2018

User's Manual

KYTC Pavement Design Web Application

Charlie Sun and Christopher Van Dyke

Table of Contents

LIST OF FIGURES iii
1. INTRODUCTION 1
2. OVERALL WEB PAGE SETTING 2
2.1 Header 2
2.2 Main Content 2
2.3 Footer 3
3. USER AS A NON-REGISTERED USER 4
3.1 HOME – Default Page of KYTC Pavement Design Web Application 4
3.2 EXISTING DESIGN → Approved Design -- View Approved Design List 4
3.3 REGISTER – Get Approval Instantly from KYTC Pavement Design Web Application Management System 5
3.4 FAQ – Frequently Asked Questions 8
3.5 CONTACT US – Communicating with KYTC Pavement Design Web Application Administrator 9
3.6 INSTRCTIONS 10
3.7 Pavement Design Details from *Approved Design* Retrieved in 3.2 10
3.7.1 Title & Info – Shows Pavement Design Project and Section Info 10
3.7.2 Subgrade -- Showing Subgrade Condition and Stabilization Method 11
3.7.3 AC (Asphalt Pavement Design) -- Showing Asphalt Design Results 12
3.7.4 PCC (Concrete Pavement Design) -- Showing Concrete Design Results 13
3.7.5 Cost Analysis -- Showing Cost Analysis for both Asphalt and Concrete Designs 14
3.7.7 Design Selection & Notes -- Showing Selected Design and Notes 16
3.7.8 Approval 17
4. USER AS A DESIGNER 18
4.1 LOGIN 19
4.2 FORGOTTEN PASSWORD 20
4.3 MY ACCOUNT -- Modify Personal Information 21
4.4 Starting Page after LOGIN 22
4.5 NEW DESIGN – Create and Submit a New Pavement Design 23
4.5.1 Title & Info – Entering Pavement Design Project and Section Info 24
4.5.2 Subgrade -- Entering Subgrade Condition and Stabilization Method 25
4.5.3 AC (Asphalt Pavement Design) -- Adjusting Asphalt Design 26
4.5.4 PCC (Concrete Pavement Design) -- Adjusting Concrete Design 27

4.5.5 Cost Analysis -- Adjusting Cost Analysis for both Asphalt and Concrete designs 28
4.5.6 Design Selection & Notes 30
4.5.7 Save Button 31
4.5.8 Attachments – Uploading and managing Attachments 32
4.5.9 Save Option Dropdown List 32
4.5.10 View Different Section 32
4.5.11 Reset Button 33
4.5.12 Delete Button 33
4.5.13 Submit Button 33
4.5.14 Print Design Form Button 33
4.5.15 Approval Tab 33
5. USER AS A PROJECT MANAGER 35
6. USER AS A DISTRICT TEBM FOR PROJECT DEVELOPMENT 36
6.1 APPROVE or REQUEST CHANGES – District TEBM's Decision 36
6.2 DB MAINT -- Database Maintenance on Bid Items for Their Own District 37
7. USER AS A CENTRAL OFFICE TEBM PAVEMENT 39
7.1 Screen for Managing Existing Project List 40
7.2 Screen for Managing Attachments 41
7.3 Approve or Request Changes – Central Office TEBM's Decision 42
7.4 USER ADMIN – User Administration 43
7.4.1 Pending Designer -- Approve/Reject Pending Designer 43
7.4.2 All Existing Users -- Maintain All Registered User's Information 43
7.4.3 Add New User -- Add/Invite New User 45
7.5 USER List 46
7.6 GROUP ADMIN – Group Administration 47
7.7 DB MAINT -- Database Maintenance 48
8. USER AS AN ADMINISTRATOR 49
9. LOGOUT 49

