Select appropriate Units (I – Imperial, M – Metric)
4. This button will bring up a separate window that contains the project snapshot information.
5. The bid prices in the estimate are used to generate the Weighted Average Unit Prices in the following categories:

Group A: Rural projects over \$750,000

Group B: Rural projects under \$750,000

Group C: Bridge projects

Group D: Urban projects

Group F: Signalization Projects

Group H: Special projects

Note: If you are doing an estimate without items (i.e. Modified Project Agreement Estimate for PE/ROW) this is all the information that needs to be entered before going to the front sheet. If you are just creating a front sheet style estimate go to page 11 after entering the above information.

6. The body (list of items, quantities and costs) of the estimate can be previewed and printed here. This also provides a “apples & oranges” summary for use in preparing final summaries.
7. This button is a link to the project front sheet, an excel file, that is further discussed on page 11.
8. Not for highway use.
9. Exit from this screen to the previous.
10. This area is used when special inspections are charged to a project. On the estimate they appear with Construction Engineering. If the work will be done by a Consultant, identify the Consultant by name or show “Consultant To Be Determined”. Examples of work shown here are, steel inspection, underwater inspection, overhead sign structure shop inspection, etc. See Sheet 7 for example.
11. When a bridge is included on a project, the body of the estimate for the bridge is kept separate from the roadway. If there are multiple bridges on a project, then there will be multiple bodies. This is when adding the bridge number is useful. It will identify which body goes with which bridge.
12. The information contained in “Item Sub-Total” and “3% Additives” is for information and is generated from the current items and prices in the body of the estimate. When computing Construction Engineering, the 3% additives need to be accounted for.
13. To add items or edit existing items in the body, enter here. For more discussion see pages 7 & 8.
14. You can add funding groups (19) or you can delete funding here. This will delete the entire funding group and associated items.

15. This drop down menu allows the selection of appropriation codes. These appropriation codes are obtained from the project snapshot and after selected here will show on the body the estimate.

Consult Project Programming to verify the Codes to be used and the separation of cost (percentages) for each Code. The Appropriation Code will also distinguish (Federally) Non-Participating work funded either by the State or by the municipality.

16. A good place to start is to use 10% Construction Engineering on projects with an item total equal to or greater than \$500,000. Use 15% Construction Engineering on projects with an item total less than \$500,000. On large projects or special projects such as Interstate 4-R, less than 10% Construction Engineering may be used (shown either by a % amount or by an estimated lump sum). On all projects this amount needs to be coordinated with the Section Chief and with the District Construction Engineer.

After the Construction Engineering amount is agreed to the 3% additives (12) need to be included and then rounded to a reasonable number.

17. For Preliminary PS&E Estimates, include an amount for “Contingencies”, if appropriate, to cover unknown costs, quantities that have not been checked or items not added to date. Normally, this would be approximately 10% or less of the item total, depending on the accuracy of the estimate. Delete “Contingencies” on the PS&E Estimate.

18. The body of the estimate will total all items at the end of the estimate. The description of the total can be added here. If nothing is added here the body will simply say “TOTAL”, if “Roadway” is added here the total will read “Roadway TOTAL”

19. This area allows you go to the different funding groups within the estimate. i.e. the Roadway section, bridge section, non-participating section. Be careful when you start to add or change items quantities etc. that you are in the correct section of the estimate. The 1,2,3..., etc. may not match the “funding group” listed above if the order of printing was switched after the funding groups were created.

Special Inspections

When this button is clicked the following screen will appear:

Enter in the information for any special inspection on the project.

Click to go to the previous page.

P.S.E. Estimate Processing
Edit Special Inspections
****READ ONLY MODE****

State Project	Project Name	Funding Group
11849	Holderness-Plymouth	2

EXIT
35
M.P.H.

Undo Changes

Cost:	<input type="text" value="\$60,000.00"/>
Description:	<input type="text" value="Structural Steel"/>
Cost:	<input type="text" value="\$15,000.00"/>
Description:	<input type="text" value="Precast Concrete"/>
Cost:	<input type="text" value="\$0.00"/>
Description:	<input type="text"/>
Cost:	<input type="text" value="\$0.00"/>
Description:	<input type="text"/>
Cost:	<input type="text" value="\$0.00"/>
Description:	<input type="text"/>
Cost:	<input type="text" value="\$0.00"/>
Description:	<input type="text"/>
Cost:	<input type="text" value="\$0.00"/>
Description:	<input type="text"/>

Click to go back to the previously entered amount.

Edit/Add Group Items

By selecting (13) you will be prompted with the following;

Adding Project Items ✖

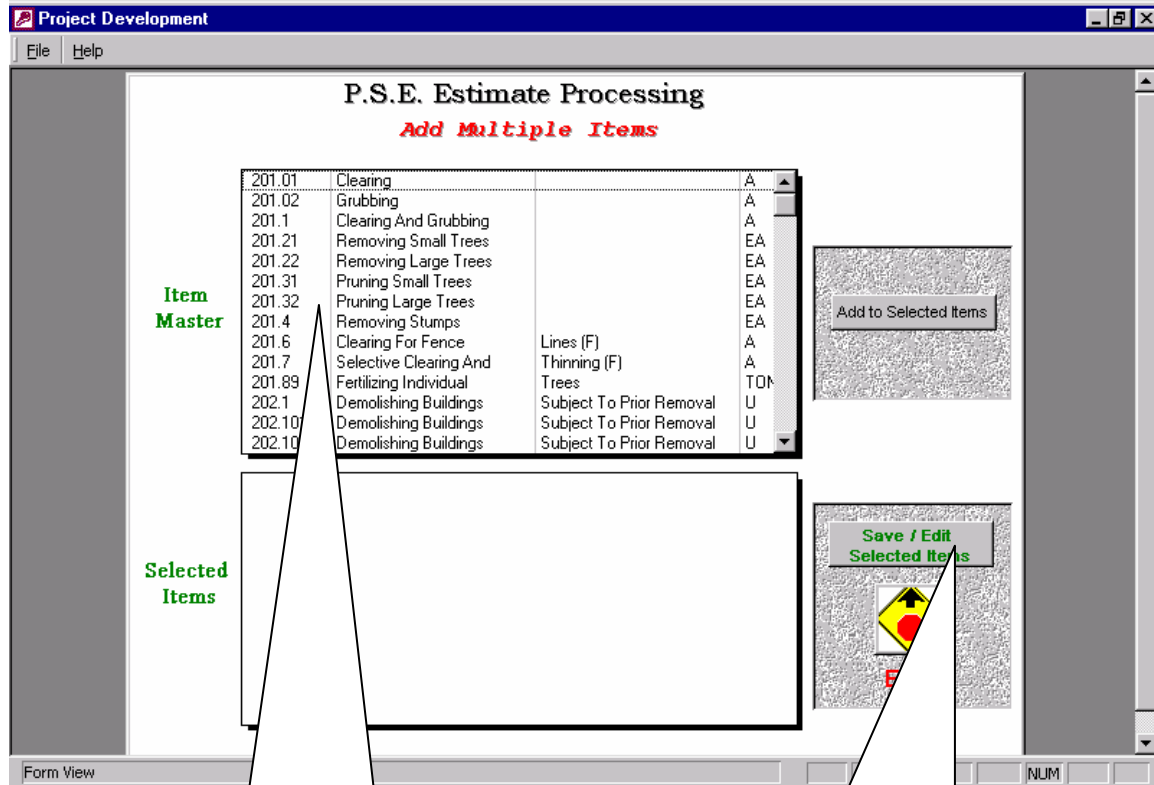
? Would you like to Add Multiple Items ?

Click "Yes" if you are entering many new items to the estimate or if this is the first time entering items. (see next Page)

Click "No" if you would like to edit existing item quantities, prices or enter just a few items to the estimate. Also click this button to delete items.

If you click YES the following screen appears.

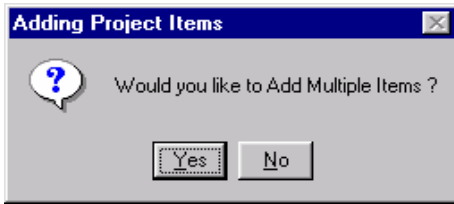
This screen allows you to add many items to the body of the estimate



Double click on the items in the master list to add the item to the estimate. The item will appear in the Selected Items box.

Once you have completed entering items, click this button to save the items in the estimate. Exit will not save what was added.

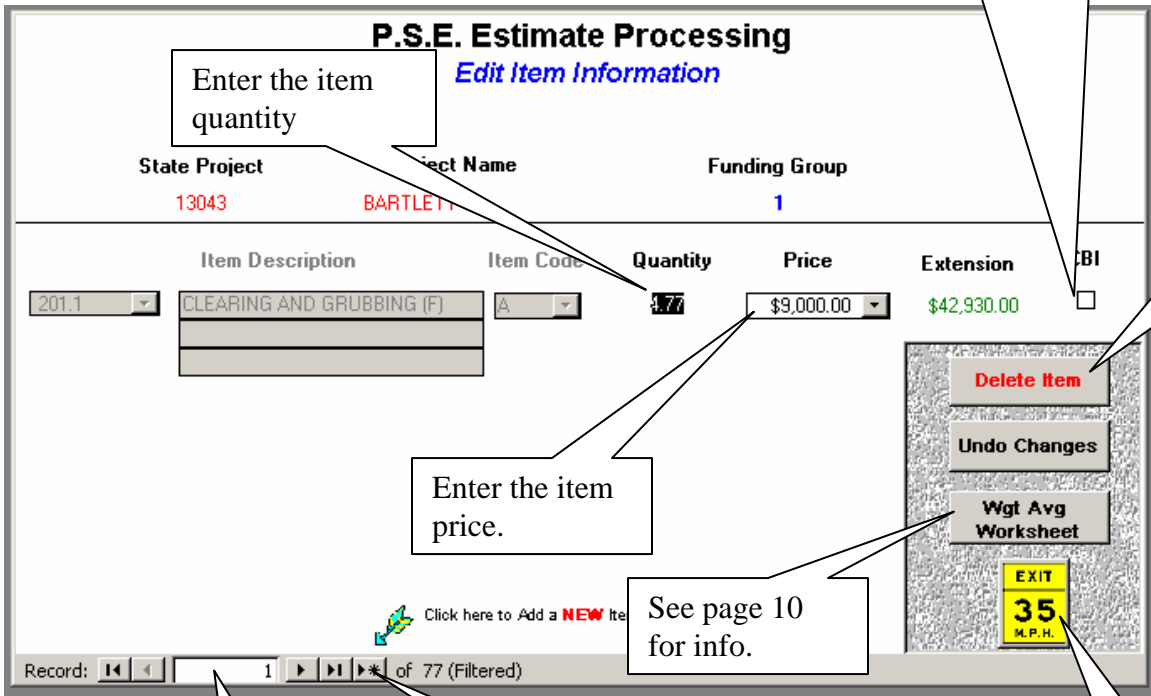
If multiple items are selected, using the “ctrl” button, the “add to selected items” button can be used to add the items in one step.



If you click **NO** the following screen will appear:

This screen allows you to enter quantities, prices, add or delete items to the estimate.

Check this box if the item is a Construction Engineering Bid Item (i.e., Field Office, Lab Trailer, etc)



Enter the item quantity

Enter the item price.

See page 10 for info.

Click to delete the item shown

These buttons allow you to scroll through all the items in the estimate

Click this button to enter in a Special item that is not in the master list. You will have to enter the item number and description.

Returns to previous page

When selecting prices from the drop down menu, use caution. Prices should be taken from similar past projects or from the "Wgt Avg Worksheet".

**Wgt Avg
Worksheet**

When **Wgt Avg Worksheet** is selected the following screen appears;

The screenshot shows the 'Weighted Average Worksheet' interface. At the top, there are filter controls for Item Number (Between 201.1 and 201.1), Standard (I), Type (A), Unit, and Project #. Below these are date filters (Between 1/19/2005 and 1/19/2006) and quantity filters (Between 0.00 and 1,000,000,000.00). A table displays search results with columns for Item #, S, Type, Unit, Project #, Project, Quantity, A Bid, A Exc, B Bid, B Exc, and Bid Date. The table contains two rows of data. Below the table is a summary section with the following data:

Summary of Results	
Total Cost of all Items	\$83,033.00
Total Quantity of all Items	9.65
Average Unit Price	\$8,604.46
High Bid	\$10,200.00
Low Bid	\$8,440.00
# of Bidders	3

Callouts in the image point to various elements: 'Filtering criteria to research prices.' points to the filter fields; 'Close Window' points to a button in the top right; 'Clear Filters' points to another button; 'Search Results' points to the data table; and 'Summary of Results' points to the summary section.

Note: Unit prices can be greatly effected by the quantity of the item. For example, a small quantity of Cold Planing will cost \$7/sy, where a large quantity could be as low as \$1.50/sy. You can filter out large or small quantities and high or low bid prices by checking the EXC box and any excluded bid prices will be shown in red.

