iPDWeb Project Cost Estimating
Iowa DOT Office of Bridges and Structures

Contents

Login

Consultants may use the link at https://iadot.exevision.com/ipd/index.aspx?ln=app to get to the iPDWeb cost estimating software. Alternatively, it can be accessed from the Designer/Consultant Resources webpage at https://iowadot.gov/projectdev/consultant-designer-resources-home.

DOT employees may access the software by logging into Office 365. Once logged in click on the "waffle" in the upper left-hand corner of the screen, click on "All" applications, and scroll down the list to click on "iPD Web App". You can also right-click on "iPD Web App" and select "Pin to home" so that it will show up in the home application list when logging into Office 365.
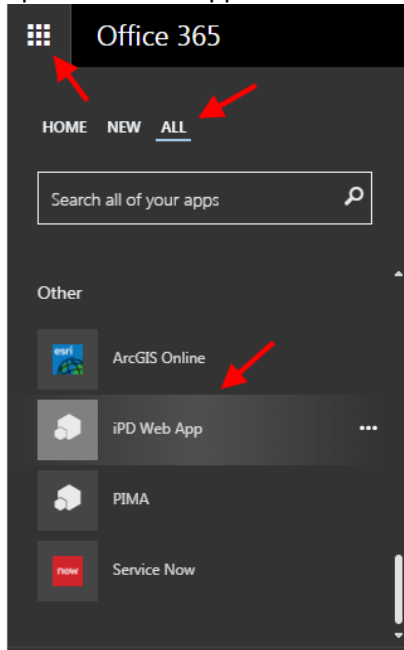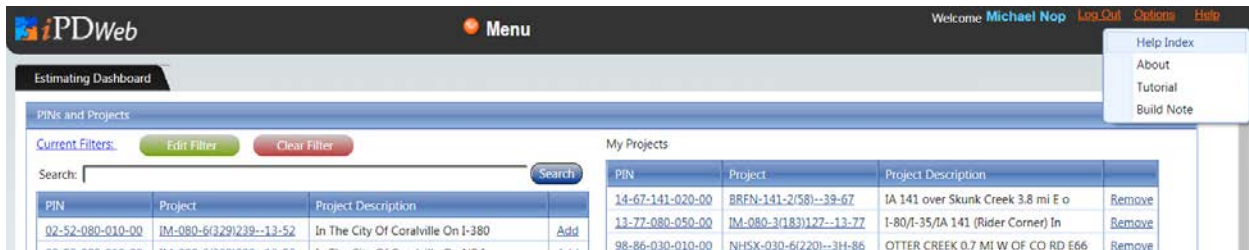

The "Ribbon"

The black ribbon at the top of the iPDWeb application has a Menu drop-down button at the center of the ribbon to access the various menu options. Additionally, the Help option on the right-hand side of the ribbon contains a help index file, information about the current version of iPDWeb, and some video tutorials.

A full listing of menu items under the drop-down Menu button is shown below. The menu items displayed to each user depends on the user's security settings. Most users doing estimates will not need to access the Menu as part of their estimating workflow.

Estimating Dashboard Tab – Finding and Selecting a Project

The "Estimating Dashboard" tab has two sections to it. The left-hand side contains a list of all active projects in the system. New projects and project information are fed nightly into iPDWeb from the Iowa DOT's Project Scheduling System (PSS). As described below, users can create custom filters to limit the list of available projects in the left-hand side. Click "Add" on the far-right side of a record to add that project to the "My Projects" portion of the dashboard. "My Projects" is a list that is user specific to allow quick and easy access to saved projects.

To select a project for cost estimating, click a PIN number or Project number in either section. Doing so will open a "Cost Estimating" tab for that project. Entering a cost estimate on the "Cost Estimating" tab is discussed later in this document. In general, users should click the project number rather than the PIN number since the project number will be highlighted in orange on the "Cost Estimating" tab, making it easier to identify. By clicking different project numbers on the "Estimating Dashboard" tab users can open more than one "Cost Estimating" tab at a time.

There are three ways to find a project in iPDWeb.

1. Users can scroll through the list of active projects on the left-hand side to find a project. Users may first want to click "Clear Filter" to obtain a complete list of all active projects. Projects can be sorted in ascending or descending order by clicking on one of the blue headings at the top of the list. (Note that PIN numbers are first sorted by the 3ʳᵈ and 4ᵗʰ numbers in the PIN number sequence.)
2. The Search feature can be utilized to search for PIN numbers, project numbers, or project locations and descriptions. Users may want to "Clear Filter" before searching.
3. Users can create custom filters to limit the list of available projects. Creating a filter is described below. Click on "Current Filters" to see a summary of the active filter. (If nothing displays then there is no active filter.) Click "Clear Filter" to remove an active filter and display a complete list of all active projects.

Filters

Users can create and edit filters for the projects that display in the "Estimating Dashboard". Selecting "Edit Filter" from the dashboard will bring up the "My Filter" dialog.

To create a new filter:

- Click on the "Add" button.
- Enter a name for the new filter you want to create.
- Enter any desired filter parameters.
- Click the "Save & Close" button to save and apply the filter.

To edit an existing filter:

- Select the appropriate filter from the "Select Filter" drop-down. This should fill out the parameters for the selected filter.
- Edit any of the desired fields.
- Click the "Save & Close" button to save and apply the filter.

Below is a brief description of the various options for filters:
- Users may select one of the saved filters to be the "Default Filter" by checking the box. Having a default filter can save time when accessing the iPDWeb application.
- A filter can be applied to the list of "My Projects" if the "Show Favorite Projects Only" box is checked. This could be desirable if you have an extensive list in "My Projects".
- The "Filter Logic" options (i.e. "AND" and "OR") apply when more than one "Filter Type" is set by the user.
- Users can filter for a range of letting dates.
- The "Applied Filters" selected by the user from the list box will appear at the top of the list for each of the "Filter Types". Multiple filters in the "Applied Filters" list can be selected using the "Ctrl" and "Shift" keys in combination with clicking the mouse.
- Clicking on "Show Filter" displays the filters applied for the selected filter. It is good practice to check this for newly created or modified filters to ensure the filter settings are as intended.
- Clicking "Save As" will create a copy of an existing filter. The name of the copy will begin with "Copy of" followed by the name of the filter copied.

Cost Estimating tab – Tree Structure Levels

After you select a project from the "Estimating Dashboard" tab, the estimate will open in a "Cost Estimating" tab (see screen capture below). If you clicked the project number rather than the PIN number, the project number will be highlighted in orange on the "Cost Estimating" tab as shown below, making it easier to identify. By clicking different project numbers on the "Estimating Dashboard" tab users can open more than one "Cost Estimating" tab at a time.

If a project has any existing estimates or the bid items for that project are entered into PSS, you will see a **+** symbol to the left of the project number. Clicking the **+** symbol will expand the tree structure to reveal additional levels. Clicking the **–** symbol will contract the tree structure.

The tree structure contains the following levels.
- PIN Segment – This is the highest level of the tree structure.
- PIN Section – These are designated with by an orange square containing the letter "S".
- Project Number
- Office – Each office can create this level using default naming conventions such as "Office of Bridges & Structures" or "Office of Design". Note that the level "PSS" is special. Projects that have bid items entered into PSS will have "PSS" at the office level.
- Event (or Estimate) – Estimates are normally completed at designated event dates for each office. Examples of OBS events include B01, B03, Annual, and 50% Complete. Naming conventions at the event level include the event followed by a dash and a name entered by the user (e.g. "B03-New Version"). If "PSS" exists at the office level then "PSSLive" will exist underneath it at the event level.
- Division – This is the level at which estimates are created. Users can rename a division from its default name "New Division". Users can create multiple division levels. If the "PSSLive" event level exists it should contain one or more division levels carried over from PSS. These division levels will contain the bid items and quantities that were entered into PSS.
- Alternate Group – Alternate groups are designed to allow users the flexibility to add estimates for alternative options. An example could include an estimate for a CIP culvert versus a precast

culvert option. In this case, two division levels could be created under the alternate group level. The "Alternate Group" default name can be renamed by the user.

Cost Estimating tab – Project Level
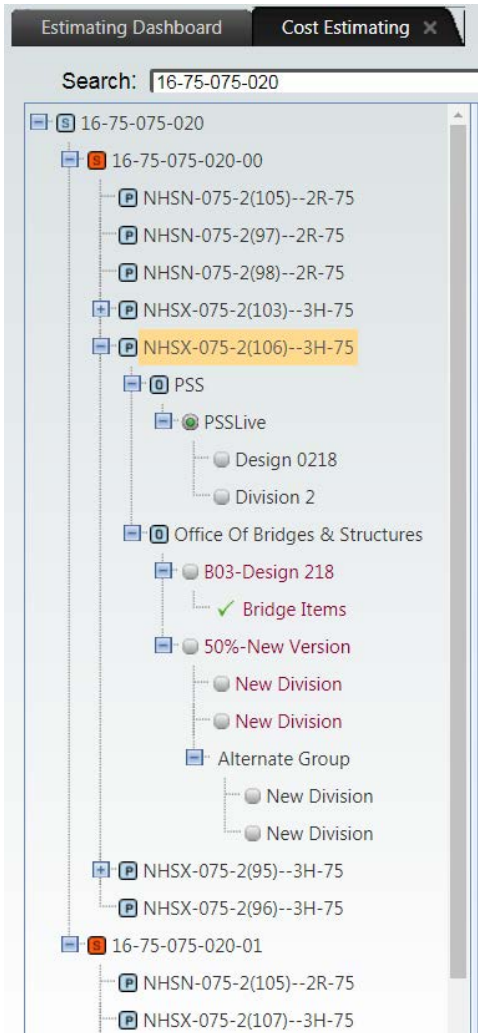
After you select a project from the "Estimating Dashboard" tab, the estimate will open in a "Cost Estimating" tab. If you clicked the project number rather than the PIN number, the project number will be highlighted in orange on the "Cost Estimating" tab as shown below, making it easier to identify.

If a project has any existing estimates or the bid items for that project are entered into PSS, you will see a **+** symbol to the left of the project number. Clicking the **+** symbol will expand the tree structure to reveal additional levels. Clicking the **–** symbol will contract the tree structure.

A project number in red text means the project has been deleted from PSS.

When a project number is selected from the estimate tree structure, three tabs that provide information about the project become available:

- Project Details – This tab provides detailed information about the project, often referred to as the project header information and the Organization table, identifying who has access to the project. Note that a project must be assigned to "Office of Bridges& Structures (CC:5320)" for OBS estimators to have the necessary permissions to add an estimate.
- Project Review – This tab provides a summary of the offices and office estimate totals that compose the project. An estimate needs to be marked "Selected" and "Complete" to show up on this tab.
- Project Parameters – This tab contains the general scope of the project. The bridge parameters must be filled out before a B03 or B04 cost estimate can be finished. These parameters are important for future parametric project estimates.
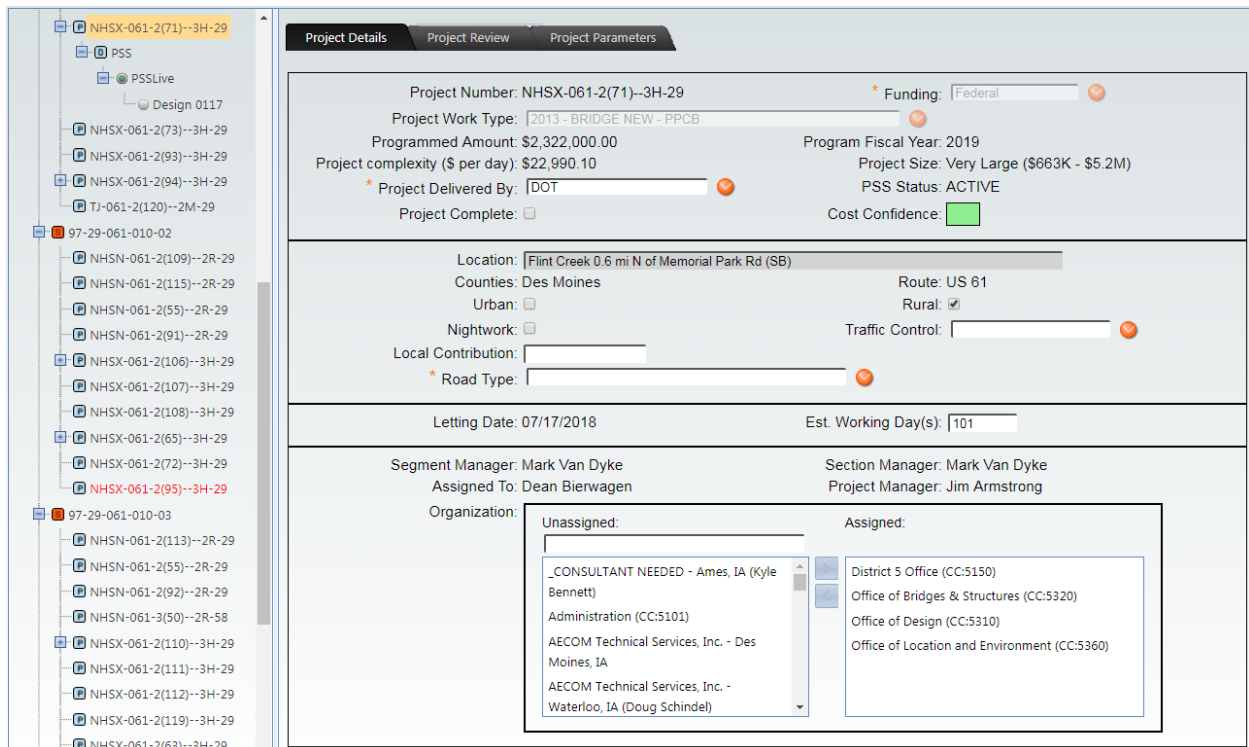
Cost Estimating tab – Office Level

Once the user is at the project level for which it is desired to create an OBS estimate, it will be necessary to create the office level folder "Office of Bridges & Structures" if it does not already exist. To create this folder right-click on the project number and select "Add Estimate". The dialog will ask which office folder you would like to create. Select the "Office of Bridges & Structures" from the drop-down. After selecting OK, a folder will be created for the "Office of Bridges & Structures". Underneath the office level folder will be the event level folder with the default name "50%-New Version". Underneath the event level folder will be a division level folder with the default name "New Division".