LIST OF FIGURES

Figure 1. Overall web page setting 2

Figure 2. List of the approved pavement designs sorted by County 4

Figure 3. **REGISTRATION** screen 5

Figure 4. Information after **Register** button is clicked 6

Figure 5. Email provides a link to activate user's account 6

Figure 6. Screen after activating user's account 7

Figure 7. **FAQ** page with KYTC Pavement Design Approval Flowchart, and, Users, Functions, and Relationships 8

Figure 8. **CONTACT US** screen 9

Figure 9. Pavement design Title & Info. for non-registered users 10

Figure 10. Subgrade information for non-registered users 11

Figure 11. Asphalt Pavement Design results for non-registered users 12

Figure 12. Concrete Pavement Design results for non-registered users 13

Figure 13. Cost Analysis on AC and PCC designs for non-registered users 14

Figure 14. Pavement design attachments for non-registered users 15

Figure 15. Pavement design selection and notes for non-registered users 16

Figure 16. Design and approval information for non-registered users 17

Figure 17. Designers can view all the designs at different stages 18

Figure 18. **LOGIN** page 19

Figure 19. **Reset Password** screen 20

Figure 20. Update user's account from **MY ACCOUNT** link 21

Figure 21. Starting page after a Designer logs in 22

Figure 22. Screen for inputting new project and section information 23

Figure 23. Screen for inputting subgrade information 25

Figure 24. Screen for adjusting AC (Asphalt pavement design) results 26

Figure 25. Screen for adjusting PCC (Concrete pavement design) results with default JPC shoulder 27

Figure 26. Screen for adjusting PCC (Concrete pavement design) results with Asphalt shoulder 28

Figure 27. Screen for adjusting cost analysis on both asphalt and concrete pavement designs 29

Figure 28. Screen for design selection and notes associated with this route section 30

Figure 29. More functions show up after **Save** Button is clicked 31
Figure 30. Upload and manage attachments under **Attachment** Tab 32
Figure 31. Approval Tab will show up after pavement design is successfully submitted 34
Figure 32. Project Manager submits her/his decision 35
Figure 33. Header settings for District TEBM for Project Development 36
Figure 34. **District TEBM for Project Development** submits their decision 37
Figure 36. How to modify or add new bid items for their own district 38
Figure 35. District TEBM has the ability to modify existing bid items or add new bid items for their own district 38
Figure 37. **Header** – after a **Central Office TEBM Pavemen**t logs in 39
Figure 38. Archive/active projects by a **Central Office TEBM** 40
Figure 39. Manage attachments by **Central Office TEBM** 41
Figure 40. **Central Office TEBM** submits their decision 42
Figure 41. **User Administration** page with **Designer** in pending 43
Figure 42. User info appears when user is selected on **All Existing Users** tab 44
Figure 43. **Add New User** tab lets **Central Office TEBM** to add/invite new users 45
Figure 44. **USER ADMIN → User List** page provides CO TEBM an interface maintaining user information and copy user email addresses 46
Figure 45. **USER ADMIN → Groups** page provides CO TEBM an interface maintaining group information 47
Figure 46. **DB MAINT --> Bid Items** page provides CO TEBM an interface maintaining bid items for all the state 48

1. **INTRODUCTION**

The Kentucky Transportation Cabinet's (KYTC) Pavement Design web application[1] is intended to supplement the Cabinet's Pavement Design Guide. The Guide presents in detail specific processes for pavement design. Once in the design module, the web application automatically fills in many details based on user input, and is intended to be used from the **Title & Info.** tab on the page settings (see Figure 9). This carries information entered by users onto subsequent tabs.

It is anticipated that there will be three (3) primary users of the web application — consultant engineers, KYTC Engineers and Officers engaged in developing pavement designs. Non-registered users can use the application as well, however, these users can only view approved designs. They cannot add or edit designs. Primary users can submit designs online, approve designs online, and retrieve communications circulated among designers and approvers when they submit or approve designs.

To assist users of the web application, the following sections highlight many of its features and provide guidance on their use. The web application's various graphical user interfaces are illustrated and described.

[1] Referred to hereafter in this guide as *web application*.