The screenshot shows the 'Project Development' software interface. A 'Project Selection' dialog box is open, displaying the 'Print P.S.E. Estimate' option. The dialog includes a dropdown menu for project selection (currently showing '12898'), a 'Start Page Numbering at Page:' field (set to '1'), and an 'EXIT 35 M.P.H.' button. The background window shows project details for 'Orford N.H. - Fairlee Vt' and various buttons like 'Print Estimate', 'New Project', 'Edit Front Sheet', 'END', and 'Special Inspections'. Callouts provide instructions on how to use these elements.

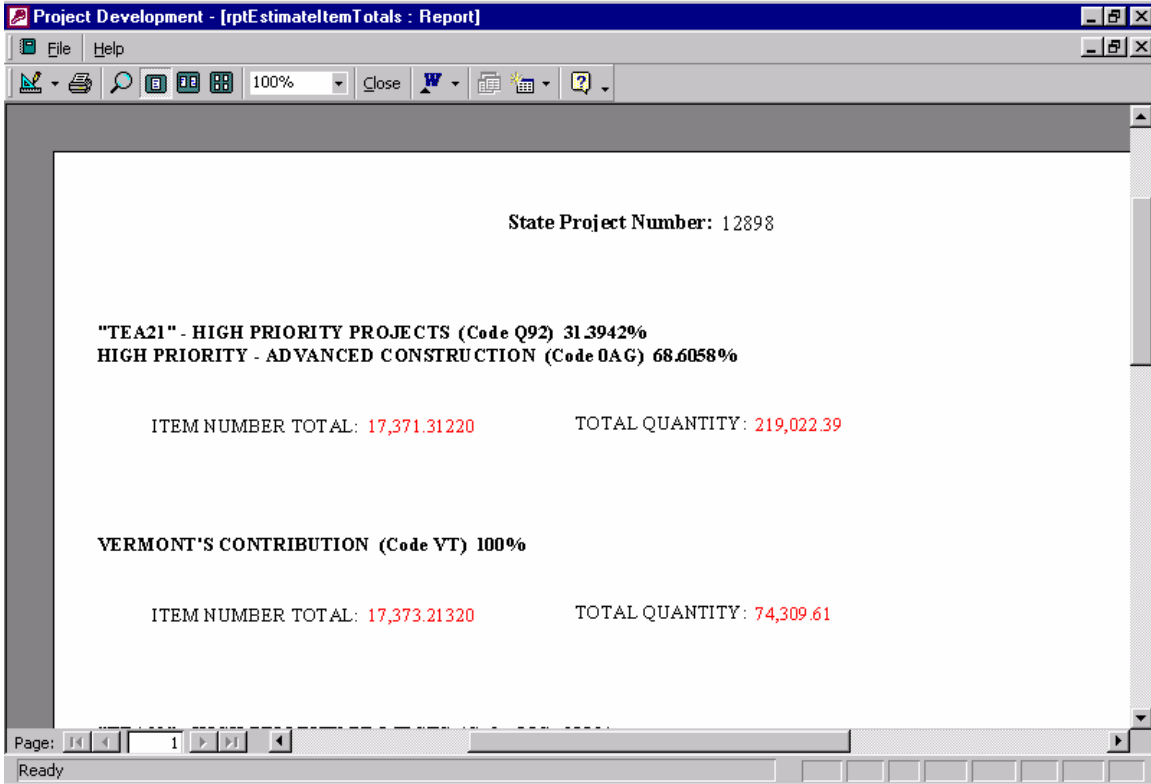
Clicking this button will result in the following action box

By default, the project number of the project you are in appears. You can choose any project estimate to view from the drop down list.

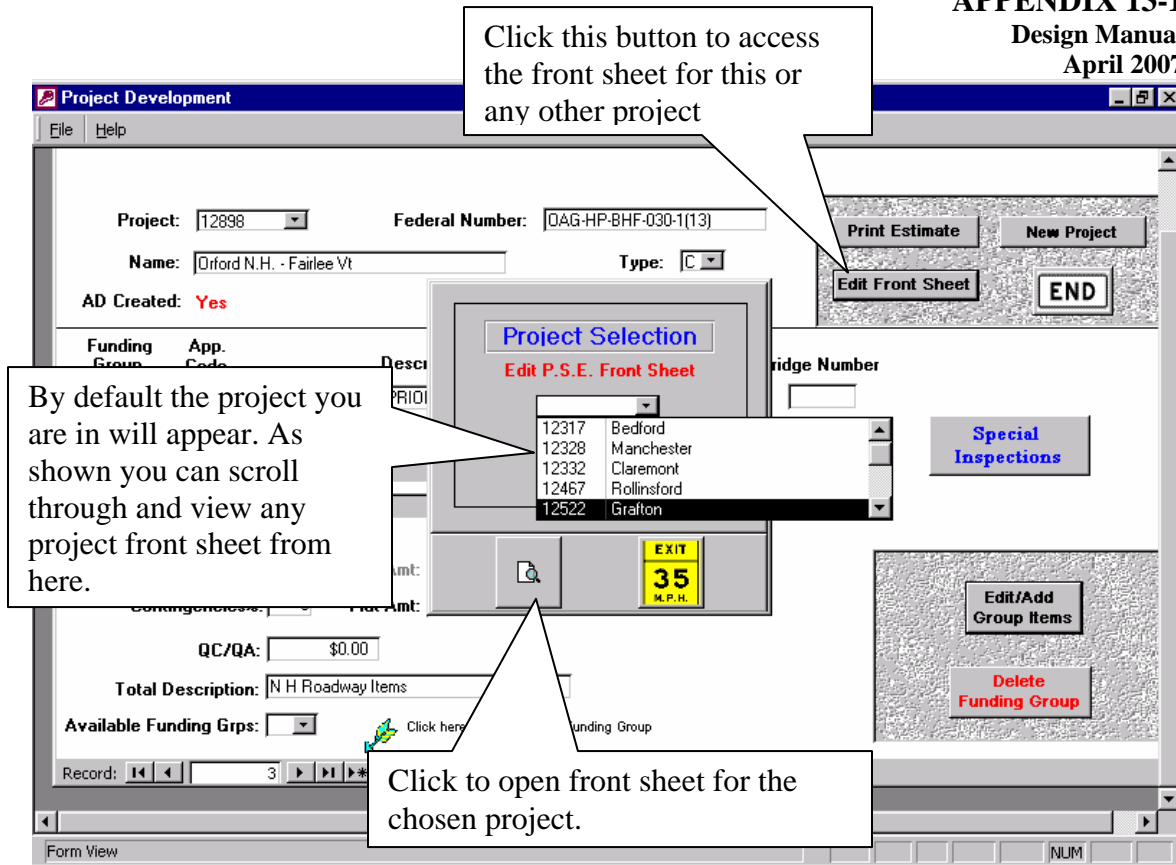
Enter the page number you would like the body of the estimate to start with. This will typically be 3.

Click to preview the estimate body

Click to exit back to previous page



When you close out of the estimate body print preview the above information is shown. It can be used to check the items and quantities between the estimate and summary sheets in the plans (i.e. “Apples and Oranges”).



The new format is intended to separate project related data from funding related data. In doing so designers can free themselves from having to incorporate funding codes, and instead concentrate on providing project parameter information and actual and programmed costs associated with PE, ROW, and Construction.

Description: The Description of the project should be the same as that used by the last project authorization form. If the project description has changed, then a new authorization form should be submitted to Project Programming

Current Advertising Date: The current advertising date is as listed in the “Greer Report”. For projects in the initial stages of development, the date would typically be the first week of the fiscal year in which the project is listed on the State’s Ten Year Transportation Improvement Program. For projects that are not in the Ten Year Program, the space should say “Constr. Not Funded”.

County Name: From the drop down list, enter the county in which the project takes place.

Project Type: From the drop down list, pick the type of project. This is used to further develop the weighted average unit prices.

Estimate Type: refers to existing estimate descriptions (i.e. Modified Project Agreement Estimate for PE and ROW, etc.). See estimate routing slip for estimate choices.

Note: The heading may include more than one title as appropriate, e.g. the PS&E Estimate may also request Authorization from FHWA for additional Preliminary Engineering or Right-of-Way as a “Modified Project Agreement Estimate for PE and/or ROW”.

Explanation of Estimate: Should include a brief explanation of why the estimate is being processed and what, in general terms, is being updated and why. The explanation should also include the previously programmed amounts if they change.

When running the Based on Bids estimate the explanation will include who the A bidder is, how much the contract with the A bidder will be for, and how much the engineers estimate was.

Project Detail: The format allows for better “detail” of the project scope. Include detailed information such as project length, typical section, and construction type; side road lengths, typicals, and construction type; bridge length, type, and type of construction; mitigation type, location, size, and type of construction; and other structures (ie. buildings, etc) type, location size, and type of construction; all will provide a basis for understanding what the project costs are purchasing, making comparisons with other seemingly similar projects more useful. Equally important, by updating the project detail as the design is developed and estimates are rerun, the designer and decision makers can track how the project scope has changed, and with it, project costs.

The degree of detail should reflect the level of design effort. Projects that are entirely conceptual are not necessarily expected to have side road and bridge information. Projects that are well along in design should have fairly accurate project detail, but need not be exact. If the scope of work on a portion of a project has changed in a meaningful way, the detail information should be revised.

For large projects, the Project Detail Spread Sheet can be expanded to allow for inclusion of more side roads, bridges, mitigation (wetland, noise barriers, etc.), or other structures.

Project Funding Requirements: should note any special funding sources, (ie, municipalities or other agencies and there associate DUNS number), funding limits (ie, agreed to caps on funds) associated with the project, or abrupt changes in funding status (ie, project going from strictly Betterment funding to Federal funding), all in an effort to provide communication between the designer, the lead person, Planning, and the Bureau of Finance and Contracts.

PE, ROW and Construction:

Within each category of Preliminary Engineering, Right-of-Way, and Construction, you can have Programmed or Authorized funds. The following are terms used to describe the status:

Authorized:

The term “Authorized” means that (Federally Participating) funds for PE, ROW and Construction can be spent. Use this term when requesting Authorization for Federal Aid for *PE, ROW and CONSTRUCTION*. When an amount is shown as Authorized, the amount Previously Authorized must also be shown in all areas where the term Authorized appears.

FHWA will not Authorize funds for ROW acquisition until:

- 1.) The “Resolution of Issues” from the Public Hearing is finalized; and,
- 2.) The ROW Purchase Plans are available.

The cost of ROW appraisal work is part of ROW Acquisition cost, not incidentals. To avoid re-work, check with the Right-Of-Way representative regarding possible changes to any right-of-way cost before running the estimate.

The request to Authorize Construction funds is made at the PS&E stage. Exempt projects (“X” in the Federal number) can request Authorization for any Force Account Work at the PS&E stage, i.e., by State Forces or by a Utility.

Non-Exempt (or overview) projects (no “X” in the Federal number) can request Authorization for Utility Force Account Work at the PS&E stage only with a fully executed Utility Agreement, i.e., signed by both the Utility involved and the NHDOT. For unexecuted Utility Agreements with accurate cost estimates for the utility work, FHWA will approve Authorization with the statement, “(Pending Receipt of Executed Utility Agreement)”. If there is not an accurate cost estimate of the utility work at the PS&E stage, the funds for Force Account Work by Utility will be Authorized when the agreement is executed at the after-bid stage. Until that time, show this work as Programmed. (See Appendix J for a summary outline of the Utility Agreement submission to FHWA.)

Note: If it is necessary to make changes to the PS&E Estimate after the project advertises and before the bids are opened, i.e. during the bidding process, a Revised PS&E Estimate is issued. Implement the following procedures when this takes place:

- **Any change to the PS&E Estimate must be approved by the Director of Project Development.**
- **Changes to the PS&E Estimate must be coordinated and processed with an “Addendum” to the Proposal along with any changes to the plans which may require a “Revision After Proposal”. (Refer to Chapter 13 of this Manual for information regarding Addendums.)**

- Unless a Federal project is Exempt, any change to the PS&E estimate must be approved by FHWA. This is normally done by their approval of the Addendum.
- FHWA will not normally Authorize additional funding when there is a change during the bidding process resulting in a Revised PS&E Estimate. Therefore, when the estimate after bids is prepared, the “Previously Authorized” amounts for construction would be those amounts Authorized from the PS&E Estimate, not from the Revised PS&E Estimate. (There are exceptions to this procedure, e.g. when the change during the bid process requires a substantial adjustment in the amount of funds Authorized.)

Advanced Construction is a technique which allows the NHDOT to advance the obligation of PE, ROW or Construction beyond the obligational limit of that year. The NHDOT can then determine when to convert the advanced funding to reimburse the Highway Fund, by either converting the entire project in a single year or partially converting over many years. In order to use this technique, there are many requirements. See Project Programming for this unique circumstance.

Programmed:

Use this term to show PE, ROW or CONSTRUCTION for which funding Authorization will be requested at some later date. Indicate the Fiscal Year (FY) in which the work is Programmed. (Federal fiscal years begin October 1, e.g., October 2, 2006 is Federal FY’07. State fiscal years begin July 1, e.g., July 2, 2006 is State FY’07.)