If you go through the process of creating the office level folder "Office of Bridges & Structures", but it already exists the software will simply add another event level folder with the default name "50%-New Version".

As stated previously, the "PSS" folder, if it exists, is an office level folder carried over from PSS. The "PSS" folder and all its contents are read-only.
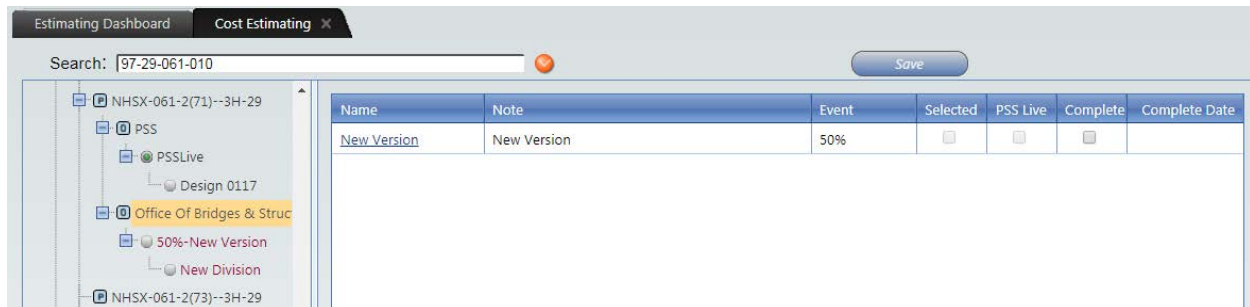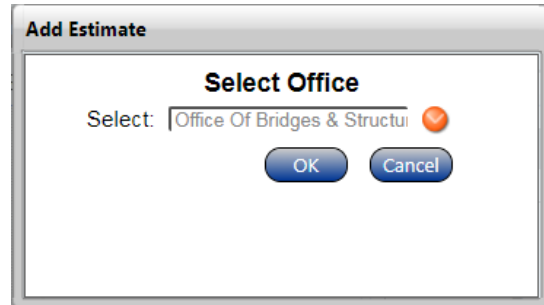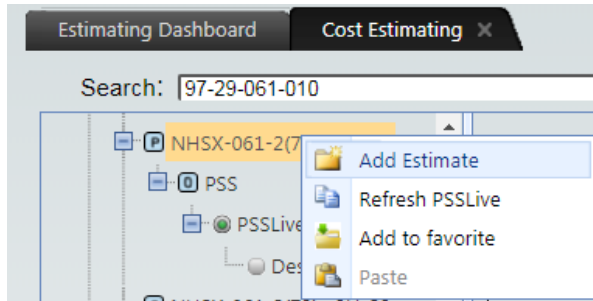
Cost Estimating tab – Event Level

Estimates are normally completed at designated event dates for each office. Examples of OBS events include B01, B03, Annual, and 50% Complete. If "PSS" exists at the office level then "PSSLive" will exist underneath it at the event level.

By default, an event level folder with the default name "50%-New Version" is created when the office level folder "Office of Bridges & Structures" is created. Additional event level folders with the default name "50%-New Version" can be created by right-clicking on the office level folder and then clicking "Add Estimate" as shown below.
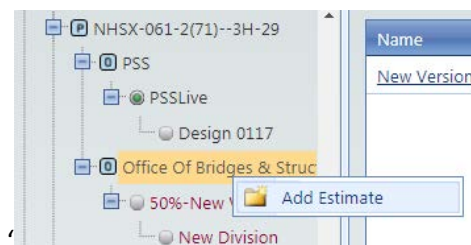
Naming conventions for the event level folder include the event followed by a dash and a default name or a name entered by the user (e.g. "50%-New Version" or "B01-Prelim"). Users can change the event by selecting the event in the tree structure and then clicking on the event drop-down in the panel on the right. The list of possible events depends on how the project was setup in PSS. The user can also change the name from "New Version".
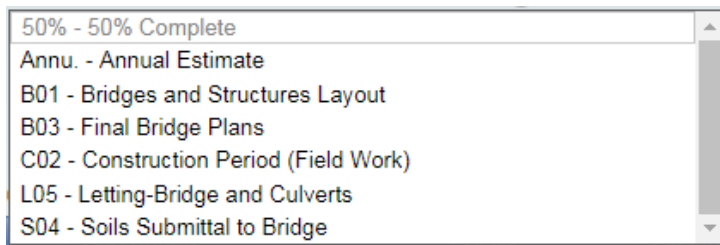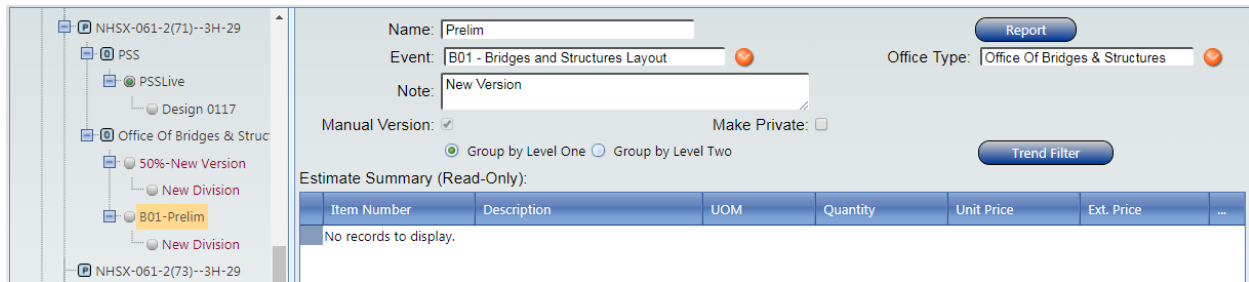
Trend Filter at the Event Level

At the event level folder in the right-hand pane is a "Trend Filter" button. Clicking this button opens the "Trend Filter" dialog which contains four tabs: "Main", "Locations", "Work Type", and "Estimate Parameters". On each of these tabs the user can select filters that will apply to the all the bid item cost data in the estimate. [Exception: The "Bridge Parameters" filters on the "Estimate Parameters" tab only apply to parametric bid items.] The filters are used to establish parameters and project characteristics that identify projects that are similar to the current estimate. As described later, this overarching trend filter can be superseded by using an individual trend filter for each bid item in the cost estimate.

Most estimates for structures only need to make use of two filters. The first filter is the default filter settings for the date range as given on the "Main" tab. The default "End Date" is the current date and the default "Begin Date" is two years earlier. The last two years of historical cost data should generally be sufficient for an estimate. Note that all cost data will be inflated to present day dollars. The second filter is project work type on the "Work Type" tab. The application automatically selects work types that are similar to the user's project work type. In this case, the project work type is "2013 – BRIDGE NEW – PPCB" so the application selected all the bridge work types shown in the figure below. In this case the user might choose to narrow down the filter to the following work types since these are more directly related to the project work type: "2013 – BRDIGE NEW – PPCB", "2023 – BRDIGE REPLACEMENT – PPCB", and "2053 – BRDIGE AND APPROACHES – PPCB". One benefit of doing this for PPCB bridges would be for a bid item like "2408-7800000 Structural Steel" which is typically a relatively small quantity for PPCB bridges. Narrowing the work type filter will eliminate steel girder bridges from the regression analysis for this bid item which is desirable since steel girder bridges typically have a large quantity of steel compared to PPCB bridges. Users do need to be careful about applying too many filters since the number of past projects used to calculate the suggested unit price for the various bid items can become too small to be considered useful. Generally, it is preferable to have at least 10 past projects contributing to a suggested unit price.

The "Estimate Parameters" tab was revamped in April 2017 so it will take 2 to 3 years for the "Bridge Parameters" filters on this tab to work effectively on the parametric bid items in iPDWeb.
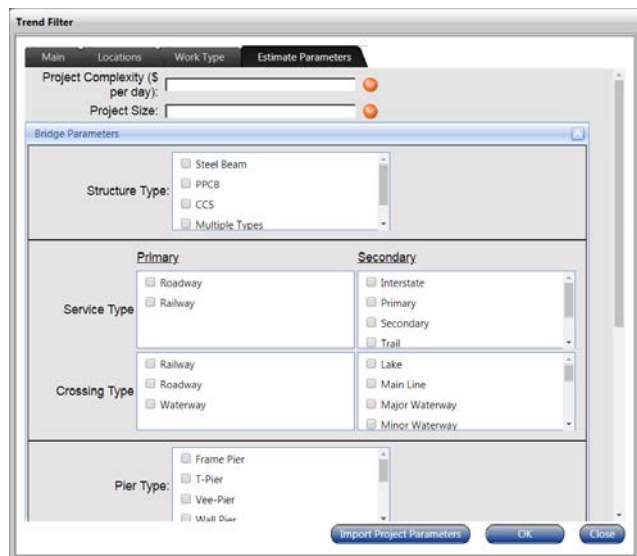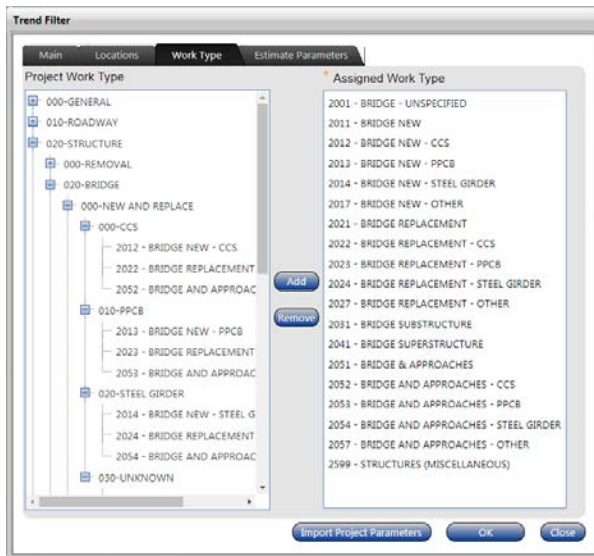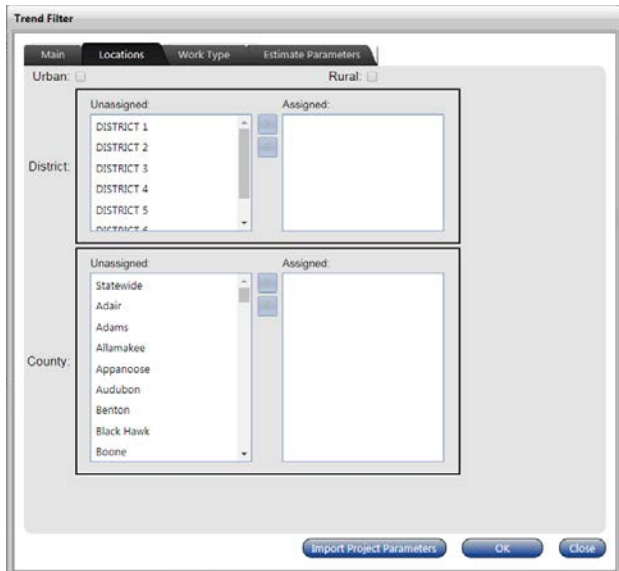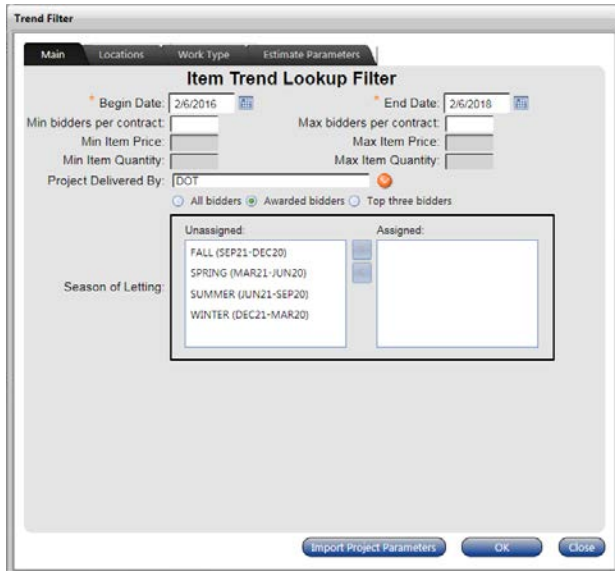
Cost Estimating tab – Division Level

The division level is where the estimates are put together for the structure. The default division level name in the tree structure is "New Division". If the design number is known, the user should change the division name to the design number (e.g. "Design 117").