2. OVERALL WEB PAGE SETTING

All functioning web pages on the web application are divided into three sections — **Header**, **Main Content**, and **Footer** (Figures 1).

Figure 1. Overall web page setting

2.1 Header

The **Header** is fixed at the top of each page and has two different settings for before and after login. The content present before *and* after login include web title, date and time, and links to **HOME**, **EXISTING DESIGN**, and **INSTRUCTIONS**. Before login, there are also links to **LOGIN** (upper right corner of the page), **REGISTER**, **FAQ**, and **CONTACT US**. After login, the user's first name appears on the top line and the **LOGIN** link is replaced with **LOGOUT** in the top right corner. Links for **NEW DESIGN** and **MY ACCOUNT** appear for users who are registered as Designers, Project Managers, District TEBMs for Project Development, Database Administrators, and Central Office TEBM Pavement. Additional links, including **USER ADMIN** and **DB MAINT,** appear for users registered as District TEBM for Project Development, Database Administrator, and Central Office TEBM Pavement.

2.2 Main Content

The **Main Content** section of each page hosts the different functioning pages, which are illustrated in detail later.

2.3 Footer

The **Footer** contains links to related web sites such as **KYTC Pavement Design**, **Kentucky Transportation Cabinet**, and **Kentucky Transportation Center**.

3. USER AS A NON-REGISTERED USER

Non-registered user can only view approved pavement designs. They can register as **Designers** and receive instant approval from the web application's management system. The functions described below are available to non-registered users in the **Header** section.

3.1 HOME – Default Page of KYTC Pavement Design Web Application

The **HOME** link is the first link in the **Header**'s last line (Figure 1). Clicking this link loads the web application's home page (Figure 1). This is the web application's default page and briefly introduces the application.

3.2 EXISTING DESIGN → Approved Design -- View Approved Design List

The **EXISTING DESIGN** link is the second link in the **Header**'s last line (Figure 1). When a user mouse over the link, a sub-link to **Approved Design** appears. Clicking the sub-link brings up a list of all approved pavement designs currently housed in the web application (Figure 2). All titles of columns function like "**sort by**" key when any title is clicked. The list in Figure 2 is sorted by column of **County**, which is default sort order.