Note: Programmed amounts on the estimate should approximately equal the future year funding amounts shown in the latest version of the STIP. If these amounts vary substantially, check with Project Programming whether a STIP Amendment is necessary.

On larger and more complex projects, the amount of future year funding should be tracked by Project Programming for STIP purposes on a separate form kept current as each estimate is processed. As an example, show the information on the estimate as:

Programmed:

Preliminary Engineering	50,000.00	FY 2008
Preliminary Engineering	50,000.00	FY 2009

Design is no longer responsible for showing the funding codes on the front sheet of the estimate. Project Programming takes care of this when the estimate is routed through them.

The entries of Preliminary Engineering must be identified by who does the work, either by the State or by Consultant, individually listed. Also, describe briefly the nature of the Consultant work (Wetland Delineation, Highway/Bridge Design, etc.) and the Agreement amount. If work under Statewide contract is charged to the

project, it must also be included, listing the Consultant on this project. To identify such Consultant work that must be shown on the estimate, a copy of the “Notice to Proceed” for Consultant work is forwarded to the Lead Person and to the Section Chief responsible for running the estimate by the Bureau monitoring the work.

Note: Preliminary Engineering and Right of Way charges must be Authorized by FHWA prior to beginning work, unless approval for non-participation has been obtained from the Director of Project Development in advance.

Preliminary Engineering is initially estimated at 10% of construction cost. All of this amount can be Authorized “up front” for a single fiscal year or it can be split up over 2 or more fiscal years with a portion Authorized and the remainder shown as Programmed.

If it’s necessary to increase PE, a projection is made of what it will cost to complete the design. Estimate the percent complete for the different categories of State PE using the WCC and proportionately increase it to account for the remaining cost for State PE. Contact those involved to verify their remaining expected charges. Sub-total this cost, increase it by 3% (additives), i.e., overhead, and round it to an even amount. Next, add the Consultant *Agreement* amount, not the Consultant expenditures to date, to obtain the total cost for PE. It’s not uncommon for the Consultant amount to increase over the design life of a project, therefore, make sure that the Consultant Agreement amount is current.

As a convenient check of current expenditures for PE and ROW, access the Project Cost Detail available through the intranet. This will provide a snapshot of expenses by section and a total for State expenditures and additives along with Consultant expenditures and the amounts under Agreement with FHWA.

When calculating Non-Participating PE, include only expenditures, i.e. do not include “additives”.

Whenever an entry is shown as Authorized, the total amount (not the amount of Federal Aid) “Previously Authorized” must also be shown. This is normally obtained from the previous estimate, Project Tracking or the “Request for Federal-Aid Program Approval/ Authorization to Proceed”. If there is a question, check with Project Programming.

Show the “Roadway Total” and “Bridge Total” as separate line entries even if they are funded under the same Code. Other major items could also be entered separately. When this is done, the items must also be shown separately in the body of the estimate, e.g., a major wall structure, utility work, a building, etc. When more than one (1) Code for certain types of work is included, e.g., roadway, bridge, etc., each Code must indicate the percentage it represents of the total cost for that type of work (for accounting purposes), in the body of the estimate.

Estimate Processing and Routing:

The project manager, lead person, or design engineer completes the front sheet, attaches the items portion of the estimate (if available), attaches the routing slip, and

requests input from project manager, lead person, design engineer, bridge engineer, municipal engineer, and ROW engineer.

When routing the PS&E, the estimate shall have a PS&E checklist included with all appropriate information that is called for as part of the form. The latest version of this form can be found on the Project Programming website.

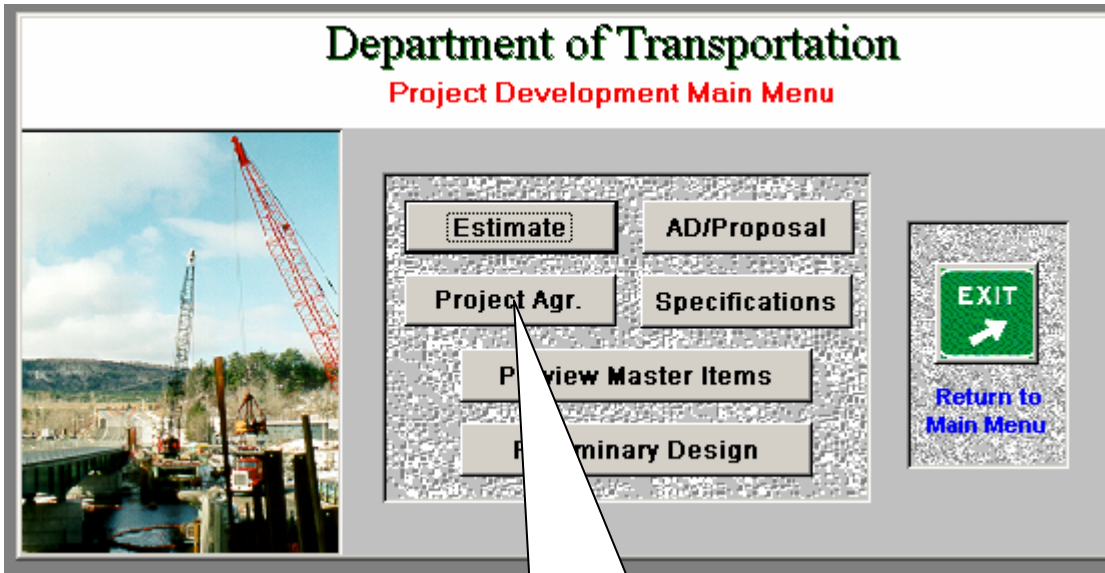
Following receipt of signoffs, the front sheet is signed by the Project Manager/lead person and forwarded to the Bureau of Finance, Project Programming section. Project Programming will review the estimate relative to general conformity and Project Funding Requirements and then attach the funding sheets and process the estimate.

Project Programming will forward the estimate (front sheet, items list, and funding sheets) to the Project Manager/lead person, as well as Finance and Contracts.

The Project Manager will review the completed document, and forward the document to the Design Engineer for distribution to Project Development bureaus.

In an effort to maintain some standardization over the format for the front sheet, the excel template for the front sheet will be the responsibility of the Bureau of Finance and Contracts through the Project Programming section. The person preparing the estimate will be able to add to (or subtract from) the number of lines or detail cells required to characterize the project description and scope, as well as listing vendors (PE), Service (ROW), and Type of Work (Construction).

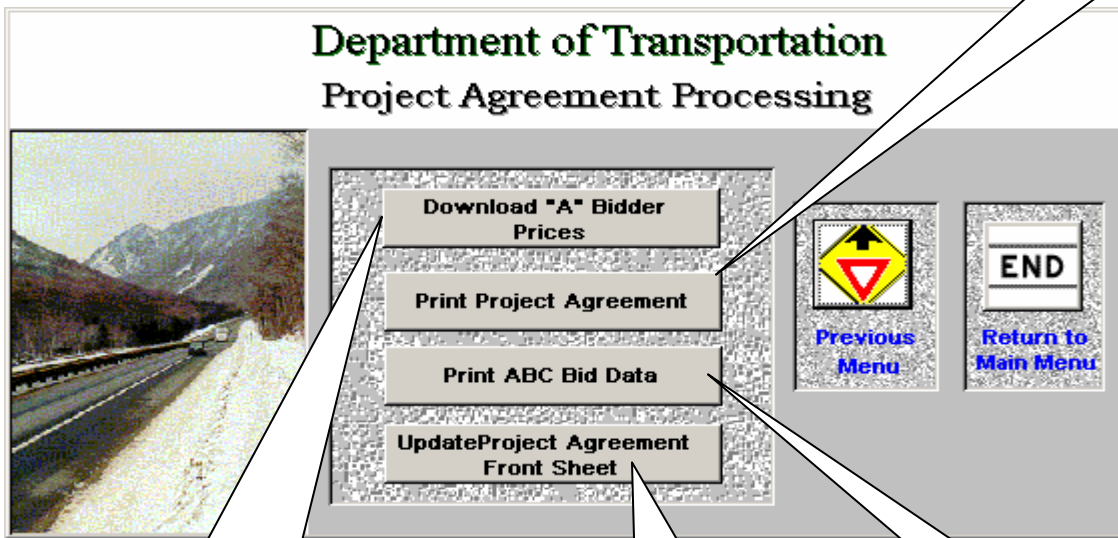
After the PS&E is completed and the bid schedule run by contracts, the estimate will be locked to prevent changes to the estimate until after the bids are received. Once bids are received and entered into the computer, they can be downloaded into the estimate so the “Based on Bids” estimate can be run. First the estimate must be unlocked by Contracts. Then from the Main Menu select Project Agr.



Click this button to start the process of running the based on bids estimate.

Click to Preview or Print the Estimate with Bid Prices

The following screen appears.

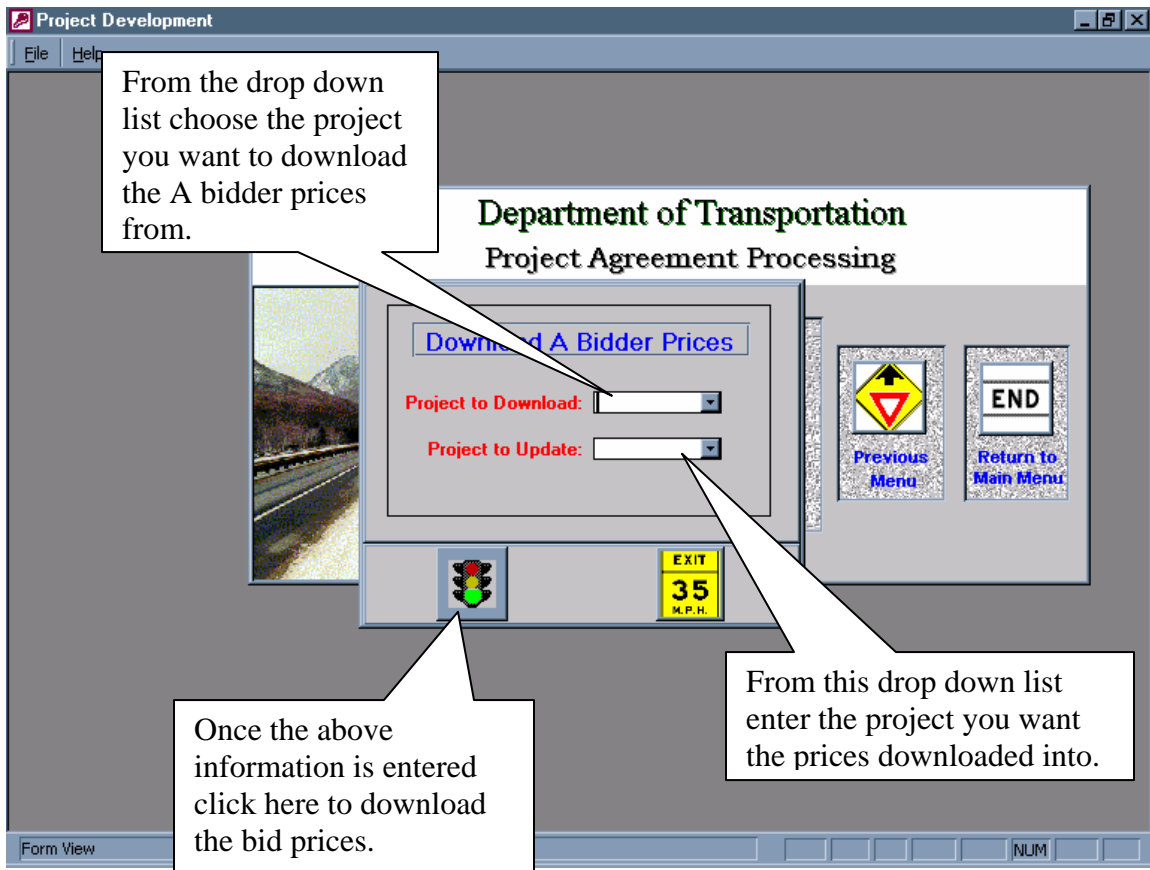


Click this button to begin download of A bidder prices

Click to go to the Project Front Sheet.