Bid item based estimates will be covered first and then parametric based estimates. Parametric based estimates are sometime called early estimates.

Bid Item Based Estimates

Bid item based estimates are generally performed near the end of the design when the bid items and quantities are known. These estimates tend to be the most accurate since the project is fully-defined and the historical price data used to make an estimate is up-to-date and easy to apply.

Adding Bid Items

There are three ways to add bid items to start creating an estimate.

- Estimates can be created from scratch by manually adding each bid item individually.
- New division estimates can be started using a template for a particular work type or design.
- Copying a division from "PSSLive" is the simplest way if you already have everything entered into PSS, or if you have another estimate division from a similar project, you could also copy an entire division from one project to another.

Adding bid items individually to a new estimate is one option. Bid items can be added by simply right-clicking in the lower half of the division level estimate screen and selecting "Add Item(s)". The "Item Load" dialog window will appear and the user can search for and add one or more items at a time to the estimate screen.
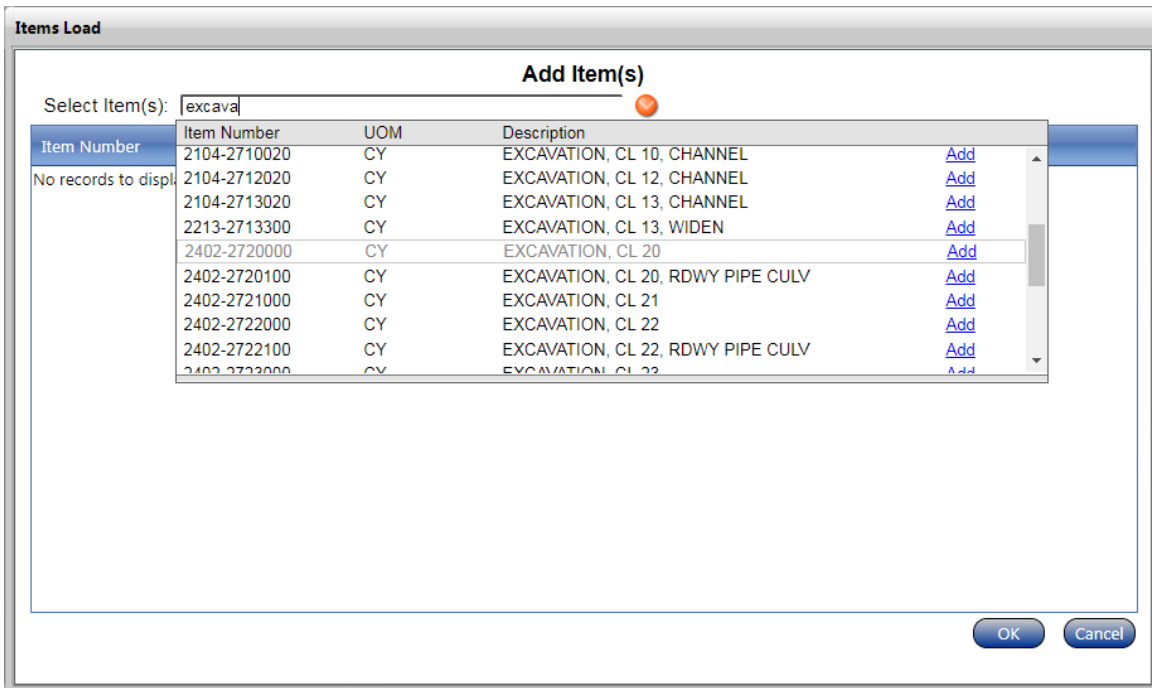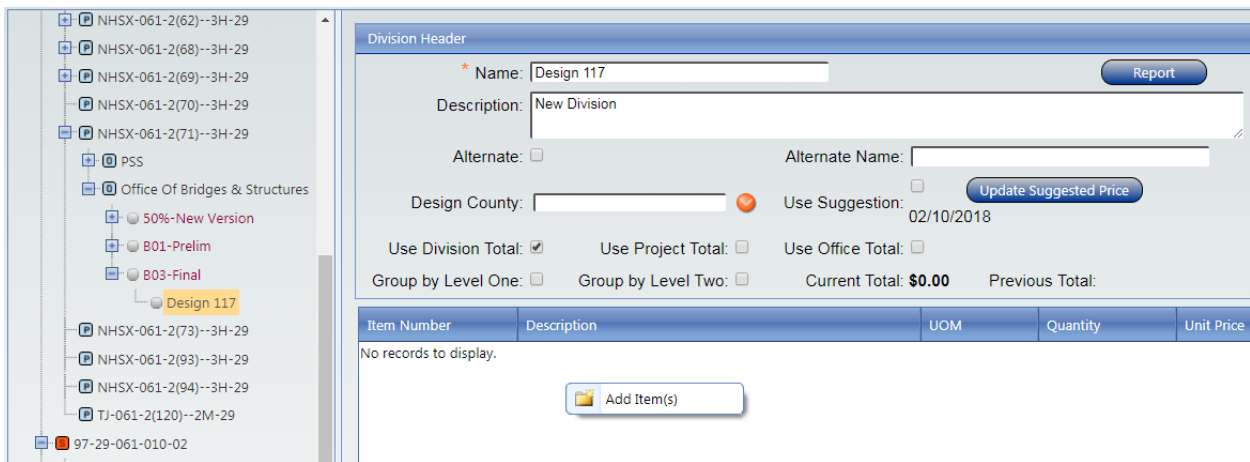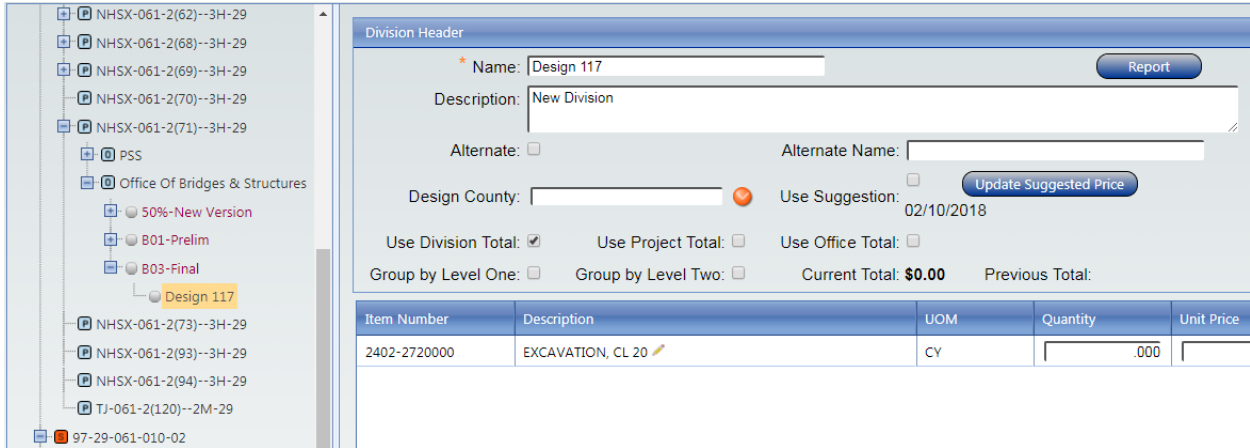
New division estimates can also be created using templates. Division templates can be found by right-clicking on a division and selecting "Import from Template". Templates are very handy because they have been setup to include common bid items for a particular type of design or project work type.
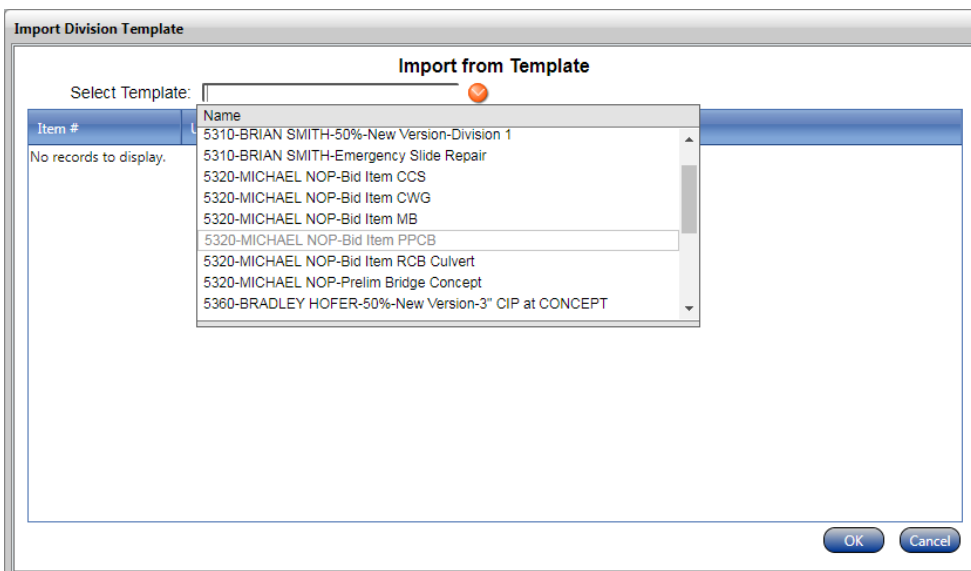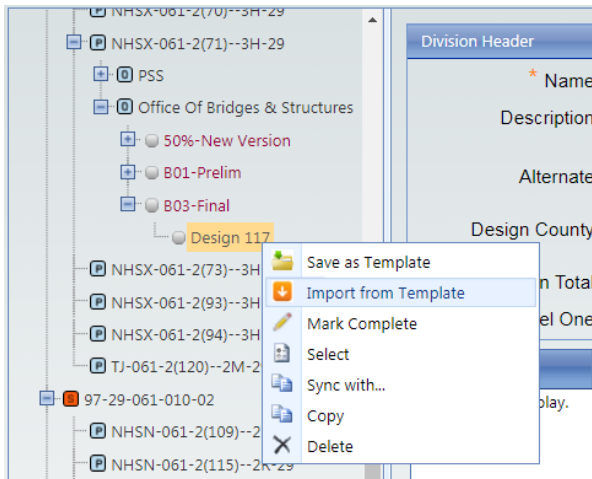
Import Division Template

Import from Template

Select Template: | 5320-MICHAEL NOP-Bid Item PPCB |

Item #	UOM	Description
2104-2710020	CY	EXCAVATION, CL 10, CHANNEL
2401-6745625	LS	RMVL OF EXISTING BRIDGE
2402-2720000	CY	EXCAVATION, CL 20
2403-0100010	CY	STRUCT CONC (BRIDGE)
2403-7000210	CY	HIGH PERFORMANCE STRUC CONC
2404-7775000	LB	REINFORC STEEL
2404-7775005	LB	REINFORC STEEL, EPOXY COATED
2404-7775009	LB	REINF STEEL, STAINLESS STEEL
2407-0551510	EA	BEAM, PPC, D110
2408-7800000	LB	STRUCTURAL STEEL
2414-6424110	LF	CONC BARRIER RAIL
2501-0201057	LF	PILE, STEEL, HP 10X57
2501-0201473	LF	PILE, STEEL, HP 14X73

OK   Cancel

Division Header

* Name: Design 117   Report

Description: New Division

Alternate: ☐   Alternate Name:

Design County: ☐ Update Suggested Price

Use Suggestion: 02/10/2018

Use Division Total: ☑   Use Project Total: ☐   Use Office Total: ☐

Group by Level One: ☐   Group by Level Two: ☐   Current Total: **$0.00**   Previous Total:

Item Number	Description	UOM	Quantity	Unit Price
2104-2710020	EXCAVATION, CL 10, CHANNEL ✎	CY	.000	$0.00
2401-6745625	RMVL OF EXISTING BRIDGE ✎	LS	1.000	$0.00
2402-2720000	EXCAVATION, CL 20 ✎	CY	.000	$0.00
2403-0100010	STRUCT CONC (BRIDGE) ✎	CY	.000	$0.00
2403-7000210	HIGH PERFORMANCE STRUC CONC ✎	CY	.000	$0.00
2404-7775000	REINFORC STEEL ✎	LB	.000	$0.00
2404-7775005	REINFORC STEEL, EPOXY COATED ✎	LB	.000	$0.00
2404-7775009	REINF STEEL, STAINLESS STEEL ✎	LB	.000	$0.00
2407-0551510	BEAM, PPC, D110 ✎	EA	.000	$0.00
2408-7800000	STRUCTURAL STEEL ✎	LB	.000	$0.00
2414-6424110	CONC BARRIER RAIL ✎	LF	.000	$0.00
2501-0201057	PILE, STEEL, HP 10X57 ✎	LF	.000	$0.00
2501-0201473	PILE, STEEL, HP 14X73 ✎	LF	.000	$0.00
2501-6335010	PREBORED HOLE ✎	LF	.000	$0.00
2507-2638650	BRIDGE WING ARMORING - EROSION STONE ✎	SY	.000	$0.00
2507-3250005	ENGINEER FABRIC ✎	SY	.000	$0.00

The third method is to copy all the bid items from another division or from PSS Live. Before copying from PSSLive it may be advisable to first force a refresh of the PSSLive data by right-clicking on the project number and selecting "Refresh PSSLive". Doing so will ensure all bid items and quantities in iPDWeb are current with those in PSS.