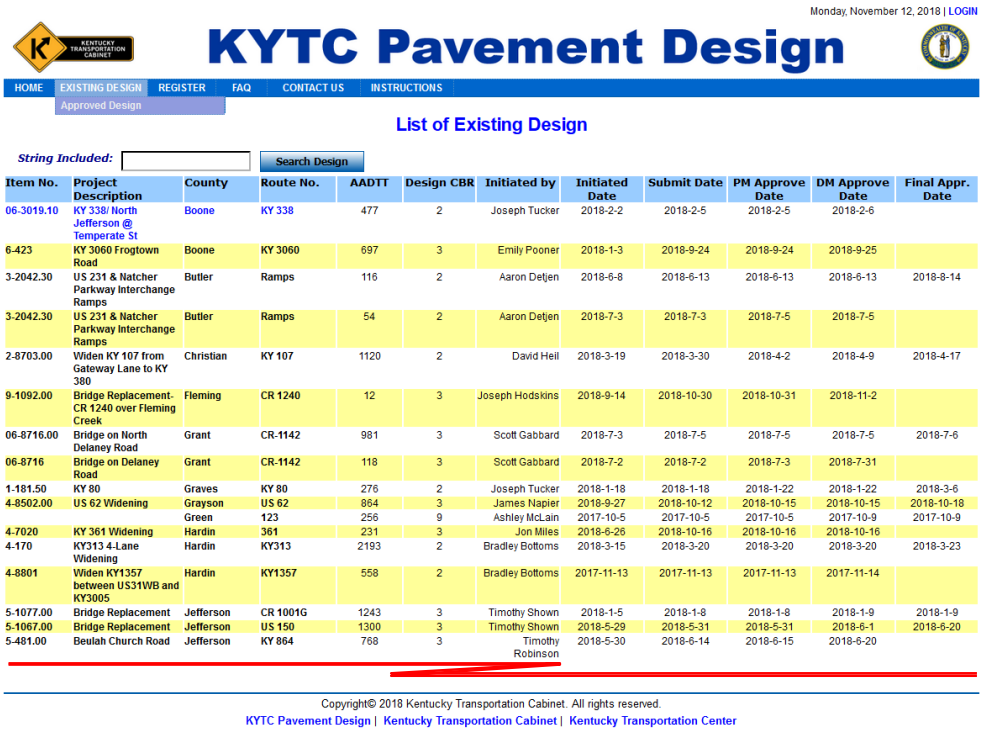


Figure 2. List of the approved pavement designs sorted by County

3.3 REGISTER – Get Approval Instantly from KYTC Pavement Design Web Application Management System

The **REGISTER** link is the third link in the **Header**'s last line (Figure 1). After clicking this link, users are asked to supply personal information to create their account (Figure 3). If a red asterisk appears next to a field, the user must provide the requested information to complete their registration. Required information includes **First Name**, **Last Name**, **Email** (which is used as the **Login ID** by the user and for all correspondence email sent by administrators), **Password** (created by the user), **Phone Number**, **Street Address**, **City**, **State**, **Zip Code**, **Country**, and **Organization**. ***Designer*** is the only option for user **Designation** for now. If registrant's email domain contains "gmail" or "yahoo", or does not exist in current user database, they will be assigned as a **Viewer** temporarily and wait further verification by administrator from KYTC Pavement Design web application. The **Viewer** can view all the designs in different stages, such as **Design Initiated, Submitted, Project Manager Approved, District Manager Approved, Approved Design,** and **All Existing Designs**. Some information (e.g., **Fax Number**, **Web Site**, and **Description**) is optional. Information supplied by the user is confidential and maintained in the web application management system. Passwords are encrypted and stored in the web application management system as well.

After the user enters all the required information and clicks the **Register** button, the page shown in Figure 4 appears. This page informs the user: "*An activation link has been sent to your email address. Please follow the instructions in the email to activate your account.*"

Figure 3. **REGISTRATION** screen

Figure 4. Information after **Register** button is clicked

Figure 5 is an image of the email sent to the user.

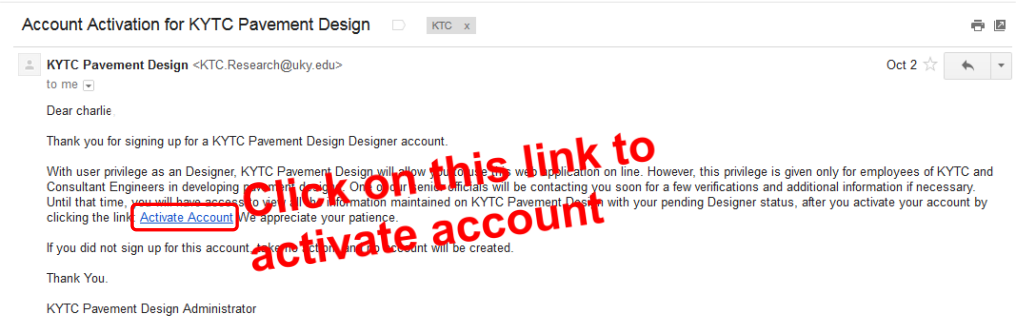


Figure 5. Email provides a link to activate user's account

A user can automatically activate their account by clicking on the link provided in the email. The **Activation** page (Figure 6) informs the new user of their account activation status. If activation is successful, the registered user may click on the **LOGIN** link, which is located on the upper right corner of the page, to log into the system by using **LOGIN** page (Figure 18).