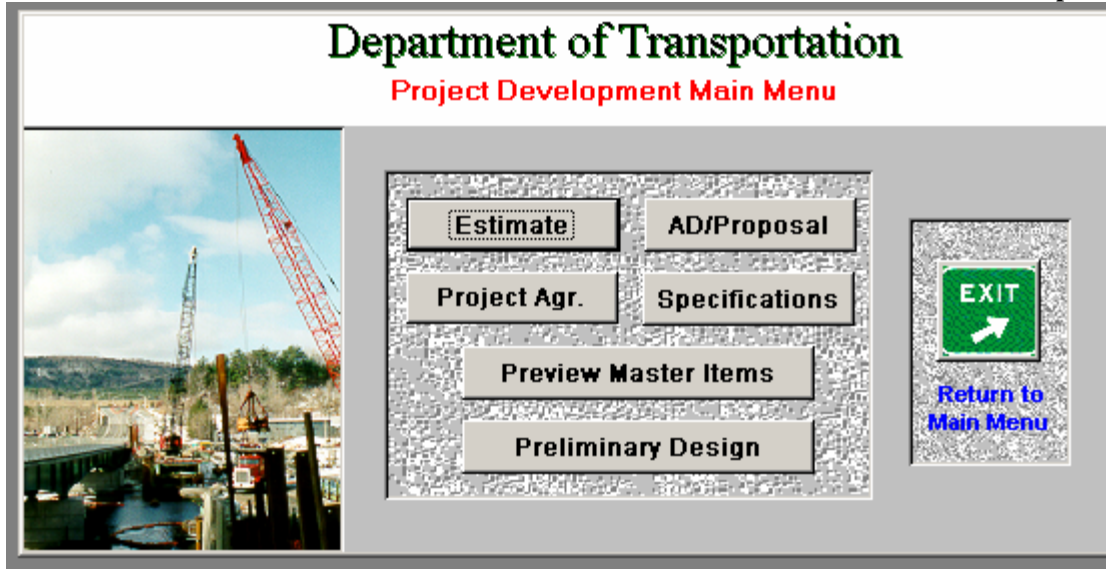
This will print ABC bid prices.

When Download A bidder prices is selected, the following box will appear:



Note: In the **majority** of cases both the above project numbers will be the same. There are some cases where the two project numbers will not be the same. Examples are: If you advertise two or more projects, with different project numbers, in one contract (some building demolition contracts are done this way). The way the bid prices are keypunched in the computer room is by the first project number. So the project to download from will always be the first project number shown in the proposal. Then enter the project number to download into for the first project; then again for the second project, etc., until the bid prices have been downloaded into all the separate projects.

If for any reason the bid information (item numbers, quantities, etc.) does not exactly match that shown in the estimate, an error message will occur preventing the download of the A bidder prices. This must be rectified before the bid prices can be downloaded.



The Preliminary Design section is a relatively new section to the database. When a preliminary estimate is generated, many item quantities are not known, therefore percentages are used to approximate the project cost. This database was developed to track these percentages to be sure they stay up to date and the estimates are as accurate as possible. Preliminary Design is developing this section and is specific for their needs, therefore, for additional information, a Preliminary Design representative should be consulted.

STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: November 8, 1999
FROM: David J. Brillhart, P.E.
Chief Project Manager
AT (OFFICE): Bureau of Highway Design
SUBJECT: Securing Federal Funding for Municipally Managed Projects
TO: Robert Greer, P.E.
Director of Project Development

MEMORANDUM

The purpose of this memo is to clarify the process required at the time of advertising to assure Federal participation in a municipally managed project. The process is no different than the process required for any other Federal Aid project. Here are the major steps necessary:

- Obtain from the municipality and submit the project PS&E to FHWA through Transportation Planning. The submission must include a PS&E estimate, front sheet of plans, and a ROW Certificate. This must be done PRIOR to advertising and must be delivered to Transportation Planning 1 1/2 weeks prior to advertising to be sure it is with FHWA at least 1 week ahead of the scheduled advertising date. This package requests authorization of Federal Funds; until approval of the PS&E, the project cannot be advertised for bids.
- Once FHWA approval is received, the Municipality can be given approval to advertise the project. A copy of the advertisement should be provided by the Municipality to the Project Manager, who then forwards a copy to the Director of Project Development.
- The Municipality tabulates the bid results, and requests NHDOT approval through the Project Manager. The Project Manager reviews the bid result tabulation, and if in order, forwards approval to the municipality. The Municipality can then award the contract to the low bidder. A copy of the bid tabulation needs to be provided to the Director of Project Development and Transportation Planning (Project Programming). NOTE: if the bid results vary significantly from the PS&E estimate amount, the Director shall be consulted prior to NHDOT approval.
- The Project Manager shall assure preparation of a Project Agreement Estimate Based on Bids to make modifications to Federal Funding Authorization as appropriate; essentially to reflect the bid results as higher or lower than the PS&E. This estimate is processed to FHWA in the standard estimate processing manner.

Projects that do not follow these procedures may be ineligible for federal participation. Project Mangers must take care to make municipalities aware of the need to obtain approvals for both bidding the project and awarding the contract.

DJB/jmc



U.S. Department
of Transportation
**Federal Highway
Administration**

Memorandum

APPENDIX 13-3

Subject: Utility Authorization Procedures

Date: December 12, 1996

From: ^{William F. O'Donnell}
W.F. O'Donnell, Environmental Program Manager
Thru: T. Myers _____, A. Fletcher _____, D. Hall _____, M. Calawa _____

Reply to
Attn. of:

To: Files

On this date I met with Greg Placy, Administrator of the Bureau of Highway Design, Chuck Schmidt and Mel Kangas of Design Services, and Linda Hodgdon and Joyce Cote of Planning to discuss methods of streamlining the process that is currently used for oversight projects to authorize utility work. On exempt projects, funding for utility work is routinely authorized at the PS&E stage without the need to submit utility agreements. It is understood that under 23CFR645, utility work on any project cannot be authorized without benefit of an executed agreement.

Under the current system for oversight projects, Design Services typically submits 2 copies of an unexecuted or executed utility agreement, if available, directly to this office, normally several weeks after a PS&E is authorized. If the agreement is unexecuted, we review it and write back to Design Services that it appears satisfactory. After it becomes executed Design Services submits 2 copies of the executed agreement for our approval. If the agreement is executed, we review and approve the agreement, returning one copy to Design Services. Following our approval of the executed agreement, an estimate is processed through Planning shifting the utility amount from Programmed to either PS&E or Authorized and Planning prepares a request for Federal Funding (long sheet), which they submit to us. Often these transactions only amount to tens of thousands of dollars and they are processed separately, potentially involving three separate submissions.

In an ideal situation, the executed agreements would be available at the PS&E submission or even at the Post-bid Project Agreement Estimate Submission from Planning. If they were they could be processed simultaneously with those requests. Unfortunately this does not often occur.

After discussing the issues and some options, I suggested the following:

* When Design Services is requesting funding with their first utility agreement submission, either executed or unexecuted, they will process it through Planning. Where it is an unexecuted agreement, only one copy will be provided to FHWA. If it is an executed agreement two copies will be sent to FHWA to allow for an approved agreement to be returned to Design Services from FHWA. Planning will provide the appropriate funding request (long sheet) and ship the long sheet, estimate and agreement to FHWA.

* Where possible, Design Services will submit at least an unexecuted utility agreement, hopefully an executed one, through Planning at the PS&E or Post-bid Project Agreement Estimate Submission. This will reduce at least one NHDOT submission to FHWA.

* We will authorize the utility funding on the basis of either an executed or unexecuted agreement. If we authorize funding on the basis of an unexecuted agreement, the long sheet will be conditioned on the understanding that the utility work cannot begin until the agreement is executed and approved by this office. This latter executed agreement submission would be made directly to FHWA from Design Services as no additional funding is being sought.

All present thought that it should save some effort. Substantial further gains can be achieved if these submissions are processed with the PS&E or Post-bid Project Agreement Estimate submissions. This approach will be tried for the interim and will be revisited as a part of a process review planned for early 1997 on the utility program.

GUIDELINES ON PREPARING ENGINEER'S ESTIMATE, BID REVIEWS AND EVALUATION

January 20, 2004

Par.

1. Purpose
2. Background
3. Pre-Bid Considerations
4. Preparing Engineer's Estimates
5. Bid Analysis and Contract Award
6. Post-Award Reviews
7. Removal from the Bidders List (Debarment)

1. PURPOSE

- a. To outline recommended procedures for preparing engineer's estimates and for reviewing bids prior to concurrence in award.
- b. To provide guidance for improving pre-bid, bid review and evaluation policies and procedures.
- c. To improve competitive bidding procedures.

2. BACKGROUND

A State Transportation Agency's (STA's) procedures for soliciting and awarding construction contracts are an important part of the competitive bidding process. To

ensure a competitive contracting environment, STAs should develop effective prequalification programs and other procedures to ensure fairness in the pre-bid solicitation process and post award review of construction bids. In addition, the STA's procedures for developing a reliable engineer's estimate are critical to the success of such programs. The engineer's estimate should reflect a fair and reasonable cost of the project in sufficient detail to provide an accurate estimate of the financial obligations to be incurred by the State and FHWA and permit an effective review and comparison of the bids received.

This guideline replaces Technical Advisory "T5080.4 - Preparing Engineer's Estimate and Reviewing Bids", dated December 29, 1980 and Technical Advisory "T5080.6; Guidelines on Contract Procedures with Emphasis on Bid Reviews and Evaluation", dated December 17, 1982.

3. PRE-BID CONSIDERATIONS

a. *Contractor Prequalification* In general, contractor prequalification is used to help determine the quantity and type of work a firm is capable of undertaking. Normally the firm's resources, its financial assets, work experience, and its staffing capability must all be identified for it to become prequalified. Some States that do not require prequalification find it necessary to collect some information via a financial statement or some other abbreviated process. These States do not specify the type of work or limit the size of project a firm may bid upon because they feel prequalification may restrict competition unduly. Other States do not prequalify but instead rely on the contractor's ability to provide a performance bond. The FHWA does not require prequalification, but if a STA elects to prequalify contractors, such procedures must not restrict competition.

Prequalification has been identified by some of the States as a useful tool for gathering pertinent information on the intricate management details of a contractor's firm. In the event of a conviction of a crime such as bid rigging, such information proves useful as an aid in determining the appropriate sanctions for the firm and/or the individuals involved. Another possible use would be to determine the relationship of firms bidding on any one project.

Specific information that should be collected from a firm includes the following: financial resources, principal individuals in the firm (anyone having a 10 percent or more interest in the firm), all affiliates or subsidiary companies including material sources, available equipment, work experience, individuals and organizations that have control or influence over the firm's bidding procedures, and whether the firm has ever been suspended or debarred from bidding and the related circumstances.

The instructions for completing the work experience section (of the pre-qualification form) should require that the firm identify all projects for which it was the prime contractor and those on which it worked as a subcontractor during at least the past two

years as well as the contracting agency for those projects. Also, the contracting agency should describe the penalties for making false statements in the pre-qualification process.

b. *Anti-collusion Statement* A sworn anti-collusion statement should be included as part of the bid proposal package. Under the 23 CFR 635.112(f), the STAs are required to include provisions in the bidding proposals that require all bidders to include a non-collusion statement with their bids. The FHWA in consultation with the DOJ has concluded that non-collusion statement may be either an un-sworn declaration made under penalty of perjury under the laws of the U.S., or a sworn affidavit executed and sworn before a person who is authorized to administer oaths by laws of the State. All non-collusion certifications shall be retained by the STA in accordance with the retention policy of 49 CFR 18.42. These certifications could serve as important evidence in the event that collusion or bid rigging is discovered at a later date. If any bidder submits a false statement, sanctions could then be taken against the firm.

c. *Standard Specifications* All States should have standard specifications that address the issue of evidence of collusion among bidders. Those State specifications that currently address this item generally specify that the STA may determine that the bidder is not responsible and reject his/her proposal based on evidence of collusion. In addition to rejection of a firm's proposal, the specification should advise that collusive bidding is a violation of the law and could result in criminal prosecution, civil damage actions, and State and Federal administrative sanctions.

d. *Bidders List* Confidentiality of the bidders' list (those firms that have taken out plans and a bid proposal document) has both advantages and possible disadvantages.

(1) With the availability of bid tabulation information and bidders lists on the Internet, the potential for bid collusion is higher than in previous years when such information was not readily available. In an effort to create the most competitive environment for potential bidders, a firm should not be aware of the identity of the other potential bidders. An advantage of keeping the bidders' list confidential is that bidders will submit what is believed to be a realistic competitive bid based upon the company's own individual circumstances. This is especially important for projects where there would be limited competition.

(2) A possible disadvantage of keeping the bidders' list confidential would be that potential material suppliers and subcontractors would not be informed of what firms to contact for upcoming projects. Therefore, a material supplier may fail to inform a potential bidder of its current prices. However, by the very nature of competitive bidding and the last-minute quotes traditionally provided contractors, it is felt both contractors and suppliers will continue to have adequate communication. Further, since the bidder must perform the contract work with his/her own firm and/or subcontract it, the burden actually lies with the bidder to determine what other firm he/she wants to work with on a project. Unless the project has new or unusual material or construction requirements, it is believed most contractors are aware of the available subcontractors and potential

material suppliers. Therefore, it is believed the bidder is generally the one seeking potential subcontractors, especially if Disadvantaged Business Enterprise goals are included in the proposal. During court testimony, defendants have stated the bidders' list was used to identify other potential prime contractors to be contacted to rig the project bids. Although there are other ways to find out who plans on bidding, i.e., from material suppliers, bonding companies, etc., at least the contracting agency is not providing this information when it keeps the bidders list confidential. It is recognized that State freedom of information or similar statutes may, however, preclude keeping the bidders' list confidential.

e. *Competition* Competition for projects by bidders is an integral part of a successful construction program. An effort should be made by the contracting agency to maximize the competition by a number of methods.