To copy, simply right-click on the PSSLive division and select "Copy". (Copying from PSSLive or another project work the same way.) Next right-click on the event level estimate you want to copy to and select "Paste". It will copy the entire division to your event level estimate. The division name will remain the same. Note that you can't select a division to paste to. If the trend filter for the project you are pasting to varies from the project you copied from, you will receive a warning message "Do you want to use the destination trend filter?". Selecting "Yes" will update the trend filter settings to match the estimate version you are pasting to. "No" will maintain the trend filter settings from where the division was copied.

Item Number	Description	UOM	Quantity	Unit Price
2104-2710020	EXCAVATION, CL 10, CHANNEL ✎	CY	1,420.000	$0.00
2402-2720000	EXCAVATION, CL 20 ✎	CY	1,180.000	$0.00
2402-2721000	EXCAVATION, CL 21 ✎	CY	733.000	$0.00
2403-0100010	STRUCT CONC (BRIDGE) ✎	CY	1,274.800	$0.00
2404-7775000	REINFORC STEEL ✎	LB	80,807.000	$0.00
2404-7775005	REINFORC STEEL, EPOXY COATED ✎	LB	131,918.000	$0.00
2404-7775009	REINF STEEL, STAINLESS STEEL ✎	LB	4,375.000	$0.00
2407-0563070	BEAM, PPC, BTC70 ✎	EA	6.000	$0.00
2407-0563080	BEAM, PPC, BTC80 ✎	EA	6.000	$0.00
2407-0563115	BEAM, PPC, BTC115 ✎	EA	6.000	$0.00
2408-7800000	STRUCTURAL STEEL ✎	LB	8,866.000	$0.00
2414-6425420	CONC BARRIER, PARAPET ✎	LF	552.200	$0.00
2414-6445100	STRUCTURAL STEEL PEDESTRIAN HAND RAIL ✎	LF	287.800	$0.00
2414-6625502	STRUCT STEEL RAIL, TRAFFIC ✎	LF	520.000	$0.00
2499-2300001	DECK DRAIN ✎	LS	1.000	$0.00
2501-0201057	PILE, STEEL, HP 10X57 ✎	LF	7,655.000	$0.00
2501-6335010	PREBORED HOLE ✎	LF	200.000	$0.00
2507-2638650	BRIDGE WING ARMORING - EROSION STONE ✎	SY	24.000	$0.00

The user can also copy all the bid items from PSSLive into a division level using the "Sync with…" option. Simply right-click on a division level and select "Sync with…". The "Sync Division" dialog will open. Select the division name for the PSSLive division you want to copy. Click the "Sync All" button to copy all the bid items and quantities from the PSSLive division to your division.

Sync Division

Synchronize Division

Select Division: [   ] 🔽 (Sync Selected) (Sync All) (Cancel)

Add/Delete

Key	Name	Description	uantity	Unit Price	Select
0001	Design 0117	Design No. 0117;			
No records to di					

Sync Division

Synchronize Division

Select Division: [Design No. 0117;   ] 🔽 (Sync Selected) (Sync All) (Cancel)

Add/Delete **Update**

Item Number	Description	Quantity	Unit Price	Select
Item(s) to be ADDED				
2104-2710020	EXCAVATION, CL 10, CHANNEL	1,420.00	$0.00	☐
2533-4980005	MOBILIZATION	1.00	$0.00	☐
2507-3250005	ENGINEER FABRIC	2,080.00	$0.00	☐
2507-8029000	EROSION STONE	30.00	$0.00	☐
2507-2638650	BRIDGE WING ARMORING - EROSION STONE	24.00	$0.00	☐
2507-6800061	REVETMENT, CLASS E	2,300.00	$0.00	☐
2402-2720000	EXCAVATION, CL 20	1,180.00	$0.00	☐
2402-2721000	EXCAVATION, CL 21	733.00	$0.00	☐
2407-0563070	BEAM, PPC, BTC70	6.00	$0.00	☐
2501-0201057	PILE, STEEL, HP 10X57	7,655.00	$0.00	☐
2414-6445100	STRUCTURAL STEEL PEDESTRIAN HAND RAIL	287.80	$0.00	☐
2414-6425420	CONC BARRIER, PARAPET	552.20	$0.00	☐
2414-6625502	STRUCT STEEL RAIL, TRAFFIC	520.00	$0.00	☐
2499-2300001	DECK DRAIN	1.00	$0.00	☐
2501-6335010	PREBORED HOLE	200.00	$0.00	☐

Assigning Price

Once the bid items have been added the user can enter the quantity for each bid item. In cases where the user copied data from PSSLive the quantities may already be there.

Users can enter prices simply by entering a price in the "Unit Price" field directly. This may be the best approach for some bid items, particularly 2599 bid items. However, for most bid items the user should take advantage of the historical price data and regression analysis provided within the iPDWeb software.

To assign suggested prices, the user should check the box for "Use Suggestion" in the upper section of the division level estimate screen. Once that box has been checked, checks will be applied to all the boxes for the various bid items in the "Use Suggestion" column in the lower section of the division level estimate screen. Next, click the button "Update Suggested Price" to let the software determine suggested unit prices for each bid item. The suggested unit prices are based on past projects which meet the trend filter settings at the event level (discussed earlier in this manual) and also contain the bid item being estimated. If a bid item has a suggested unit price of $0.00 it means that price data for that bid item was not found among the filtered projects. The user should carefully consider the price for each bid item to ensure it makes sense.
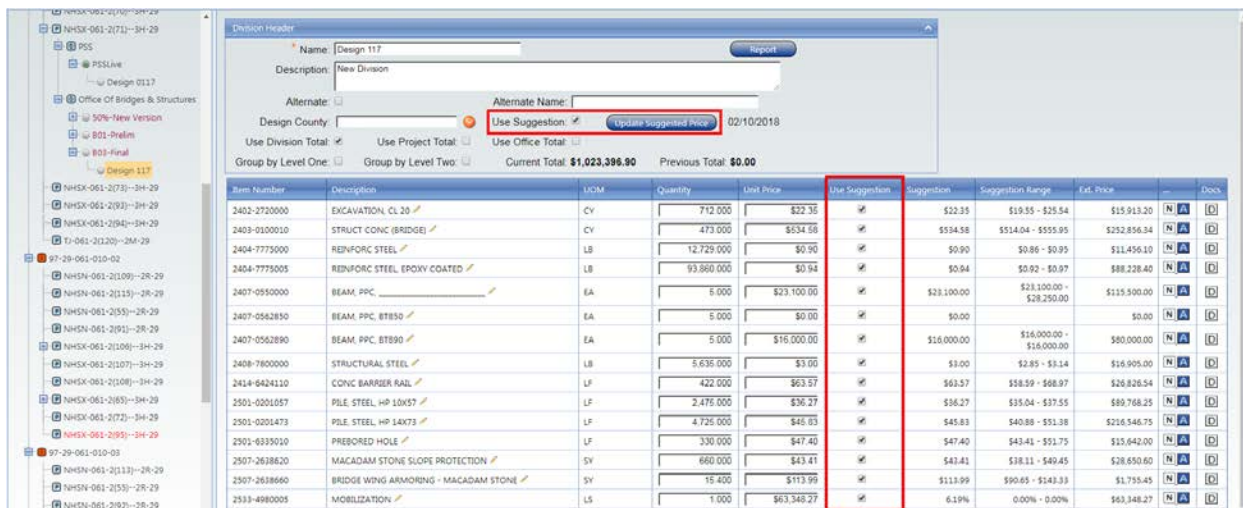
To find out more information about a suggested price for a particular bid item, right click on the row containing that bid item and select the option for "Item Trend Lookup" to open its dialog screen.
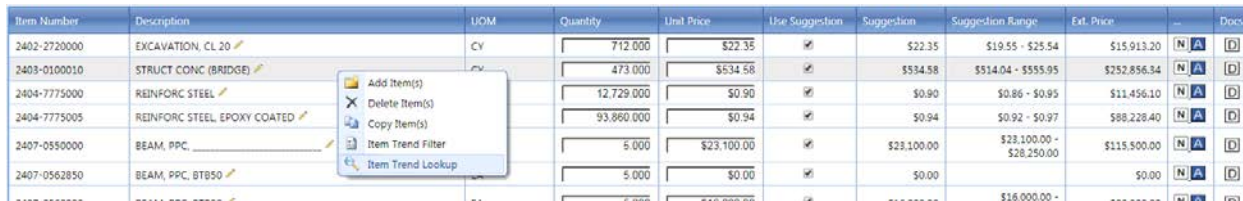
The "Item Trend Lookup" dialog screen displays the bid item information for each filtered project used in the regression analysis for determining the suggested unit price. Each orange and gray dot in the "Item Trend Chart" represents a project data point in the listing above the chart. Orange dots indicate data which is included in the regression analysis. Gray dots indicate data excluded from the regression analysis. By default, some data may be automatically excluded since they are flagged as outliers which are more than 2 standard deviations from the average price. If you scroll through the project listing you will see a check mark in the "Excl." column for any excluded data. Users can exclude or include project data by checking or unchecking the box in the listing or by double-clicking a data point in the graph. If the user excludes any data points other than the default outliers or includes any of the default outliers

in the data then the font color of the suggested price in the "Suggestion" column of the lower section of the division level estimate screen will be changed to orange. In general, it is advisable to have at least 10 sample data points for a valid regression analysis. The green dot represents the predicted price.

Most of the statistical data shown below will already be well understood by most users.
- R^2 measures the reduction in the variation around the cost (dependent variable) with respect to the quantity (independent variable). R^2 is a proxy for the goodness of fit in the regression model used to estimate a price for a given level of quantity. It is based on the sample used to estimate the regression model. If the regression equation predicted each observed value precisely, the R^2 value would be 1. If there is no correlation, the R^2 value would be 0.
- The "Suggestion Range" in the application is a 95 percent prediction interval for a new value of a quantity. (The prediction interval is not the same as a confidence interval around the mean.)
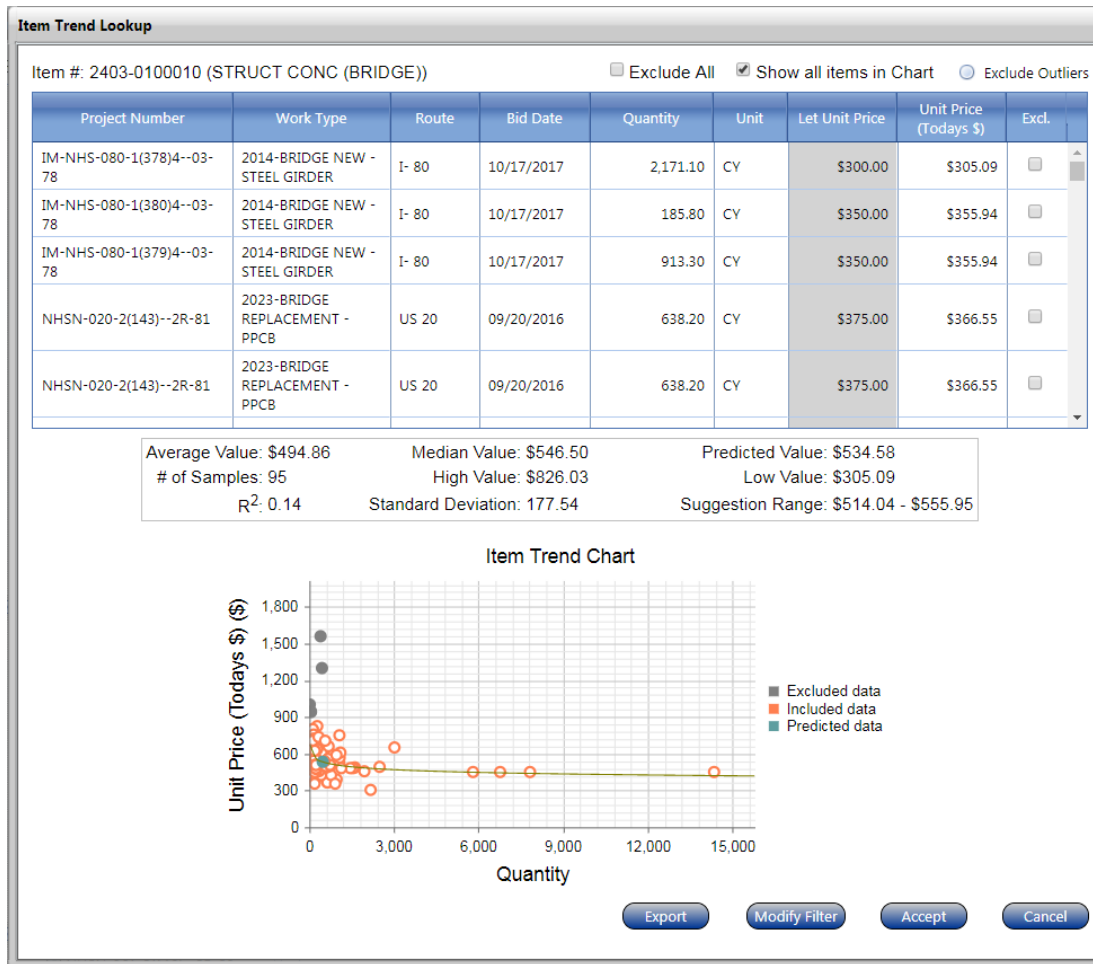
Users have the ability to change the filters for an individual bid item. To do so, the user can click on the "Modify Filter" button on the "Item Trend Lookup" screen or the user can right click on the row containing that bid item in the lower section of the division level estimate screen and select the option for "Item Trend Filter" to open its dialog screen directly.