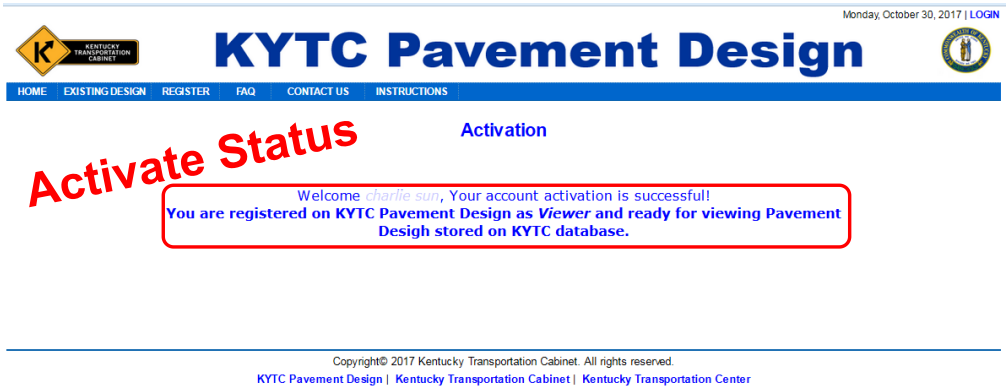


Figure 6. Screen after activating user's account

3.4 FAQ – Frequently Asked Questions

FAQ link is the fourth link in the **Header**'s last line (Figure 1). This link provides straightforward answers to frequently asked questions about the web application. KYTC's Pavement Design Approval Flowchart and its Pavement Design Users, Functions, and Relationships are posted for now (Figure 7).

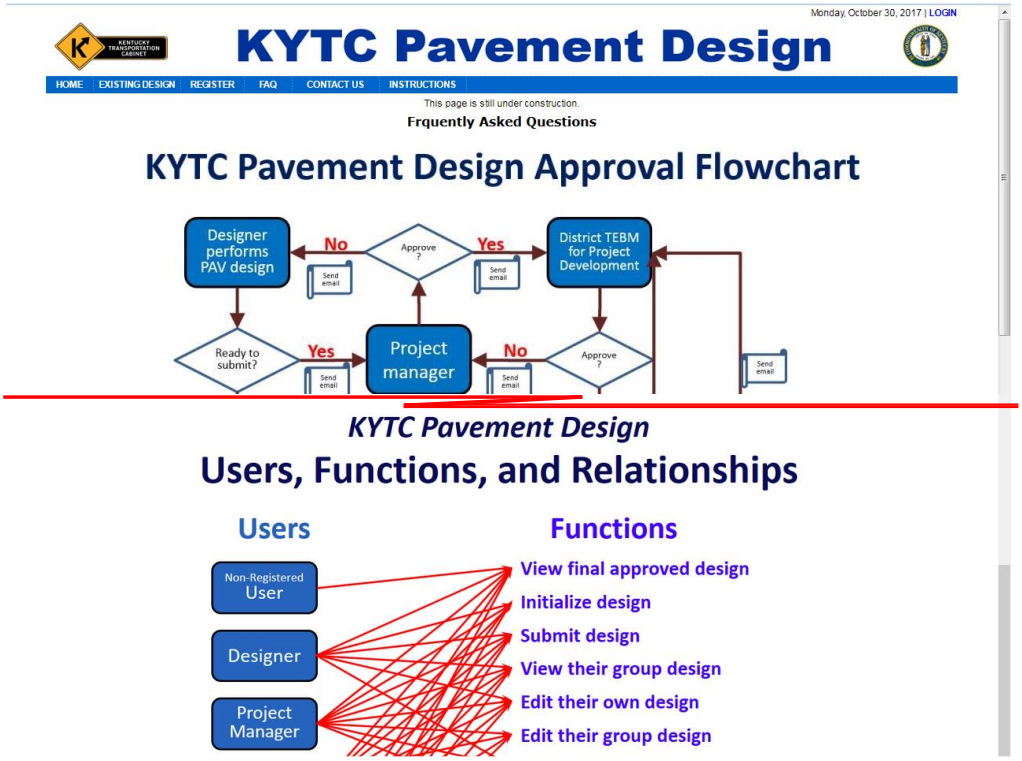


Figure 7. **FAQ** page with KYTC Pavement Design Approval Flowchart, and, Users, Functions, and Relationships