(1) Advertisement should be widespread enough to advise those potential bidders interested in the type of work and size of project involved. Based on the complexity of the project, extended advertisement periods are encouraged.

(2) Consideration should be given to the project's estimated cost/size to maximize the number of bidders. The size normally varies in each State depending on the makeup of the construction industry. In some situations, it may be desirable to divide the project into several smaller contracts to foster competition.

(3) Jobs should be allowed to be bid individually or in combination.

f. *Multiple Bid Requirements* If a State law or regulation exists which requires that more than one bid be submitted before award can be made, efforts should be made to revise or repeal it. There is evidence that in those cases where only one contractor was interested in a project and the multiple bid requirements existed, the firm actually contacted other contractors to submit a complementary bid so award could be made. If only one bid is submitted and it far exceeds the estimate, it should be rejected; but if it is at or below the estimate, it should be considered for award.

g. *Escrow of Bid Documents* The STAs should consider escrowing bid documents where it is administratively feasible to do so. Section 103.08 – “Escrow of Bid Documentation” of the AASHTO Guide Specifications for Highway Construction provides a sample specification for this requirement.

4. PREPARING ENGINEER'S ESTIMATE

The critical review of any bid depends on the reliability of the estimate it is being compared to. Therefore, State Transportation Agencies (STAs) are strongly urged to devote sufficient attention to preparation of estimates using the same level of detail as the contracting industry. The engineer's estimate should reflect the amount that the

contracting agency considers fair and reasonable and is willing to pay for performance of the contemplated work. Under-estimating causes project delay while additional funding has to be arranged to meet the contract costs. On the other hand, over-estimating causes inefficient use of funds that could be used for other projects. In addition, the engineer's estimate serves as the benchmark for analyzing bids and is an essential element in the project approval process. There are three basic approaches to estimating: actual cost, historic data, and a combination of historic data and actual cost. One of the most important factors in obtaining a good engineer's estimate is the experience of the estimator. While documented estimating procedures are helpful, contracting agencies are encouraged to provide sufficient training opportunities for their staff.

a. Estimating Methods

(1) *Actual Cost Approach* The actual cost approach takes into consideration factors related to actual performance of the work (i.e. the current cost of labor, equipment, and materials; sequence of operations; production rates; and a reasonable value of overhead and profit). This approach requires the estimator to have a good working knowledge of construction methods and equipment. Also the estimator should have resources available for determining production rates from actual work performed by the contracting industry on similar type projects as well as resources for determining current construction methods and equipment. While adjustments for current market conditions may be required, this approach typically produces an accurate estimate and is useful in the bid review process in aiding the decision to award or reject the project. However, this method may be more time consuming and may not be practical for all projects.

(2) *Historic Data Approach* The use of historic data from recently awarded contracts is a cost-effective method to develop the engineer's estimate, however, solely relying on historic data may not be appropriate when the data is based on a non-competitive bidding environment. A file of previous unit bid prices should be maintained according to type, size, and location of project. Upcoming projects should be matched to the most recent projects to develop base prices for estimating the value of the unit prices. Under this approach, bid data are summarized and adjusted for project conditions (i.e., project location, size, quantities, etc.) and the general market conditions.

This approach requires the least amount of time and personnel to develop and produces an adequate estimate for use in budgeting/programming, as long as competitive bid prices are used to build the estimate. Non-competitive bidding and unbalanced practices are the least recognizable using the historic data approach to estimating. Further adjustment of the base prices should be considered based upon the ages of the similar projects, but past inflation rates should not be projected into the future unless based on circumstances which can be reasonably expected to occur, such as labor rate increases through labor negotiations and known material price increases.

Where the magnitude and timing of future increases are uncertain and would have a major effect on critical unit prices, price adjustment clauses may be a better alternative.

(3) *Combination Approach* This approach combines the use historic bid data with actual cost data. Most projects contain a small number of items that together comprise a significant portion (e.g. 75 percent) of the total cost. These major contract items may include Portland cement concrete pavement, structural concrete, structural steel, asphalt concrete pavement, embankment, or other major items of work within the contract. To the extent practical, STAs should collect information on local market prices of materials, equipment manufacturers, dealers, and rental companies, and material suppliers to obtain current cost information on a regular basis. Davis-Bacon prevailing wage rates on Federal-aid contracts could be easily incorporated to provide labor costs as determined by Department of Labor. Current material costs are obtained from local approved sources. Equipment costs can be obtained through rental companies or equipment dealers based on a reasonable depreciation schedule. The remaining items are estimated based on historical prices and adjusted as appropriate for the specific project.

b. Confidentiality of the Engineer's Estimate

Procedures and policies concerning confidentiality range from including the total estimated construction cost in the bid proposal to keeping the estimate confidential from the public even after the project has been constructed and opened to traffic. Benefits of making the total estimate public include eliminating the possibility of only one or some of the bidders knowing what the State believes the project is worth plus removing any pressure from State employees to release the estimated cost secretly. One disadvantage of making the estimated cost public is that firms desiring to rig bids can use the engineer's estimate as a basis for determining the low-bid amount to be submitted. This is especially important in cases where the contracting agency anticipates minimal competition and/or a single bid for construction.

While confidentiality of the estimate obviously will not by itself successfully deter a firm from conspiring with other bidders, it does prevent bidders from knowing what approximate amount the contracting agency is willing to accept. For those agencies that believe total secrecy from the public is not realistic in their State, as a minimum attempt of confidentiality, a range for the estimated project cost could be provided and included in the bid proposal document. For example, a range could be established as follows:

Project Classification	Project Cost
A	\$ 0 - \$100,000
B	\$100,000 - \$250,000
C	\$250,000 - \$500,000

D	\$500,000 - \$1,000,000
E	\$1,000,000 - \$2,500,000
F	\$2,500,000 - \$5,000,000
G	\$5,000,000 - \$10,000,000
H	\$10,000,000 - \$15,000,000
I	\$15,000,000 - \$25,000,000
J	\$25,000,000 or greater

A policy of providing a specified dollar amount for a bid bond could indicate the amount of the estimate. This procedure should be revised to specify a percentage of the bid submitted, thus maintaining the confidentiality of the estimate.

c. Accuracy of Engineer's Estimate

The estimate must have credibility if the bid review process is to be effective. Estimate accuracy should be judged by comparing the estimate against the low bid (%). Estimate accuracy relies on the estimator using all the available resources to create a fair and reasonable value for the work given all particular job conditions and evaluating these conditions accurately to establish a credible estimate. It is realized that estimate preparation is not an exact science; however, it is felt the engineer's estimate should be within ± 10 percent of the low bid for at least 50 percent of the projects. If this degree of accuracy is not being achieved over a period of time, such as one year, confidence in the engineer's estimates may decline. Further, if estimated total costs are made available to the public, even after the letting, and are consistently running well above the low bid (say 15-20 percent) when a sufficient workload is available, bidders may be cognizant of the higher estimates and may submit higher bids accordingly.

Where confidence in the estimate has been established by the contracting agency, it follows that to be an effective tool, the agency must show that confidence by rejecting those low bids that are not within a reasonable percentage above the estimate. Adjustments to the estimate for projects to be re-advertised should not be made to correspond to the previous bids submitted without adequate justification.

Attachment A provides a review guide for assessing a contracting agency's procedures for developing the engineer's estimate.

5. BID ANALYSIS AND CONTRACT AWARD

In 1983, the Office of the Inspector General (OIG) performed a review of the STA's preparation of the engineer's estimate. They found that: 1). Estimates were overstated and unreliable for bid evaluation, and 2) The FHWA had not adequately reviewed the

STA's estimating procedures to assure that contracts were awarded at the lowest reasonable rates. In response to the OIG's findings and recommendations, the FHWA established criteria to support and assist the STAs to improve their estimating procedures. In addition, the FHWA Division Offices were advised to review their STA's procedures.

The engineer's estimate should be a fair and reasonable value for the work to be performed. It should be within plus or minus 10% of the low bid for at least 50% of the projects awarded. Specialized highway construction work should be evaluated on a case-by-case basis. The following guideline discusses circumstances where an apparently excessive bid may be justified as a basis for award:

a. *Assessing Competition* Competition should be considered excellent when there are six or more bids within 20 percent of the low bid, including the low bid. Fewer competitive bids should require evaluation to determine whether competition was adequate, and whether additional competition or better prices could be obtained. As a guideline to this determination, the following is offered as a suggestion for determining whether adequate competition was obtained:

Number of competitive bids * (*Range = low bid + 20 percent)	Competition May be considered adequate when low bid does not exceed **
5	120 percent of engineer's estimate
4	115 percent of engineer's estimate
3	110 percent of engineer's estimate
2	105 percent of engineer's estimate
1	The engineer's estimate

** (Exceptional types of projects should be identified where competition has been historically poor, and when the prospects of increased competition are not apparent. Such projects should be reviewed independently of this or any alternative guideline.)

b. *Considering Re-Advertisement* Few projects are considered so essential that deferral (even for 60 days to solicit re-advertised bids) would not be in the public interest. However, projects that are considered essential are of the following:

- (1) Safety projects which are to correct extremely hazardous conditions where the traveling public may be in danger.
- (2) Emergency repair or replacement of damaged facilities.
- (3) Projects to close gaps in otherwise completed facilities to allow opening to traffic.

(4) Projects that are critical elements in a staged or phased construction schedule, where a delay would mean substantial impact on the completion date of the facility.

It is difficult to justify that re-advertising would likely result in higher cost without concluding that all practical anti-inflation measures have been employed to the maximum extent possible.

Estimating errors should not be considered unless the magnitude of the error is significant and procedures are modified to attempt to prevent the occurrence of similar errors. Some errors are merely mistakes that can be corrected easily once discovered, while others are “errors of judgment” which cannot be as easily explained.

States are encouraged to track projects that are re-let and tabulate either savings or higher cost for each calendar year. If higher costs are found in the re-let projects, a thorough review of the current estimates and procedures should be performed. Also, current bid collusion detection techniques should be employed to identify potential bid rigging/collusion.

The analysis and award process for a project should be thorough even when the low bid is below or at a reasonable percentage above the engineer's estimate. It is reasonable, however, to expect that larger projects will receive a more thorough review than very small projects. The STA should have written procedures for justifying the award of contract, or rejection of the bids, when the low bid appears excessive or rejection is being considered for other reasons.

c. Bid Review Factors

(1) Factors that should be considered in reviewing the bids received for a project include the following:

- (a) Comparison of the bids against the engineer's estimate;
- (b) Number of bids submitted;
- (c) Distribution or range of bids received;
- (d) Identity and geographic location of the bidders;
- (e) Potential for savings if the project is re-advertised;
- (f) Bid prices for the project under review versus bid prices for similar projects in the same letting;

- (g) Urgency of the project;
- (h) Current market conditions/workload;
- (i) Any unbalancing of bids;
- (j) Which unit bid prices differ significantly from the estimate, and from other bids?
- (k) If there is a justification for the difference; and
- (l) Any other factors the contracting agency has determined to be important.

(2) The influence of any one of the above factors may not be too meaningful. However, when considered in combination, the results could be significant. Although the number of bids received is a measure of bidder interest, by itself the number does not indicate the degree of competition. For example, one would not normally expect a firm that is located near a project to be underbid by a firm located a distance from the project and having extensive mobilization and materials transportation costs if both firms are bidding truly competitively. A number of other factors enter into a particular firm's bid such as workload or the size of project, but a bidder's geographic location is a significant factor.

d. *Comparison of Bid Prices* A comparison of project unit bid prices should be made at each letting to determine if the contractors are submitting consistent prices on the different projects they bid. In general, there will be an adequate number of projects in each letting to make a comparison except for the large or very specialized jobs. Although the projects being compared may not be in the same geographic area, the reviewers should be aware of any geographic price differences, which normally remain constant between areas even when the overall market conditions change.

e. *Unbalancing of Unit Bid Prices* The unbalancing of unit bid prices by a contractor is difficult to assess in that it is quite normal for different contractors to place their costs such as overhead or their expected profit for the project in the unit cost of different items. Normally these costs will be in those items, which the individual contractor has determined will not be eliminated or significantly under run. The main concern of the contracting agency should be to assure itself that the bids have not been materially unbalanced in order to take advantage of errors in the plans or specifications. Unbalancing of bids may also occur on those lump-sum items that can be performed in the early stages of the project.