If you change any of the filter settings for an individual bid item then the font color of the suggested price in the "Suggestion" column of the lower section of the division level estimate screen will be changed to red.

Mobilization

The bid item "2533-4980005 MOBILIZATION" is somewhat of a special case. Suggested values for this bid item are percentage-based. By default, the percentage used to calculate mobilization cost is based on a percent cost of the total division level cost. In other words, mobilization itself is included in the total division level cost. Users can also change from using a percent of the division level cost to a percent of the office level or project level cost by checking the appropriate box in the upper portion of the division level estimate screen. Finally, users can modify the percent used to estimate the cost by right-clicking in the row and selecting the "Modify Lumpsum Percent". Modifying the percent does result in a new unit price based on the percent entered. It also unchecks the "Use Suggestion" box for the mobilization bid item, but it does not change the suggested percent shown for that bid item.

Miscellaneous

When necessary, users can edit the bid item description by clicking on the pencil icon in the "Description" column located in the lower portion of the division level estimate screen. For example, the 2407-055000 bid item description below is for special PPC beams and would require the user to change the description to something like "BEAM, PPC, SBTB50". Users need to be careful about using the suggested price for bid items like this one since the historical cost data may not be representative. In this example, the price data for this bid item will likely be based on special beams of all different sizes.

In each bid item row on the far right-hand side of the lower portion of the division level estimate screen are a few icons in the "…" and "Docs" column. Clicking the "N" icon allows the user to type in and store any notes they might want to add to justify a particular price. Clicking the "A" icon reveals any notes the program makes with respect to a bid item. Clicking the "D" icon allows the user to attach any documents they may want to add to justify a particular price. For parametric estimates, to be discussed later, the user may want to attach the concept letter.
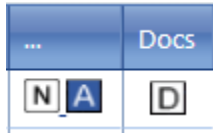
Parametric Based Estimates

Parametric based estimates are sometimes called early estimates. Essentially these estimates are made without the benefit of having a full set of quantities available. In some cases, only a rough approximation of the structure's dimensions is available.

Parametric Bid Items

For early estimates of bridge cost, it is common to use a cost per square foot of bridge deck area (out-to-out and end-to-end) based on historical costs. Early estimates for reinforced concrete box culverts are based on costs per cubic yard of structural concrete. The amount of culvert concrete is based on the estimated size and length of culvert. The thickness of the slab, floor, and walls is estimated using standard designs which are tied to the anticipated height of earth fill. Additional costs for bridges and culverts usually need to be added for staging, removal, revetment, aesthetics, mobilization, etc.

Parametric estimates in iPD are handled much like bid item based estimates. As with traditional bid items the user can add parametric bid items simply by right-clicking in the lower half of the division level estimate screen and selecting "Add Item(s)". The "Item Load" dialog window will appear and the user can search for and add a parametric bid item to the estimate screen. Searching for parametric bid items is done by searching for "para".
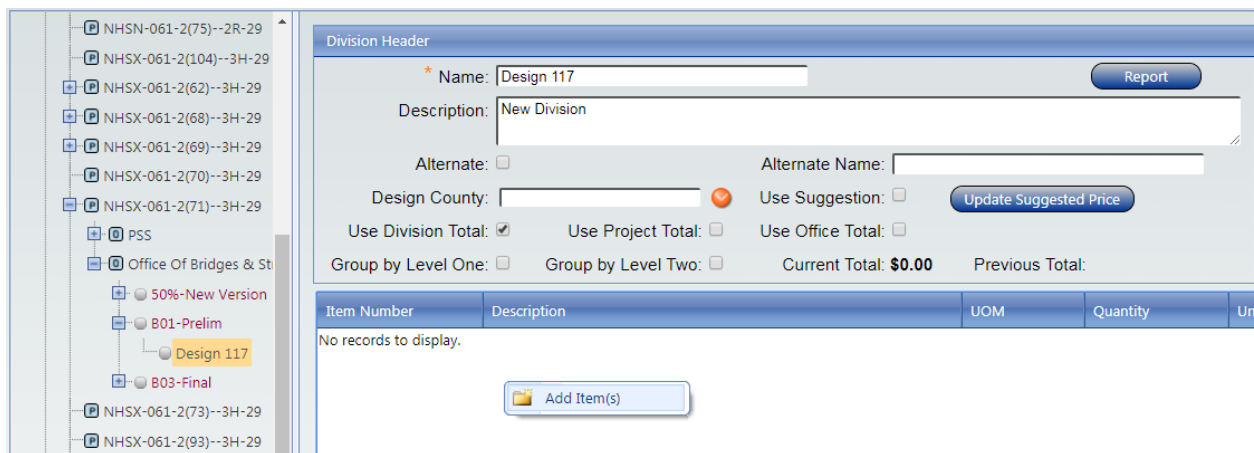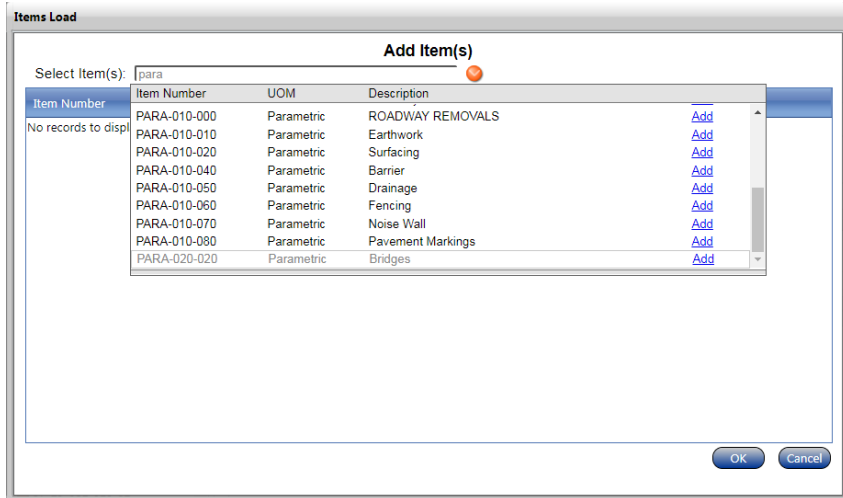
For example, if the user selects "PARA-020-020 Bridges", enters the "Square Feet of Deck", checks the "Use Suggestion" box and clicks the button to "Update Suggested Price" then the program will use regression analysis to determine the "Unit Price". To find out more information about the suggested price for the parametric bid item, right click on the row containing that bid item and select the option for "Item Trend Lookup" to open its dialog screen. Additionally, the user may want to review the filter settings to ensure they are drawing cost data from the most appropriate work types.

Item Trend Lookup

Item #: PARA-020-020 (Bridges)   ☐ Exclude All   ☐ Show all items in Chart   ○ Exclude Outliers

Project Number	Work Type	Location	Bid Date	Square Feet of Deck	Price per unit	Excl.
NHSX-100-1(95)--3H-57	2013-BRIDGE NEW - PPCB	IN THE CITY OF CEDAR RAPIDS OVER MORGAN CREEK(EBL)	05/17/2016	18,562.00	$73.78	☐
NHSX-100-1(96)--3H-57	2013-BRIDGE NEW - PPCB	IN THE CITY OF CEDAR RAPIDS OVER MORGAN CREEK(WBL)	05/17/2016	18,562.00	$74.13	☐
NHSX-100-1(99)--3H-57	2013-BRIDGE NEW - PPCB	IN IN THE CITY OF CEDAR RAPIDS OVER SILVER CREEK(EBL)	05/17/2016	25,987.00	$76.15	☐
NHSX-100-1(100)--3H-57	2013-BRIDGE NEW - PPCB	IN THE CITY OF CEDAR RAPIDS OVER SILVER CREEK(WBL)	05/17/2016	25,987.00	$77.38	☐
NHSX-100-1(92)--3H-57	2013-BRIDGE NEW - PPCB	IN THE CITY OF CEDAR RAPIDS OVER 16TH AVE. ACCESS RD.(WBL)	08/16/2016	7,862.00	$77.85	☐
NHSX-100-1(98)--3H-57	2013-BRIDGE NEW - PPCB	RAMP D OVER MORGAN CREEK	05/17/2016	14,851.00	$78.83	☐

Average Value: $118.74   Median Value: $108.02   Predicted Value: $111.60
# of Samples: 37   High Value: $314.45   Low Value: $73.78
R^2: 0.00   Standard Deviation: 19,017.35   Suggestion Range: $98.29 - $126.71

Item Trend Chart

Export   Modify Filter   Accept   Cancel

In order to see what lies behind the parametric bid items, it is generally best to select "Master D Group" from the list of "Menu" items which can be accessed from the ribbon. For example, for the "PARA-020-020 Bridges" item the user can select "STRUCTURES" and then "BRIDGES" from the tree on the "Master D Group" tab. The "PARA-020-020 Bridges" item is listed in the right-hand pane under the "BRIDGES" tree level. "BRIDGES" is a tier 2 level within the Master D Group hierarchy. Every bid item is categorized under a branch of the Master D Group. If the user continues to drill down into the "SUPERSTRUCTURE", SUBSTRUCTURE", and "BLENDED" tree levels, they will eventually reach the tier 6 level where the typical bid items are listed. All the bid items under "BRIDGES" that are contained in the list of filtered projects selected by the user for the parametric bid item will be used in determining the parametric cost.
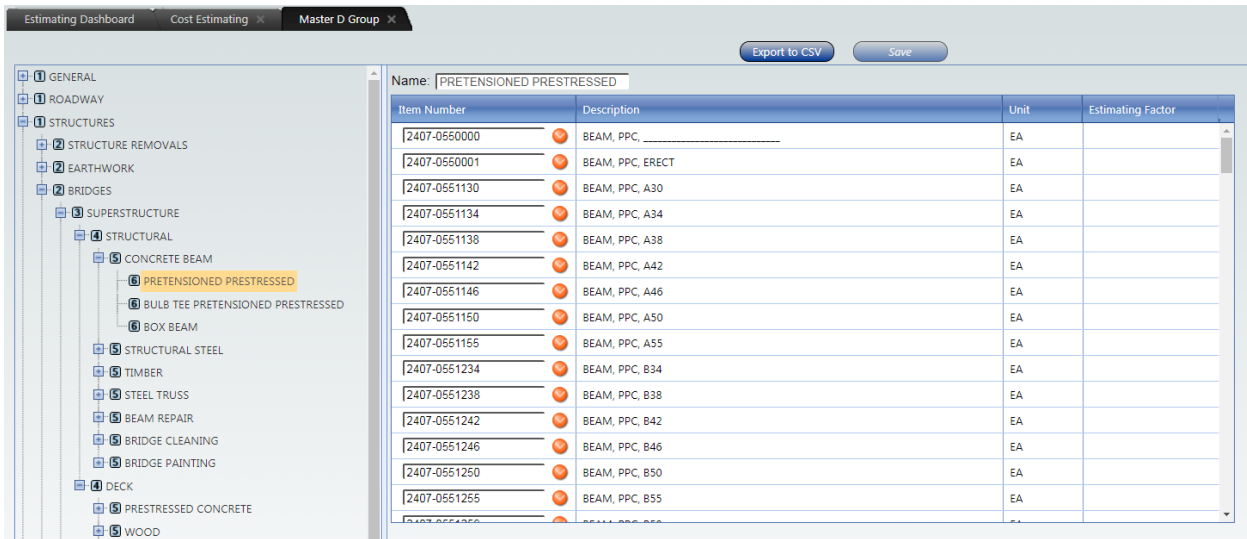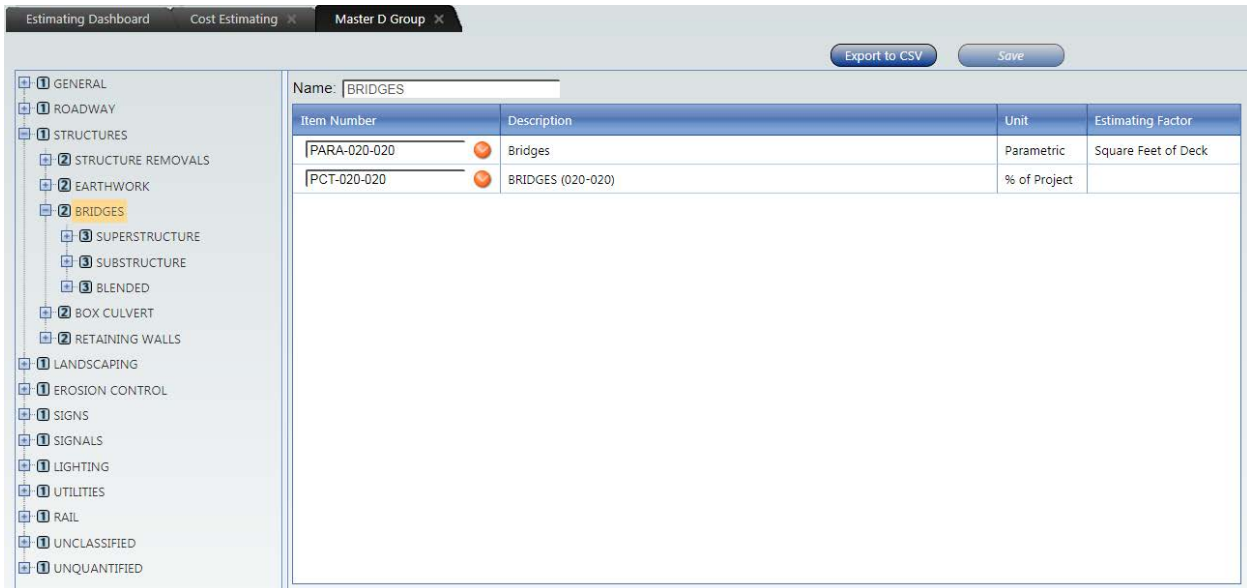
As stated previously, users may need to add other costs to the base parametric cost, in order to have a better estimate of the total bridge cost. Some items such as bridge removal, revetment, and mobilization can be taken care of by adding the appropriate bid item. Other items such as staging and aesthetics will likely require the use of 2599 bid items. Some items such as dewatering and shoring could be handled by percent based bid items (see next section).