3.5 CONTACT US – Communicating with KYTC Pavement Design Web Application Administrator

The **CONTACT US** link is fifth link in the **Header's** last line (Figure 1). The **CONTACT US** page offers a portal for users to communicate with a system administrator (Figure 8). The users may either use their regular email application by clicking on the administrator's name; or, they may supply the required information and click the **Send** button. Clicking the **Send** button generates an email that is sent by the system to both the sender and the web application administrator.

Figure 8. **CONTACT US** screen

3.6 INSTRCTIONS

The **INSTRUCTIONS** link is the **Header**'s final link (Figure 1). Under this link, users find a ***Quick Start Guide***, a ***User's Manual***, and a brief introduction for this web application. The ***Quick Start Guide*** presents a brief instruction for using this web application; the ***Manual*** provides more detailed instructions. Users can view it online or download a copy for printing.

3.7 Pavement Design Details from *Approved Design* Retrieved in 3.2

Non-registered users can view pavement design detail information by clicking on an item in any column, such as **Item No., Route Description, County**, or, **Route No.,** from the list retrieved in Section 3.2. Eight (8) tabs are visible to non-registered users on the **View Design** page — **Title & Info, Subgrade, AC, PCC, Cost Analysis, Attachments, Design Selection & Notes,** and **Approval** (Figure 9).

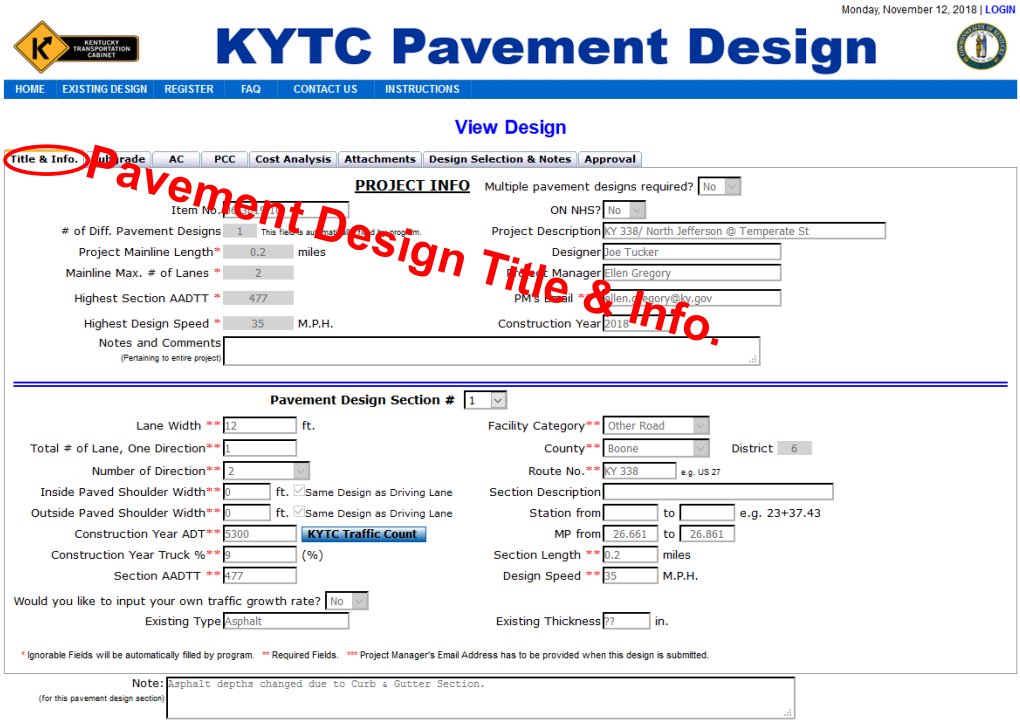


Figure 9. Pavement design Title & Info. for non-registered users

3.7.1 Title & Info – Shows Pavement Design Project and Section Info

Figure 9 displays the first tab, **Title & Info**. This tab contains detailed information, including two portions of Project and Section for the pavement design chosen by the user.