The distinction between a mathematically unbalanced bid and a materially unbalanced bid is often difficult. The State of Wisconsin utilizes a bid analysis procedure that was developed with the assistance of the contracting industry to identify materially unbalanced bids. The State examines significant items that are mathematically unbalanced (as identified by a certain percentage over or under the engineer's

estimated unit price for that item). If it appears that a quantity error may have caused a contractor to unbalance, the State will examine all significant bid items for quantity errors. If quantity errors are found, the State will examine the impact on the bidder ranking if corrected quantities had been used. A change in the ranking is an indicator of a materially unbalanced bid. See Attachment B.

f. *Review Committee* A multi-disciplined review committee should be used to analyze the bids received so that the various perspectives within the contracting agency are represented and are provided with technical and managerial input. This approach can also be used to readily identify the effects of awarding the contract or rejecting the bids. If a review committee is not utilized for analyzing bids, as a minimum, the estimating section should be involved. The estimating section is normally familiar with the project. Any major differences in the unit bid prices and the estimate will be readily identifiable and evaluated. Also, it keeps the estimating section apprised of any trends in the market conditions so the engineer's estimates can be kept current.

g. *General Guidelines* It may be beneficial for a contracting agency to develop general guidelines to be used in determining whether to award the contract or to reject all bids. However, each project should be considered on its own merits, as some will normally have a higher priority to begin construction than others. If guidelines are developed, consideration should be given to the use of a "sliding scale" approach for low bids over the estimate. A low bid 15 percent above the engineer's estimate of \$50,000 should not necessarily be treated the same way as a low bid 15 percent above an engineer's estimate of \$5,000,000. Also, if guidelines are used, it is recommended that the specifics be kept confidential from the general public so as not to influence contractors who are preparing bids.

h. *Submission of Bids* If a significant number of firms take out a set of plans and a bidding proposal but only a small percentage, less than 30 percent, actually submit a bid, an effort should be made to determine the reasons for the lack of interest. If the cause for lack of interest can be identified, appropriate steps should be taken to improve the situation.

6. POST-AWARD REVIEWS

a. *Evaluation Period* A conscientious effort should be made to determine if bid rigging is currently ongoing or has occurred in the recent past. To make this determination, an adequate number of projects awarded over a sufficient time period must be evaluated. A time period of approximately 5 years should be selected for the initial evaluation to determine if any abnormal competitive bid patterns exist.

b. *Review Considerations* The following information should be considered in a post-award review for abnormal bid patterns: (1) number of contract awards to a specific firm; (2) project bid tabulations; (3) firms that submitted a bid and later became a

subcontractor on that project; (4) rotation of firms being the low bidder; (5) a consistent percentage differential between the various firms' bids; (6) a specific percentage of the available work in a geographic area to one firm or to several firms over a period of time; (7) a consistent percentage differential between the low bid and the engineer's estimate; (8) location of the low bidder's plant versus location of the second and third low bidders' plants; (9) variations in unit bid prices submitted by a bidder on different projects in the same letting; (10) type of work involved; (11) number of firms that took out a set of plans and a proposal versus the number actually submitting a bid; and, (12) any other items discovered in the review that may indicate noncompetitive bidding. Re-advertised projects should be checked to determine if the eventual low bidder was also low in the first letting.

c. *Analysis* To consider or to analyze the above information to determine if unusual bid patterns exist. The information for project award must be in a readily accessible form, preferably on a computer. Further, although the analysis can be done manually, the use of a computer to analyze the data and to monitor bidding activity has become very prevalent. While many STAs have their own bid analysis system, the majority of the STAs are using the Bid Analysis and Management System / Decision Support System, (BAMS/DSS), a module within the AASHTO Trns-port® software package. The BAMS is a comprehensive system comprising five modules, which includes the Decision Support System containing the collusion detection capabilities. The use of a computer program is intended only to provide information to indicate whether further investigation is warranted. If for any reason, a person feels that bid rigging or fraud has occurred, they should contact the nearest USDOT/OIG Regional Office <http://www.oig.dot.gov/offices.php>. This may be based on a suspicion or actual evidence of fraud, waste, and abuse in any project funded by FHWA.

d. *In-depth Post-Award Review* The extent to which an in-depth post-award review should be carried out by FHWA or an SHA will depend upon the circumstances surrounding each particular review. If an FHWA field office believes that irregular bid patterns may exist and further investigation is warranted, any evidence should be furnished to the appropriate Department of Transportation (DOT), Office of the Inspector General (OIG) office and the State. Further, most SHA's should provide any evidence of wrongdoing to its State Attorney General's Office, FHWA, and other appropriate officials. The frequency of the in-depth reviews should be adequate to indicate to the contracting agency that illegal activities are not ongoing or have not occurred in the recent past.

7. Removal from the Bidders List (Debarment)

Suspensions and debarments are discretionary administrative actions taken to protect contracting agencies by preventing persons and / or companies from receiving additional contracts and / or subcontracts. At the Federal Government level, a notice of suspension or debarment ensures that the Federal Government does not conduct

business with a person or a company who has an unsatisfactory record of integrity and business ethics. Suspension and debarment actions are administered government wide; consequently, a person excluded by one Federal agency is excluded from doing business with any Federal agency. The FHWA's suspension and debarment policies are in 49 CFR Part 29 and the General Services Administration's Excluded Parties Listing System (<http://epls.arnet.gov/>) is a web based list that is updated daily for individuals and firms that are currently suspended or debarred. Contracting agencies may rely on this list to confirm eligibility prior to awarding any Federally assisted contract or subcontract.

It is desirable that each contracting agency has a written policy addressing what action will be taken in instances of contractor irregularities, such as bid rigging. A written policy serves as a deterrent to the contracting industry by advising them, in general terms, what activities the agency considers to be illegal or irresponsible and how it intends to deal with those involved should any wrongdoing be detected. Further, the policy provides a basis for any action(s) that may be taken against the individual or firm involved in the illegal wrongdoing by those responsible for enforcing the policy.

Many States have their own procedures for suspension, debarment or procedures for limiting future business dealings with non-responsible firms (see: <http://www.fhwa.dot.gov/programadmin/contracts/sdlinks.htm>). .

Attachment A –

REVIEW OF ENGINEER'S ESTIMATE PREPARATION

1. Are any State laws or regulation in effect regarding release or protection of the engineer's estimate?
2. Are any State laws or administrative regulations in effect for determination of whether a contract award is proper, based on estimate overrun, competition, or other factors?
3. Review and attach any copies of any procedures or instructions the State may have pertaining to preparation, revision, checking, and use of the engineer's estimate?
4. Briefly describe the intended process for preparation of estimates. Verify the actual method used in comparison with intended process and note any differences?
5. Does the State have an estimating section? Which other portions of the agency become involved in preparing, checking, or approving the estimate?
6. Briefly describe the personnel resources available for preparing, etc., estimates and note any workload changes vs. personnel available over the past 3 years.
7. What is the primary basis for establishing estimated unit prices?
8. What methods are used to identify and incorporate anticipated changes in cost of labor, equipment, and material?
9. Are upcoming labor negotiations considered in the process?
10. Are material suppliers contacted for anticipated material costs?
11. Are adjustments made for individual project conditions? In what way?
12. What other factors are used to adjust the primary basis to determine the estimated prices for the project?
13. In typical cases, how far in advance of the letting date is the estimate prepared?

14. How often is the estimate revised during the advertising period? Discounting addenda and quantity changes, what are the usual reasons for revising estimated prices?
15. Is every estimate routinely evaluated by anyone other than preparer? If so, when?
16. If possible, determine how often further study and/or revision is believed desirable but not accomplished due to workload restriction.
17. Is any information released publicly, which may indicate the actual or approximate value of the estimate prior to opening bids? Is the estimate released after opening bids?
- a. When?
 - b. Is it published and where?
 - c. Who receives copies, if published?
 - d. In detail or only giving total cost?
18. Is any other information regarding the estimate available to contractor on request?
19. Review the State's experience during the past calendar year for Federal-aid contract for up to 100 randomly selected projects if the contract volume exceeds 100 projects.
- a. Determine the percentage of projects sampled where the low bid fell within ± 10 percent of the estimate, and plot the distribution of low bids above and below the estimate.
 - b. Determine the percentage of projects with zero, one, two, three, four, etc., bids. Are there any project size trends noted?
 - c. Prepare graphs with percent above or below estimate for each project vs. cumulative percent of number of low bids for three separate groups of projects, single bids, two or three, and four or more bids. (Each group should be arranged in ascending order to facilitate preparing these graphs.) Are any trends noted?
20. Review the Contracting agency's procedure for evaluating bids received prior to recommending award or rejection.

- a. Is there an established policy on, or apparent pattern of, awards or rejections of bids at a set level above the engineer's estimate?
- b. In the case of poor competition or excessive difference between the estimate and the low bid, does the Contracting agency contact the bidders and non-bidders who checked out proposal forms?
- c. Are there any "ground rules" for adjusting estimates after receipt of bids? Is such action taken on its own merits or may it be prompted by pressure to award an apparently excessive bid?

Attachment B

Wisconsin DOT Unbalanced Bid Analysis

(Excerpt from the Wisconsin DOT Construction and Materials Manual, Section 2.1.2.1.1, revised 10/98)

1. A unbalanced bid analysis will be performed under two circumstances:

- If the Department becomes aware of an error in a quantity of an item shown in the bidding documents.

- If an item is found to be both significant to the contract and significantly unbalanced.

2. An individual item will be considered significant to the contract if a bidder has an item included in the proposal where the difference between the total cost of the item and the estimate, expressed as a percent of the estimated total contract cost, is greater than or less than 0.50% for contracts less than \$2,000,000 and greater than or less than 0.25% for contracts \$2,000,000 and larger.

3. An item will be considered significantly unbalanced if the difference between the low bidder's unit price and the estimate, expressed as a percent of the estimate, is greater than +50% or is less than -75%.

4. The Unbalanced Bid Analysis shall consist of the following steps:

A. The estimated unit price for all items identified as being significantly unbalanced will be reviewed for correctness. Corrections will be made as needed and the low bidder's unit price will be reevaluated to determine if the item remains significantly unbalanced (see item #3).

B. Quantities for all items found to be significant to the contract will be checked and verified. Quantities will be determined based upon the bidding documents and the construction methodologies depicted in the plan. These quantities will be used only for the purpose of performing the Unbalanced Bid Analysis.

C. Corrected quantities for items known to be in error (see item #3) plus corrected quantities for all items significant to the contract will then be multiplied times the unit price bid for each contractor and a gross sum for the contract for each bidder will be calculated.

D. A comparison of the calculated gross sum totals will be made. If the calculated gross sum for the contract low bid is found to be higher than the

calculated gross sum of another bidder, the low contract bid proposal shall be determined to be materially unbalanced. If the calculated gross sum of the contract low bid proposal is found to be less than the calculated gross sum of all other bidders, that bid shall be determined to be not materially unbalanced.

E. Step D will be repeated as necessary using the next low contract bid proposal until a contract bid is found to be not materially unbalanced.

5. If the initial contract low bid proposal is found to be not materially unbalanced, the contract will be considered for award at the bid contract amount in accordance to the Standard Specifications. The contract will be based upon the bid amount and the quantities shown in the bidding documents.

6. If the initial low bid contract proposal is found to be materially unbalanced it will be considered irregular and will be rejected as nonresponsive as reasonable doubt exists that the bid does not represent the lowest cost to the Department.

7. If the initial low bid contract proposal is found to be materially unbalanced and rejected, the Department may award to the next low bid contract proposal at the bid contract amount or may elect to reject all bids and relet. Decisions will be made in the public interest and will consider consequences of reletting the project.

PS&E Checklist

All PS&E submissions are required to include certain information. If this information is not available or not required, Project Programming must still be notified. The checklist below, which is required for ALL PS&E submissions, will provide Project Programming and FHWA the necessary documentation to Authorize construction funding. **This checklist must be submitted to Project Programming along with the PS&E Estimate.**

ALL QUESTIONS MUST BE ANSWERED COMPLETELY!

1. Contact person filling out this form: [Click here to enter text.](#)
2. Project Name and State Number: [Click here to enter text.](#)
3. Advertising Date: [Click here to enter text.](#)
4. Is this project exempt from FHWA overview? Yes No

***** QUESTION #5 TO BE COMPLETED BY ENVIRONMENTAL COORDINATOR *****

5. Have the following environmental issues been completed? (If no to any, please explain)

- a. Environmental Commitments memo issued and copy forwarded to Project Programming Yes No
- b. Section 4(f)? Yes No N/A
- c. Wetlands findings? Yes No N/A
- d. Floodplains findings? Yes No N/A
- e. Other Permits issued? (COE, wetlands, etc.) Yes No N/A

Please enter Permit # if Wetlands Permit has been issued: [Click here to enter text.](#)

6. Has a ROW certificate been issued? (If no, please explain) Yes No

(in accordance with 23CFR635.309(b) the NHDOT hereby states that all right of way clearance has been completed and/or all necessary arrangements have been made for the project to be undertaken and completed as required for coordination within the construction schedules.)