Item Number	Description	UOM	Quantity	Unit Price
2401-6745625	RMVL OF EXISTING BRIDGE ✏	LS	1.000	$0.00
2507-6800061	REVETMENT, CLASS E ✏	TON	2,000.000	$44.23
2533-4980005	MOBILIZATION ✏	LS	1.000	$113,181.16
2599-9999010	STAGING ✏	LS	1.000	$200,000.00
2599-9999010	AESTHETICS ✏	LS	1.000	$50,000.00
PARA-020-020	Bridges ✏	Parametric (Square Feet of Deck)	12,000.000	$111.60

Percent Based Bid Items

Percent based bid items are intended to be used to enter a high level conceptual item that eventually breaks down to actual bid items throughout the life of a project. Percent based bid items are based on the "Master D Group" hierarchy as described earlier in this document. These items begin with the prefix "PCT-" and can be searched for like any other bid item. Percent based bid items can be expanded by right-clicking on the percent based bid item and selecting "Expand Item". The use of PCT items for parametric estimates in the Office of Bridges and Structures will likely be limited to secondary items such as dewatering and shoring.
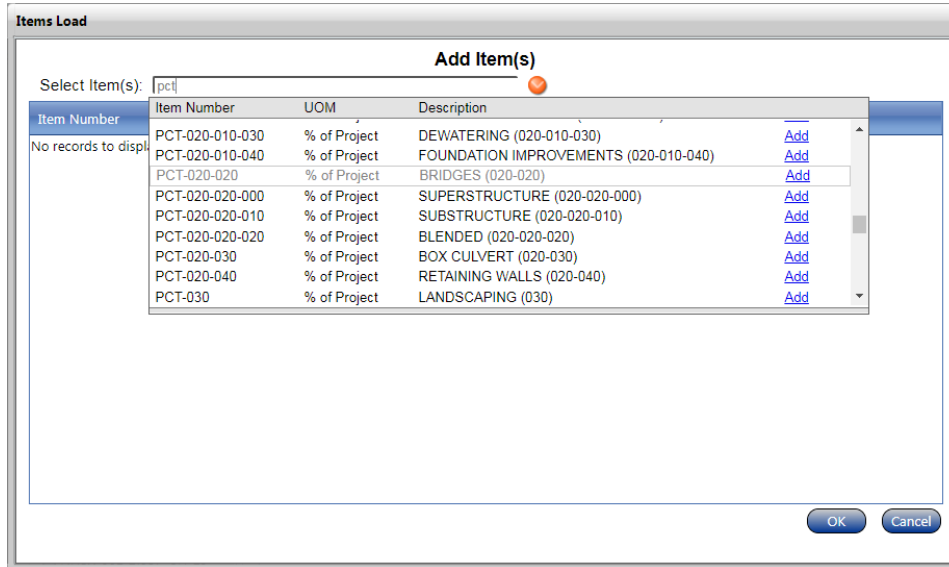
Composite Bid Items

A composite bid item is a set of bid items that are grouped together for estimating purposes. The grouped items typically form a larger component of a project. The bid items within a composite item are pre-assigned typical quantities based on past experience which is why these items can be useful for parametric estimates. The iPDWeb application will look up prices for the individual bid item quantities and assign a price to each one. These individual prices are then combined into an overall price for the composite item. Composite bid items begin with the prefix "COMP-" and can be searched for like any other bid item. Composite bid items can be expanded into the individual bid items by right-clicking on the composite item and selecting "Expand Item". The user can then adjust the quantities for the individual items if desired. The Office of Bridges and Structures does not currently make use of composite bid items. The Office of Design has a number of composite bid items.
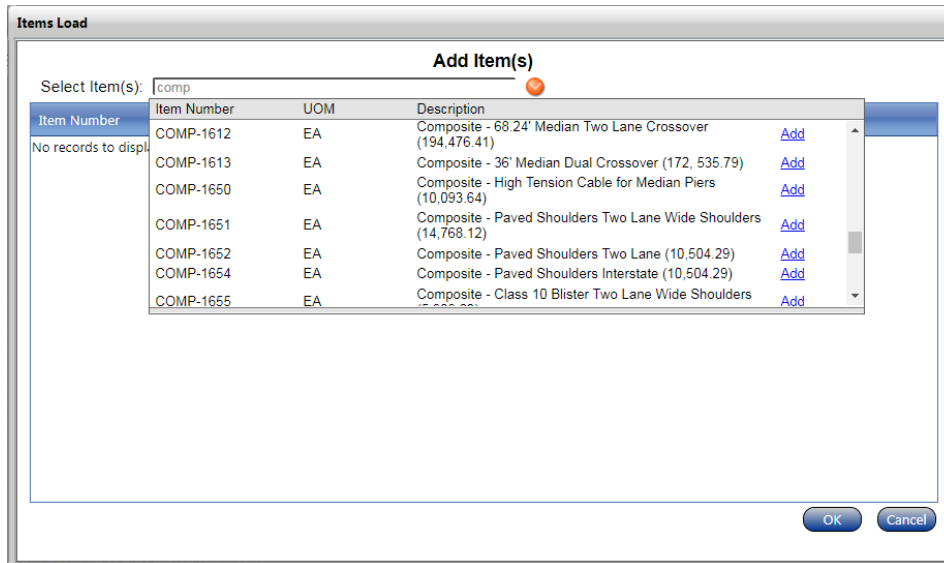
Contingency and Inflation

Estimates in iPDWeb are to be done in present day dollars and shall not be inflated. Estimates in iPDWeb shall not include any contingency or risk. Inflation and contingency/risk are going to be managed at the program level.

Currently the Iowa DOT is operating both in the Project Scheduling System (PSS) and in iPDWeb. The actual program is still being managed using PSS. Because of this the following approach is recommended:

- Estimate construction cost in iPDWeb (present day dollars). Account for all anticipated costs with one or more of the following: bid items, parametric items, and percent based bid items.
- Enter the cost developed from iPDWeb into PSS. Choose the programmed fiscal year for the project in PSS. PSS will automatically apply a 4.5% inflation rate per year. Enter contingency into PSS per our rubric in the Bridge Design Manual.

Finishing an Estimate

When your estimate is all finished, each division to be included in the total should be marked complete. To do this, right-click on the appropriate division in the estimate tree structure and select "Mark Complete". Marking a division complete indicates that no more items will be added or any modifications to prices will be made. You should see a red checkmark next to the division after a division is marked complete.
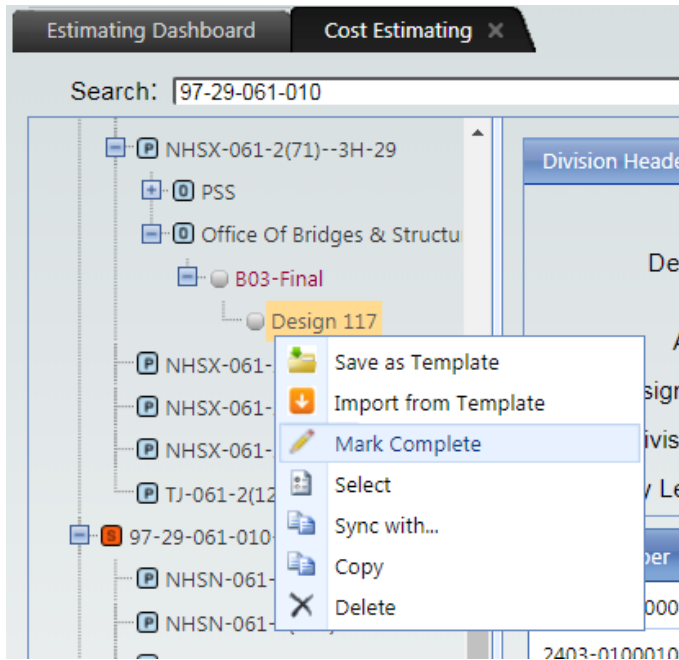
Next, the estimate divisions need to be selected by right clicking on the division and picking "Select". Selecting a division indicates that this particular division will be included in the total project cost. The red checkmark next to the division will turn green once the division is selected.
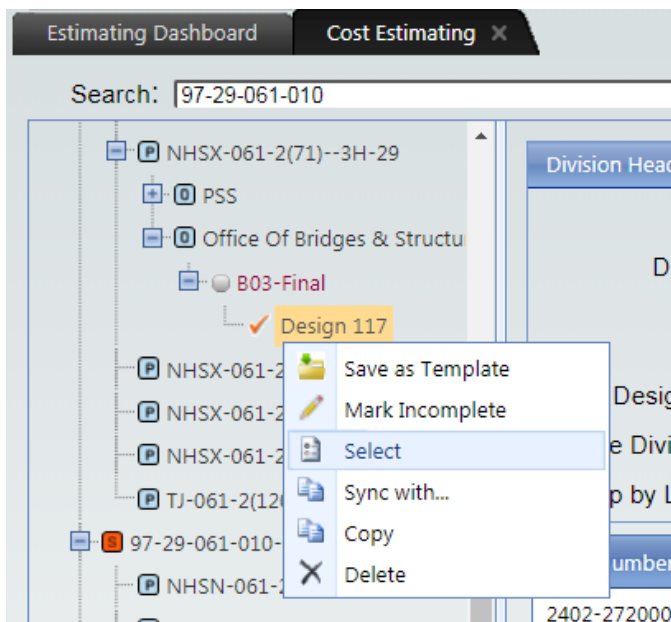
Once all divisions of interest are marked complete and selected, then the estimate version should be checked complete. This is done by selecting the appropriate office from the estimate tree structure, finding the correct version and clicking in the checkbox to complete the version. If the estimate version is for a B03 or B04 event, the user is required to first fill out the "Bridge Parameters" at the project level in the tree structure.
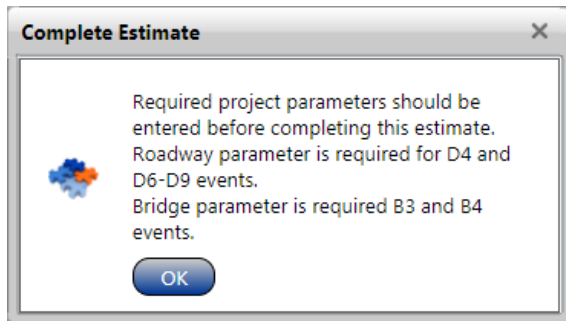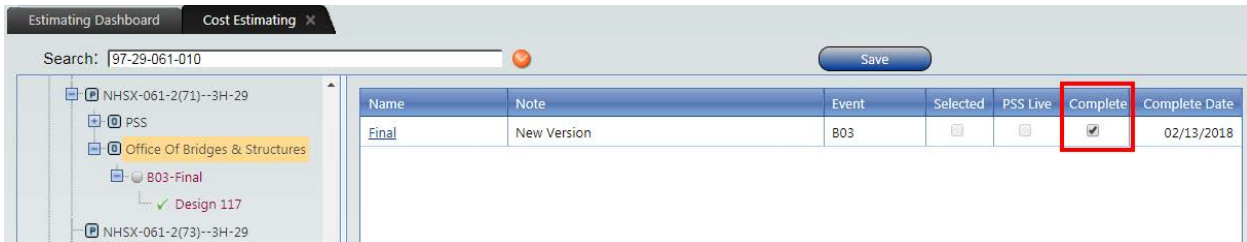
To add the "Bridge Parameters" at the project level in the tree structure, click on the "Project Parameters" tab, expand the "Bridge Parameters" header and right-click under the header to select the "Add" option from the menu to open the "Bridge Parameter" screen. The user is required to fill out the items with the orange asterisks, but in general should fill out all applicable fields. Once the project is let, the bridge parameters will be used for future parametric estimates (bridge cost per square foot of deck area). The software uses Bridge Length multiplied by Bridge Width to calculate deck area, so it may be necessary to adjust the dimensions for some bridges (e.g. variable width bridges). Typically, the width should be adjusted.