7. If project is exempt from overview, is plan front sheet attached? If project is not exempt from overview, are plans attached? (If no, please explain) Yes No N/A
8. Is Proposal included? (Federal overview projects only)(If no, please explain) Yes No N/A
9. Is Utility certificate included? (Federal projects only)(If no, please explain) Yes No N/A
10. Is the ITS certificate included? Yes N/A
11. TCC Project Determination Completed? Yes No

The PS&E submission cannot be sent to FHWA for construction funding Authorization until the information above is filled out (this includes explanations for questions answered "NO"). Use the back of this sheet for any comments or explanations. Funding requests can be sent to FHWA without all necessary details in place as long as this checklist is filled out. Approvals and conditions of these requests are then subject to the review and discretion of FHWA. This checklist will be shared with FHWA and will be kept in Project Programming files.

[Click here to enter text.](#)

(Signature of Project Manager, Lead Person or other authorized person indicating above information is complete and accurate.)

Date

Enter supporting data below.

[Click here to enter text.](#)

APPENDIX 13-6

MATERIALS TO SPECIFICATIONS FOR PROPOSAL

ADVERTISING DATE
DATE FOR PRELIMINARY
PROPOSAL

February 15, 2005
 January 17, 2005

Project Sutton
State No. 14328

		DATE DRAFT SUBMITTED	DATE FINAL SUBMITTED
	(requested by)		
Project Supplemental Data Sheet w/map	February 1, 2005		
Prosecution of Work	Final February 8, 2005		
Traffic Control Plan	Final February 8, 2005		
Permits (check if applicable)			
Wetland Board	ASAP		
Army Corp. of Eng.	ASAP		
Water Quality	ASAP		
EPA NPDES (5+ ac)	February 1, 2005		
Other	ASAP		
Construction Work Zone Limits w/map	February 1, 2005		
Railroad Requirements (if applicable)			
No Time Extension for Weather	YES _____ NO _____		
Consecutive Item List	January 16, 2005 (the items will most likely change but a good start)		
Preliminary PS &E			
PS & E			
Items that may require Special Provisions	First Draft January 16, 2005		
(description)	Final Document February 4, 2005		
Highway:			
Bridge:			
Materials & Research:			
Traffic:			
Utilities (including RR)			
Proposal to Contracts	February 8, 2005		

<\\hzndotfile1\Global\Specifications\Proposal\project information\Materials to Specs.xls>

APPENDIX 13-7

(PROJECT NAME)
(STATE PROJECT NO.)

(Date of last revision for distribution)

PROSECUTION OF WORK

DESCRIPTION OF WORK

Provide a brief narrative describing the project in general terms. Include approximate limits of proposed construction and the type of work to be performed (i.e. bridge replacement, roadway reconstruction, new alignment). If appropriate, provide a brief synopsis of implications related to the construction phasing and traffic control.

CONCURRENT WORK

List nearby NHDOT projects where construction will occur, either all or in part, during the same time frame as that of subject project. The purpose is to alert prospective bidders of work that may affect access to the project, traffic control issues including construction signing, materials availability, etc. Include the project name, State project number, target advertising date, anticipated completion date, and brief description for each project. (Check the latest Advertising Schedule for concurrent projects.)

UTILITIES

List all utilities within the project limits, whether directly affected or not. Include contact names and telephone numbers for each utility. In addition, this section should include descriptions of how each utility is affected, i.e., utility relocations/adjustments required to complete the project. For aerial services with joint occupancy, this description should include a relocation sequence with an estimated time frame for each utility. In some cases, it may be desirable to indicate the relationship of utility relocations to the overall construction sequence.

The Utility Coordinator provides the information for this section.

TEMPORARY LIGHTING

When temporary lighting is required to illuminate certain areas of the work, e.g., intersections and beginning of concrete barrier, the design and cost estimate of the temporary lighting are prepared by Design Services. This section includes specific requirements for luminaires.

(ENVIRONMENTAL CONSIDERATIONS)

HISTORIC

Describe any specific historic considerations/commitments within the project. If there is a specific issue that warrants special attention, use a separate heading.

EXCAVATING, DREDGING, OR FILLING STATE WATERS (WETLANDS)

Use this section to notify prospective bidders of the status of the Wetlands Permit applications typically from the New Hampshire Wetlands Bureau and the Army Corps of Engineers (ACOE) and whether the Permit is included in the Proposal or to be received prior to awarding the contract. If there are specific permit conditions that are unique to the project, it may be warranted to list them here. (Check with the Environmental Coordinator.)

EROSION CONTROL AND WATER QUALITY MANAGEMENT

Use this section to identify the Contractor's responsibility to develop a temporary erosion control plan, consistent with Item 645.7 - Stormwater Pollution Prevention Plan.

If there are specific water quality issues, i.e., water supply aquifers or reservoirs, adjacent lakes, ponds, or streams, it may be warranted to include a separate section describing specific requirements.

CONTAMINATED SOILS AND UNDERGROUND STORAGE TANKS

If there are sites of known or potentially contaminated soils or underground storage tanks within the project limits, list any special commitments or coordination efforts that are required. These may include excavation of the material for testing and possible treatment and/or disposal, and removal of the underground storage tanks. Coordinate with the Bureau of Environment for pertinent requirements.

RIGHT-OF-WAY AND PROTECTION OF PROPERTY

When specific commitments are made as part of the property rights acquisition process, the information should be identified, as appropriate, on the construction plans. In many instances, it is worthwhile to repeat or to further explain these commitments in the Prosecution of Work. Indicate the affected parcel number and property owner.

BUILDING DEMOLITION

When a building(s) is to be demolished as part of the project, list each building separately by Item number and include the name of the former property owner, a description of the building(s) to be demolished, and the location or street address. If any building to be demolished is located outside of the project limits, include a location map identifying the building location(s) by Item number.

GEOTECHNICAL REPORTS

This section notifies prospective bidders that the Geotechnical Report for the project is available for review at certain times during the bidding period at the Bureau of Materials &

Research. Copies of the report are also available at the office of the Associated General Contractors.

(BRIDGE ISSUES)

REMOVAL OF EXISTING BRIDGE

When an existing bridge is to be removed as part of the project, prospective bidders may review available bridge plans during the bidding period. This section should also include any specific concerns related to the removal of the existing bridge, i.e., methods of removal, traffic control issues, time frames, water quality, subsidiary work, etc..

ERECTION PROCEDURE

Notify the Contractor of responsibilities regarding submission of proposed erection procedures and falsework plans for review and approval by the Engineer.

STAGING AREA(S)

If additional area, beyond that shown on the plans for construction of the project, is required for staging for bridge construction, i.e., crane platforms, storage areas for structural members, etc., indicate any restrictions on area available that may not be apparent from the plans.

EXCAVATIONS

Typically, information to the Contractor would read: “Excavation adjacent to the traveled way or shoulders shall not remain open through non-work hours unless adequately protected by temporary traffic control barrier (at the Contractor’s expense and specifically authorized by the Engineer) or flattened to a 4:1 or flatter slope”.

CONSTRUCTION REQUIREMENTS

This section would be used to identify information directed to the Contractor, especially for those projects that do not have plans, i.e., all the information regarding the project is contained in the Proposal only.

WORK HOURS

This section identifies any restriction(s) in work hours. Typical wording would read: “Do not perform any work involving high noise machinery such as jackhammers or excavating equipment prior to 7:00 a.m. or after 7:00 p.m., unless otherwise permitted in the contract or approved by the Engineer.”

LANDSCAPING

Typical wording would read “Landscape planting or any other landscaping related work (i.e. selective pruning, fertilization, transplanting, etc.) on this project shall be performed by a qualified Landscape Contractor and/or Certified Arborist in accordance with American Association of Nurserymen (AAN) Standards and Section 650. The time frames specified in Section 650 shall be followed. The establishment period specified in Section 650 shall be

required.” Coordinate with the Roadside Development Section for project specific requirements that may be necessary.

PRE-SURVEY MEETING

Typically wording would read: "NHDOT holds a pre-survey meeting to discuss survey responsibilities and scheduling prior to the commencement of work. This meeting is intended to review Section 105.08 of the Standard Specifications."

SALVAGE OF MATERIALS

List any materials that are to be salvaged from the project for reuse. Be specific. Sometimes, for example, only certain components of guardrail are to be salvaged. (Posts, generally, are not salvaged to the State but rather are the responsibility of the Contractor to dispose of.) Include agency to receive materials, contact name, and any special considerations related to disposition of material, i.e., delivery, loading onto recipient's vehicles, etc..

SCHEDULE OF WORK

Specific construction sequencing or phasing to complete the work is outlined in the plans and is usually governed by traffic control issues. This section describes work that must be completed by the Contractor within certain time frames or by specific dates. For example, tree clearing and/or earthwork required to be done early in the construction schedule to allow for utility relocation; time of the year restrictions for the use of temporary detours; or, perhaps a description of what must be completed prior to winter suspension of work. Of primary concern is the work that may effect the overall construction schedule, interim completion milestones, traffic implications, and the like.

COMPLETION DATE

The (final) completion date of the project should be determined by consulting with the Bureau of Construction. This date, as defined in the Spec Book, "...occurs when the Contractor has completed all work required by the contract and has satisfactorily executed and delivered to the Engineer all documents, certificates and proofs of compliance required by the contract".

The "Intermediate Completion Date(s)" should also be listed here and identified specifically as an Intermediate Completion Date(s) for work that *must* be completed within these dates.

APPENDIX 13-8

(PROJECT NAME)
(STATE PROJECT NO.)

(Date of last revision for distribution)

TRAFFIC CONTROL PLAN

The following Standards and Specifications are considered to be part of the Traffic Control Plan:

1. Sections 618 and 619 of the Standard Specifications.
2. Work Zone Traffic Control Standard Plans, available on line in the Business Center at www.NHDOT.com or through the NHDOT Contracts Office.
3. Manual on Uniform Traffic Control Devices (MUTCD), 2003 Edition, with all current updates and official interpretations.
4. State of NH Flagger Handbook.

Additionally, the following are specific provisions for this project:

SPEED REDUCTION

Sometimes, it may be necessary to legally reduce the posted speed limit to provide a safer work zone, especially on a high speed facility such as the Interstate or Turnpike. This is accomplished either by the State changing the speed limit signs or by the Contractor using Trailer Mounted Speed Limit Signs (Item 619.27). Restrictions may apply which are also described here.

MAINTENANCE OF TRAFFIC

This section describes the conditions the Contractor must meet when performing the work. For example:

- Must two-way traffic be maintained throughout construction?
- Are there specific times during the day or certain days of the week that two-way traffic must be maintained?
- Is alternating one-way acceptable? What's the minimum width of traveled way during alternating one-way traffic operations? Is it necessary to restore two-way traffic prior to non-work hours? (Keep in mind that certain roadways must maintain a minimum width of 14 ft to accommodate oversize vehicles. For a list of roadways that require this minimum width or if this minimum width cannot be provided, consult with the Permit Office in the Bureau of Highway Maintenance.)
- Is it necessary to specify using Uniformed Officers to control traffic? Are Flaggers sufficient?
- Does traffic have to be maintained on pavement at all times?

- Is there a temporary detour involved? Are temporary traffic signals required?
- Is temporary widening required?
- If there are major changes to traffic patterns, the NHDOT will issue a Press Release. If so, the Contractor must know that it is issued based on information provided by the Contractor. Also, prior notification by the Contractor to the Engineer is required.

PROHIBITION OF UNNECESSARY TRAFFIC OBSTRUCTION

This section identifies issues to prevent unnecessary interruption of traffic. For example:

- What is the “clear zone” for the project?
- Must work be performed in such a way that does not adversely affect traffic from both sides of the roadway?

RAILROAD TRAFFIC

Information concerning railroad traffic is usually provided by Design Services in the Prosecution of Work under the UTILITIES section. Reference can be made here to that document.

PEDESTRIAN TRAFFIC

It is very important that provisions are made for safe pedestrian movement through construction projects that have existing sidewalks or those which have pedestrian traffic but do not have sidewalks. For those sidewalks that are to be reconstructed, the Contractor must close the sidewalk to pedestrians and work judiciously to complete the sidewalk work to enable pedestrian traffic to be restored or to make provisions for temporary walkways. For those areas that do not have existing sidewalks but do have pedestrian traffic, the plans must illustrate how pedestrian traffic can be safely accommodated.

SIGNING AND PAVEMENT MARKING

Sometimes, there are project specific requirements for signing and /or pavement marking, especially for staged construction through congested areas. Use this section of the TCP to inform the Contractor of these requirements.

VARIATION FROM THE TRAFFIC CONTROL PLAN

The following is always included as a closing statement in the TCP: “If the Contractor feels improvements can be made to the Traffic Control Plan for this project, submit a written proposal with any necessary plans for consideration and approval.”

5/13/97

APPENDIX 13-9

SAMPLE

PROJECT: BARTLETT
STATE NO.: 13043
DATE: August 29, 2006

SUPPLEMENTAL PROJECT INFORMATION SHEET

DESCRIPTION: This project is on US Route 302 beginning approximately 1400 feet southwest of the West Side Road intersection continuing northeast 1.0 mile. The work involves replacing the bridge over the State of NH Railroad (#188/123) (leased and operated by Conway Scenic Railroad) and the bridge over the Saco River (#189/129); reconstructing Route 302 on improved alignment; rehabilitating a portion of the existing roadway; and, reconstructing approximately 1500 feet of West Side Road.

FEDERAL FUNDING: 80%

PROJECT INITIATED: State's Ten-Year Transportation Improvement Program.

PROJECT NEED: Both bridges were built in the 1930's and are on the State's "Red List". They are narrow and in very poor condition with FSR of 11.0 and 29.1, respectively (out of a possible 100). Route 302 has sub-standard vertical alignment over the NH Railroad bridge and in the vicinity of West Side Road. The West Side Road intersection has poor geometry with insufficient sight distance looking eastbound onto Route 302, along with a significant accident history.

TRAFFIC IMPLICATIONS: Vehicular and pedestrian traffic on Route 302 will be maintained on a temporary bridge at each of the 2 areas of bridge construction. The NH Railroad temporary bridge will be in service for 1 construction season while the Saco River temporary bridge will be used for 2 construction seasons. Alternating one-way traffic controlled by flaggers will be permitted elsewhere on the project during off peak hours for other construction activities. Traffic will not be maintained on the same unpaved section for more than 3 weeks.

COMPLETION DATE: October 17, 2008

1/27/2004

APPENDIX 13-10

SAMPLE

Holderness-Plymouth
11849

August 29, 2006

SPECIAL PROVISION

AMENDMENT TO SECTION 105 -- CONTROL OF WORK

AMENDMENT TO SECTION 105.12 - CONSTRUCTION ZONE(S)

In accordance with Section 105.12 of the Standard Specifications, the construction work zone(s) designated for this contract shall extend 500 ft (approximately 150 meters), beyond the work limits as described below and/or as shown on the project layout map on the reverse of this page:

DESCRIPTION OF CONSTRUCTION WORK ZONE(S)

Work on Route 175A will begin at its intersection with US Route 3 (Main Street) in Plymouth and extend to Interstate 93 in Holderness (2100 feet). There will also be a shoulder work on Route 175A from its intersection with Route 175 west 850 feet. Route 3 will be reconstructed north (650 feet) and south (635 feet) of its intersection with Route 175A. The work on High Street will start at its intersection with Route 3 and extend west 350 feet. The work on Green Street will start at its intersection with Route 175A and extend south 800 feet. The work on North River Street will start at its intersection with Route 175A and extend north 400 feet. The work on South River Street will start at its intersection with Route 175A and extend south 386 feet. The work on the NH Railroad will extend north 1450 feet from the crossing of Route 175A and south 1100 feet.

APPENDIX 13-11

(Sample Addendum for Revisions After Advertisement)

CERTIFIED MAIL (Return Receipt Requested)

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION

SAMPLE

Project: Bartlett
Fed. No.: STP-BRF-X-T-032-1(21)
State No.: P-4370

Date: February 19, 1998

ADDENDUM No. 1

Bidders are advised to make the following revisions to the Proposal:

Statements in the Proposal can be modified or amended as follows:

1. **Amend** on page 5 of the Information Report and pages 441-442 of the Bid Schedule in the Proposal the quantities of the following items to read;

“Item 615.012 Traffic Sign Type A, Breakaway Mounts (F) - from 1300 ft² to 1700 ft²,
Item 615.022 – Traffic Sign Type B, Breakaway Mounts (F) - from 1400 ft² to 2800
ft²”

Quantities can be changed and items deleted from the Information Report and Bid Schedule without replacing pages of these documents by directing the Contractor, through the Addendum, to make the changes. New item(s) can be added to the Information Report in the same manner; however, a new Bid Schedule page(s) must be added to the Proposal (as an “A” page) for new or revised items.

Entire pages of the Proposal can be added or changed as follows:

2. **Replace** pages 191 - 194 of the Proposal with the attached pages numbered 191A - 194A which provides new language for a lease agreement of the State owned “ACROW” bridge.”

Changes to the plans can be made without revising the sheets by stating the change as follows:

Bidders are advised to make the following revisions to the plans:

1. **Amend** on sheet 73 of the Plans, the “Removing Overhead Signs” summary by changing all references of “Removing Partial Traffic Sign Structure” to read, “Removing Full Traffic Sign Structure”.

If the original plans must be changed to show the revisions, the affected sheets must be reprinted and included in the Addendum. The revision is described in the Addendum as follows. (For distribution, use the procedure for “Revision After Proposal” as included in this chapter, beginning on page 13-8.)

2. **Replace** in the Plans, sheets 1, 70, 73, 226 - 228 with the attached revised plan sheets, which address various signing requirements.

**THE CONTRACTOR SHALL ACKNOWLEDGE THIS
ADDENDUM ON THE BID ENVELOPE**

(name)
DIRECTOR OF PROJECT DEVELOPMENT

Date

DRAINAGE NOTE FORMAT

In order to minimize the confusion that often results in applying construction notes to a drainage design, a “standard” format for drainage notes has been developed. This format includes the necessary items in a clear and concise manner and demonstrates the proposed design based on the normal method of construction. This format is structure oriented versus pipe oriented in that all the information regarding an individual drainage structure (inlet, outlet, and rim elevations) is contained in the note.

The sample Construction Plans shows a sample drainage layout, including removal items. As shown, the notes begin at the outlet end of the drainage run, the numbering sequence should continue to the highest point of the system. In general, removal notes should be separate from construction notes if separate pay items are used. If removal is subsidiary to a particular construction item, it should be included in the same note and labeled subsidiary.

Notes to construct a pipe run will begin with the station and offset location of each end of pipe running from downstream to upstream, followed by the note to construct the pipe (length x diameter x type). The note should include the concrete strength other than 2000 D (3000 D, 4000 D, etc.), pipe thickness or other unique characteristic.

If the pipe is at the end of a closed system, the outlet end is the next item depicted in the construct pipe note. For instance, construct end section or headwall (incl. type for each). The invert at the outlet end of pipe is given here (in the case of end sections, it should be clear that the invert is at the pipe).

Following the pipe, construction of the structure at the upstream end is to be described in the same note as follows:

- 1) Type of structure, diameter (if greater than 4 ft), unique features (i.e., slab top, eccentric cone, etc.), and station and offset location.
- 2) Top grate elevation (set at the binder course elevation). Metric elevation to the thousandth and english to the hundredth.
- 3) Invert elevations, as noted above, with description and locations, if needed (i.e., 24” INV. IN, 24” INV. IN (N), etc.).

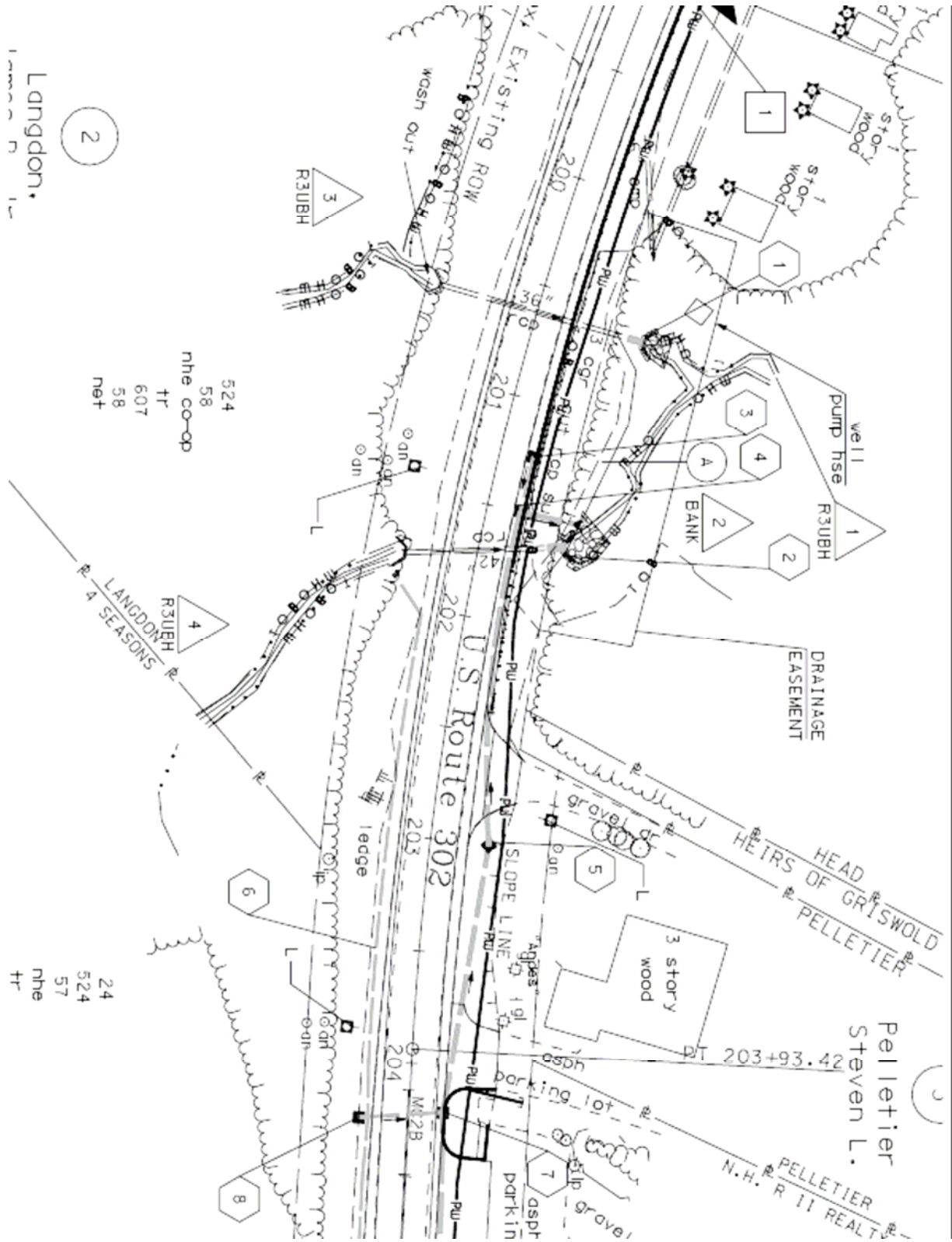
When removal of existing pipe and/or structures is subsidiary, it will be described in the construction note. If payment is made for such removal, it typically will be described in a separate note.

Any specific outlet protection should be included as well, such as a stone fill. Erosion control/stormwater treatment measures can be described in a separate note. When outlet protection ditches and/or erosion control swales are constructed, a detail should be provided to show bottom widths, side slopes, stone type and thickness, bedding material, geotextiles, and any other information to clearly show the limits of pay items included.

Separate notes will be written for detention basin outlet structures and grading.

Drainage Note Examples

- 1 STA 200+62, LT 49'
CONSTRUCT 36" PC-7 CONC. HEADWALL
REMOVE EXIST. HEADWALL
RELAY 8' OF 36" RCP TO MATCH PIPE LINE AND GRADE
CONSTRUCT STONE FILL CLASS B (12'x16'x3')
- 2 STA 201+61, LT 38'
CONSTRUCT 42" PC-7 CONC. HEADWALL
REMOVE EXIST. HEADWALL
RELAY 8' OF 42" RCP TO MATCH PIPE LINE AND GRADE
CONSTRUCT STONE FILL CLASS B (18'x16'x3')
- 3 STA 201+50, LT 15' TO STA 201+25, LT 15'
CONSTRUCT 20.2' X 15" PLASTIC PIPE
CONSTRUCT CB-B AT +25, LT 15'
GRATE = 619.72
INV OUT = 615.00
- 4 STA 201+50, LT 39' TO LT 15'
CONSTRUCT 24.0' X 24" CORR. POLYETHYLENE
PIPE FOR SLOPE DRAINAGE
CONSTRUCT 5' DIA CB-B AT +50, LT 15'
GRATE = 619.59
INV IN (N) = 614.00
INV IN (S) = 614.50
INV OUT = 613.75
CONSTRUCT 24" PLASTIC END SECTION
- 5 STA 201+50, LT 15' TO STA 203+00 LT 25.9'
CONSTRUCT 144.4' X 24" PLASTIC PIPE
SWEEP AROUND GUARDRAIL
CONSTRUCT CB-B AT +00, LT 25.9'
GRATE = 620.47
INV IN = 615.50
INV OUT = 615.25
- 6 STA 201+88, RT 34.1' TO STA 206+79, RT 26'
CONSTRUCT 500.9' X 6" PERF. CORR. POLY. PIPE UND.
CONSTRUCT MRM UL-4 HEADWALL AT +88, RT 34.1'
INV OUT = 615.50
- 7 STA 203+00, LT 25.9' TO STA 204+21, LT 15'
CONSTRUCT 115.6' X 24" PLASTIC PIPE
CONSTRUCT 5' CB-B AT +21, LT 15'
GRATE = 625.49
INV IN 24" = 620.00
INV IN 15" = 619.25
INV OUT = 619.00



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Langdon
 4 SEASONS