If two or more bridges have the same project number, the user should only enter bridge parameters for one bridge. The bridge width as needed to account for the area of both bridges. This is necessary since the cost data for bridges with one project number cannot be separated.

Bridge Detail

Bridge Parameter

Complete all applicable fields.

* Bridge Name: Design 117

* Bridge Length (ft): 278.00   * Bridge Width (ft): 43.17

Deck Area (sqft): 12,001.26   Structure Type: PPCB

Bridge length measured along centerline from face to face of paving notch. Bridge width is out-to-out of deck. If necessary modify bridge width for irregular bridges (e.g. variable width) so that calculated deck area is equal to actual deck area.

	Primary	Secondary
Service Type	Roadway	Primary
Crossing Type	Waterway	Minor Waterway

Spans: 3

Tallest Pier Height (ft): 20.00

Measure from top of pier cap to top of footing. Measure to top of drilled shaft when footings are absent. For pile bents measure to natural stream bed.

Pier Type: T-Pier

Pier Foundations Type: Pile

Skew (deg): 10.00

Project Staging: ☐   Curved: ☐   Flared: ☐
ABC: ☐   Aesthetics: ☐   Cofferdams: ☐

Close

After marking an estimate complete, a report will run to check for duplicate items. If no duplicate items are found, the report will be blank. If duplicate items are found, it will look similar to the report below. The program will allow you to continue, but you should go back and correct these duplicates.

Version Duplicate Items
B03-Final in Project NHSX-061-2(71)--3H-29

Comparing Item				Duplicate Item			
Item Number	Item Description	Quantity	Unit Price	Item Number	Item Description	Quantity	Unit Price
Design 117							
2501-0201057	PILE, STEEL, HP 10X57	2,475.00	$36.27	2501-0201057	PILE, STEEL, HP 10X57	2,200.00	$35.59
2403-0100010	STRUCT CONC (BRIDGE)	473.00	$534.58	2403-0100010	STRUCT CONC (BRIDGE)	559.00	$506.39

Report Date: 2/13/2018 2:24:16 PM   Page 1 of 1

After divisions have been marked complete and selected, and the estimate version has been marked complete, the estimate version can be selected. This is done by right-clicking on the event level estimate version from the estimate tree structure and clicking "Select". You should see the radio button turn green. Only one estimate version can be marked select for each office. Selecting an estimate version indicates that this particular version will be used for the current estimate and be used for the total

project costs. As the project progresses through the design life-cycle, different versions of the cost estimate will be selected for each office.
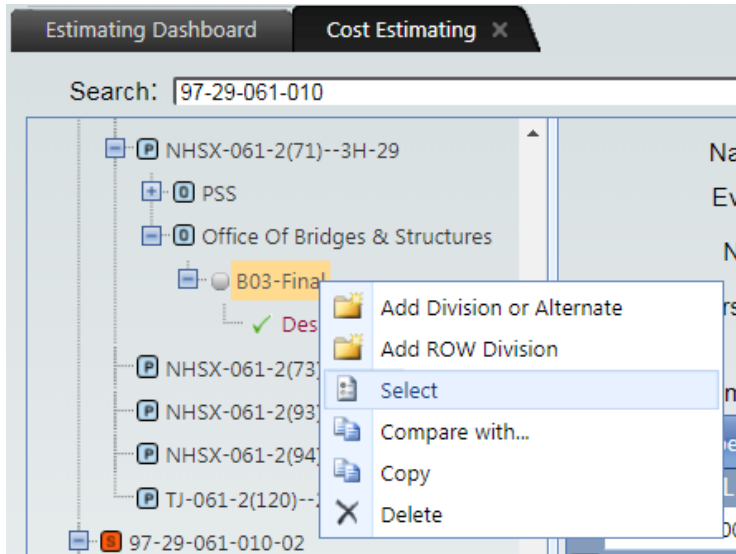
When these steps have been completed the screens should look similar to the following.

Estimating Playground

Each office has an area within iPDWeb to allow users to create hypothetical cost estimates and cost estimate scenarios without needing an actual PIN and project number.

The area can be accessed by clicking on the "Menu" button in the ribbon and selecting the "Cost Estimating" option. In the "Search" box on the "Cost Estimating" tab type in "office" and scroll to find and select "Office of Bridges & Structures" in the list. [Alternatively, the user can search "NEW PIN" on the "Estimating Dashboard" tab and select "532000-Administration".] The left pane will then display a

tree structure with the "Office of Bridges & Structures" at the top which (represents the PIN Segment level). This is followed by the cost centers for each section in the office (represents the PIN Section levels). The level below that represents the Project Number level. To create the office level simply right-click on a project number to add the "Office of Bridges & Structures" folder to the tree.
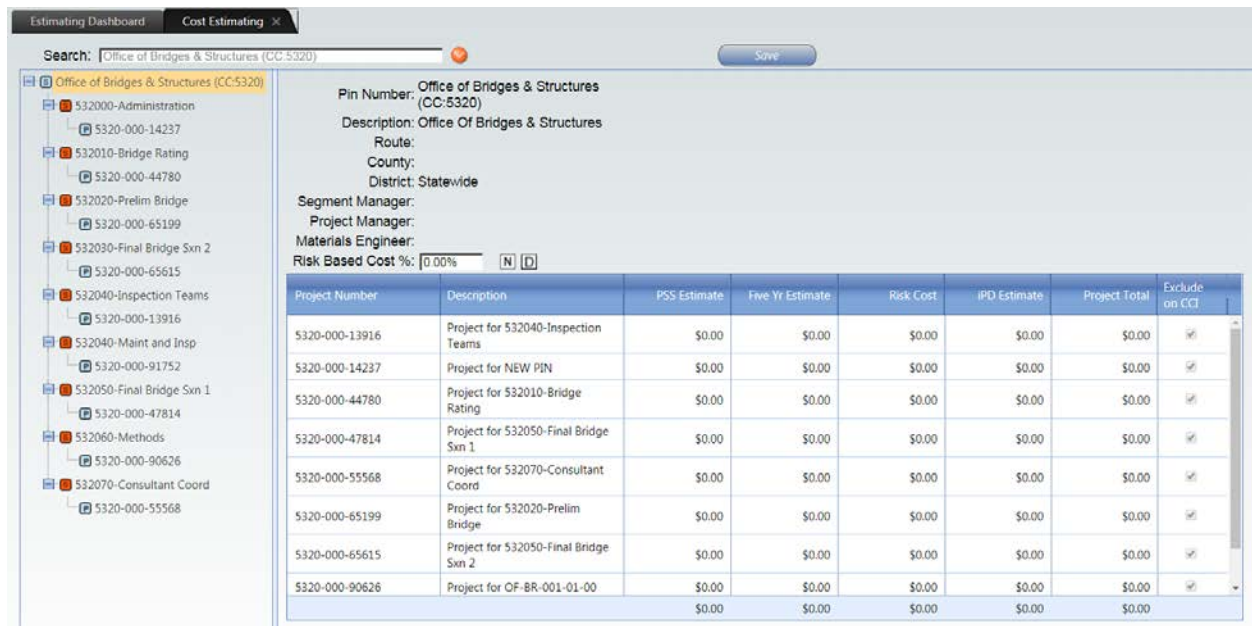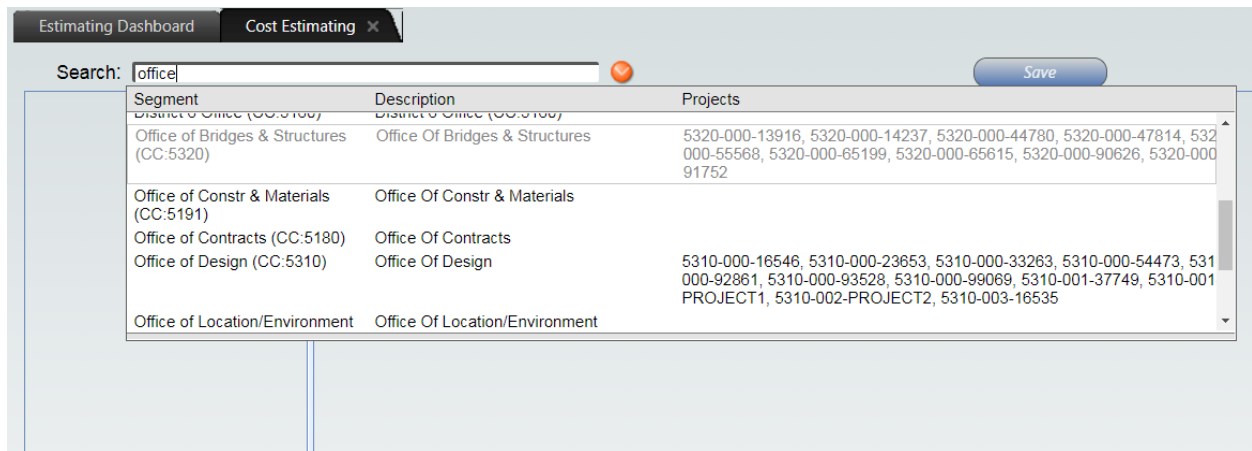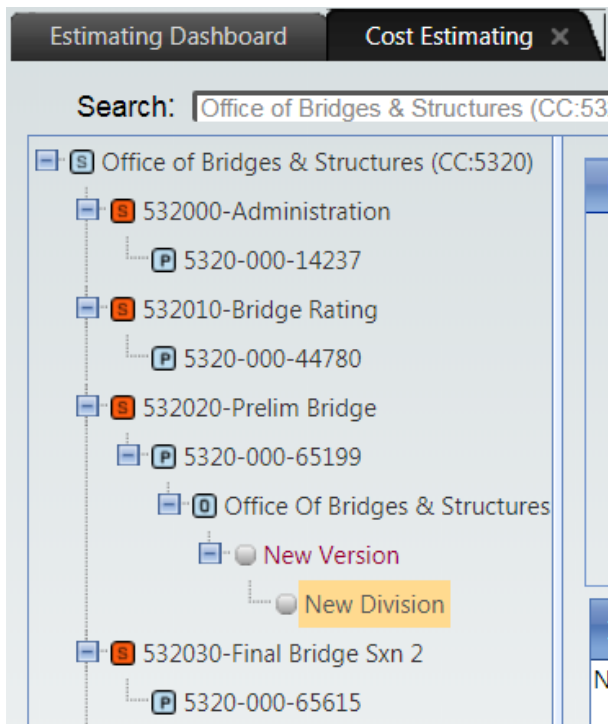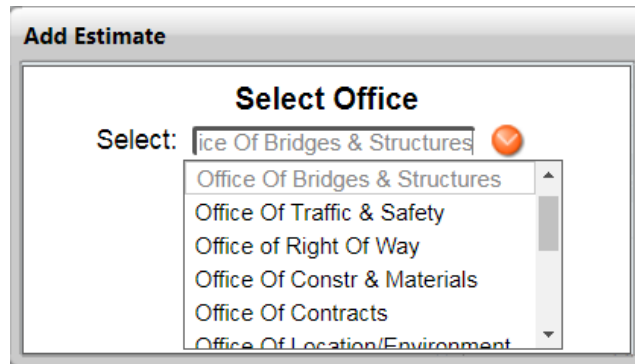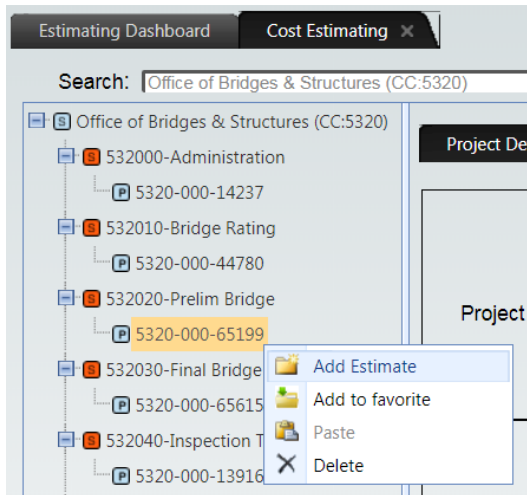
This playground area is to be maintained by our office. We can create additional "projects" in this area as needed. Anyone using this area should delete old estimates that are no longer needed.

Appendix A – Cost Estimates for Preliminary Bridge Design

While nearly all DOT cost estimates rely on historical prices, the breakdown of costs at various points in the life of a project are handled differently based on the level of project detail. Preliminary Bridge Design estimates bridge and culvert costs at the Concept and B1 event dates, which are relatively early in the life of a project. The type, size, and location of the bridge or culvert structure is known at both dates, while other items such as excavation and revetment become more refined at the B1 event date. Both cost estimates generally consist of fewer, more broadly defined cost items than cost estimates made when final design is complete and all quantities have been computed. This appendix addresses Concept and B1 event date cost estimates performed by or for Preliminary Bridge Design in the Office of Bridges and Structures.

Bridge Concept and B1 Cost Estimates

For many years Concept and B1 event date cost estimates of the bridge structure itself have been determined using a cost per square foot of bridge deck area (out-to-out and end-to-end) based on historical cost data. This estimating method has proven to be effective for typical bridges. The iPD software continues this practice by suggesting a cost per square foot of bridge deck area for the parametric bridge bid item "PARA-020-020 Bridges" based on the bridge deck area entered by the user and a regression analysis of the historical cost data. [Parametric estimates are addressed in "Parametric Based Estimates" on page 21 of this document.] The additional cost items not accounted for in the parametric bridge bid item are captured with other bid items (e.g. 2599 bid items).

Preliminary Bridge uses predefined templates "5320-MICHAEL NOP-Prelim Bridge Concept" and "5320-MICHAEL NOP-Prelim Bridge B1"as aids to establish bridge Concept and B1 cost estimates. The templates contain two separate lists of bid items that might be applicable to common bridge types for those event dates. The templates may be applied to a cost estimate as shown below. Unneeded template bid items may be deleted and additional bid items may added as necessary to capture the project cost. Office policy for assigning costs to bridge Concept and B1 estimates are found in Bridge Design Manual Article 3.8.
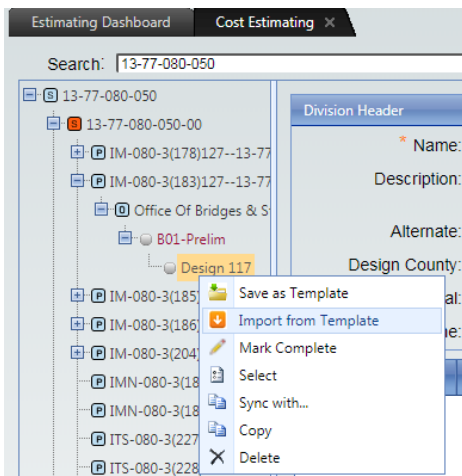
Bid Items in 5320-MICHAEL NOP-Prelim Bridge Concept

Import Division Template

Import from Template

Select Template: 5320-MICHAEL NOP-Prelim Bridge Con

Item #	UOM	Description
2401-6745625	LS	RMVL OF EXISTING BRIDGE
2501-5775000	SF	PILE, STEEL SHEET
2599-9999010	LS	STAGING
2599-9999010	LS	COFFERDAM
2599-9999010	LS	AESTHETICS
2599-9999010	LS	UNQUANTIFIED
2599-9999020	TON	REVETMENT
PARA-020-020	Parametric	Bridges
PCT-000-000	% of Project	MOBILIZATION

OK   Cancel

Bid Items in 5320-MICHAEL NOP-Prelim Bridge B1

Import Division Template

Import from Template

Select Template: 5320-MICHAEL NOP-Prelim Bridge B1

Item #	UOM	Description
2104-2710020	CY	EXCAVATION, CL 10, CHANNEL
2401-6745625	LS	RMVL OF EXISTING BRIDGE
2501-5775000	SF	PILE, STEEL SHEET
2507-3250005	SY	ENGINEER FABRIC
2507-6800061	TON	REVETMENT, CLASS E
2507-8029000	TON	EROSION STONE
2599-9999010	LS	STAGING
2599-9999010	LS	COFFERDAM
2599-9999010	LS	AESTHETICS
PARA-020-020	Parametric	Bridges
PCT-000-000	% of Project	MOBILIZATION

OK   Cancel

Culvert Concept and B1 Cost Estimates

Early cost estimates of reinforced concrete box (RCB) culverts are based on historical cost data. The iPD software does not have a parametric bid item methodology in place to provide suggested prices for culvert structures. Culvert items are generally accounted for using various bid items (e.g. 2599 bid items) to capture the costs of different elements.

Preliminary Bridge uses predefined templates "5320-MICHAEL NOP-Prelim Culvert Concept" and "5320-MICHAEL NOP-Prelim Culvert B1" as aids to establish culvert Concept and B1 cost estimates. The templates contain two separate lists of bid items that might be applicable to RCB culvert projects for those event dates. The templates may be applied to a cost estimate as shown below. Unneeded template bid items may be deleted and additional bid items may added as necessary to capture the

project cost. Office policy for assigning costs to culvert Concept and B1 estimates are found in Bridge Design Manual Article 4.5.11.
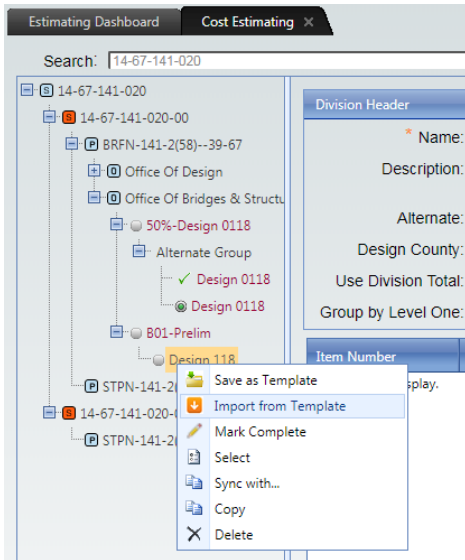
Bid Items in 5320-MICHAEL NOP-Prelim Culvert Concept

Import from Template

Select Template: 5320-MICHAEL NOP-Prelim Culvert Cor

Item #	UOM	Description
2402-2720000	CY	EXCAVATION, CL 20
2403-0100020	CY	STRUCT CONC (RCB CULV)
2404-7775000	LB	REINFORC STEEL
2501-5775000	SF	PILE, STEEL SHEET
2599-9999010	LS	CULVERT REMOVAL
2599-9999010	LS	STAGING
2599-9999010	LS	UNQUANTIFIED
2599-9999020	TON	REVETMENT
PCT-000-000	% of Project	MOBILIZATION (000-000)
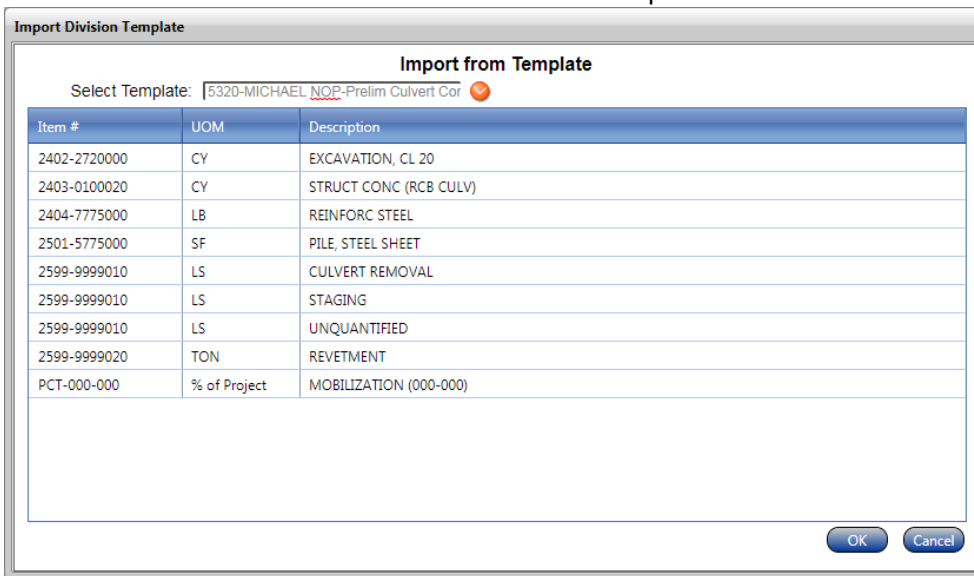
Bid Items in 5320-MICHAEL NOP-Prelim Culvert B1

Import Division Template

Import from Template

Select Template: | 5320-MICHAEL NOP-Prelim Culvert B1 |

Item #	UOM	Description
2104-2710020	CY	EXCAVATION, CL 10, CHANNEL
2402-2720000	CY	EXCAVATION, CL 20
2403-0100020	CY	STRUCT CONC (RCB CULV)
2404-7775000	LB	REINFORC STEEL
2501-5775000	SF	PILE, STEEL SHEET
2507-3250005	SY	ENGINEER FABRIC
2507-6800061	TON	REVETMENT, CLASS E
2599-9999010	LS	CULVERT REMOVAL
2599-9999010	LS	STAGING
PCT-000-000	% of Project	MOBILIZATION (000-000)

OK   Cancel

Appendix B – Cost Estimates for Final Bridge Design - FAQ

While nearly all DOT cost estimates rely on historical prices, the breakdown of costs at various points in the life of a project are handled differently based on the level of project detail. Final Bridge Design typically estimates bridge and culvert costs at the 50% Plans, B3 and B4 event dates, which are relatively close to the project letting date. Final Bridge Design uses bid item based estimates since the bid items and quantities are often well-established at these event dates. Final Bridge Design estimates tend to be the most accurate since the project is fully-defined and the historical price data used to make an estimate is up-to-date and easy to apply.

This appendix is intended to provide direction, primarily for consultants, with respect to Final Bridge Design Estimates. The FAQ format is used to address common issues and will be expanded as issues come up.

FAQ

1.) Question: Our firm is handling all road design and all bridge design for a project. May we place all the bid items under one office level (e.g. Office of Bridges and Structures), particularly, if we create separate division levels for Design and Bridge and assign the appropriate bid items to each division level under the one office level?

Answer: Separate office levels shall be used. Roadway bid items shall be placed under the Office of Design. Bridge bid items shall be placed under the Office of Bridges and Structures. The appropriate event date for each office shall be used.

2.) Question: What direction can OBS provide with respect to the use of trend filters at the event level and for individual bid items?

Answer: In general, the default trend filter settings at the event level should be used for all bid items. As mentioned on Page 9 under heading "Trend Filter at the Event Level", it may be advisable to narrow the work type filter at the event level. In most cases it should not be necessary to set a unique filter for any individual bid items.

3.) Question: When should alternate groups be used?

Answer: Alternate groups are discussed briefly on page 5 under heading "Cost Estimating tab – Tree Structure Levels". Alternate groups can be used to compare costs for different contractor bidding options. Common examples might include a CIP box culvert versus precast box culvert alternate or deck overlay alternates involving the use of Class O PCC versus Class HPC-O PCC. For culverts, base the estimate on the CIP box culvert option. In general, for overlay alternates and other estimates with alternates, base the estimate on the more inexpensive option since it is likely to be the low bid. The cost estimate in iPD should reflect the cost of only one alternate.

4.) Question: How should we handle mobilization?

Answer: Mobilization should typically be based on a regression analysis of historical data within the iPD software. Bridge design estimates and road design estimates will assign mobilization independently. When entering mobilization as a percent based item, be sure to base it on the "Use Office Total" option as shown below.

5.) Question: I have entered bid items in the Project Scheduling System (PSS), but the bid items do not appear under the project number in the PSSLive folder in the iPD application; what can I do to make them appear? [Alternatively -- I have entered bid items in PSS, but the PSSLive folder does not appear under the project number in the iPD application; what can I do to make the folder and bid items appear?]

Answer: Similar to the discussion on page 13 of this document it is advisable to force a refresh of the PSSLive data by right-clicking on the project number and selecting "Refresh PSSLive". Doing so should bring in the bid items and quantities from PSS as well as the PSSLive folder if it is missing. If you do not see the folder or bid items right away you might first try exiting and re-entering the iPD software. If that doesn't work you may need to wait a few hours or even until the next day before iPD is updated since there is a delay in service between PSS and iPD for some updates. Finally, if the bid items or folder do not appear you can contact the consultant coordination section for assistance.