3.7.2 Subgrade -- Showing Subgrade Condition and Stabilization Method

The **Subgrade** tab has information on subgrade condition, stabilization recommendation, and chosen stabilization method (Figure 10).

Figure 10. Subgrade information for non-registered users

3.7.3 AC (Asphalt Pavement Design) -- Showing Asphalt Design Results

The **AC (Asphalt Pavement Design)** tab provides detailed results for an Asphalt Design (Figure 11). Design results include the thicknesses, item codes, and unit prices for the stabilized roadbed, stabilization material (if any), aggregate base, drainage blanket, asphalt base and subbase layers, and, asphalt surface. The screen also presents the design's initial cost.

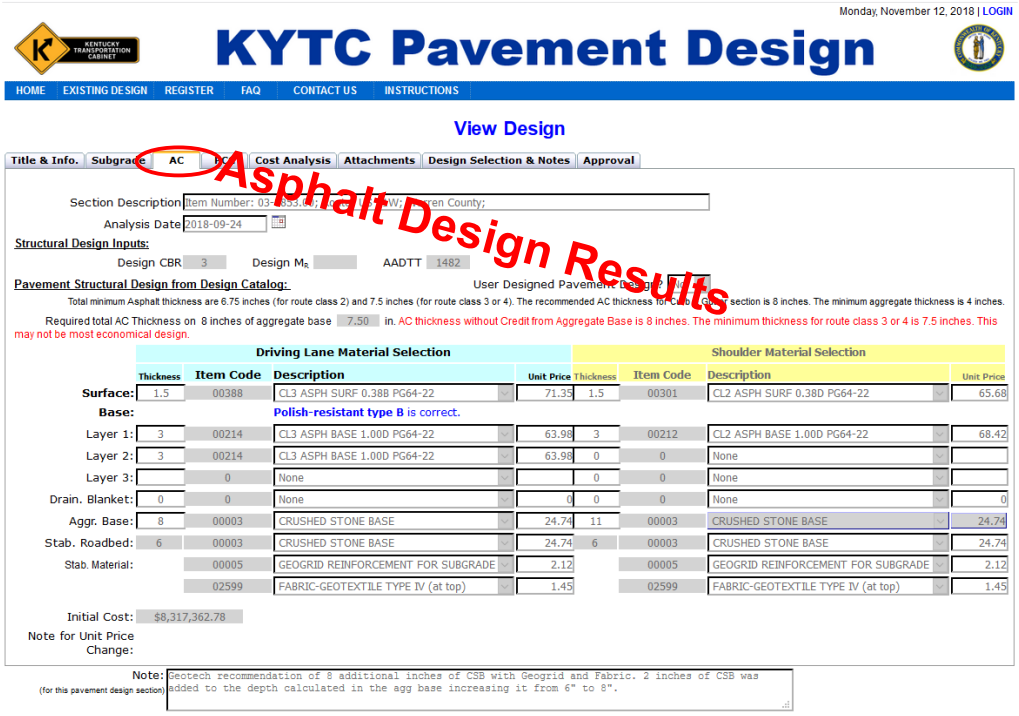


Figure 11. Asphalt Pavement Design results for non-registered users

3.7.4 PCC (Concrete Pavement Design) -- Showing Concrete Design Results

The **PCC (Concrete Pavement Design)** tab provides detailed results for a Concrete Pavement Design (Figure 12). The design results include the thicknesses, item codes, and unit prices for the stabilized roadbed, stabilization material (if any), aggregate base, and JPC pavement design. The screen also presents the design's initial cost.

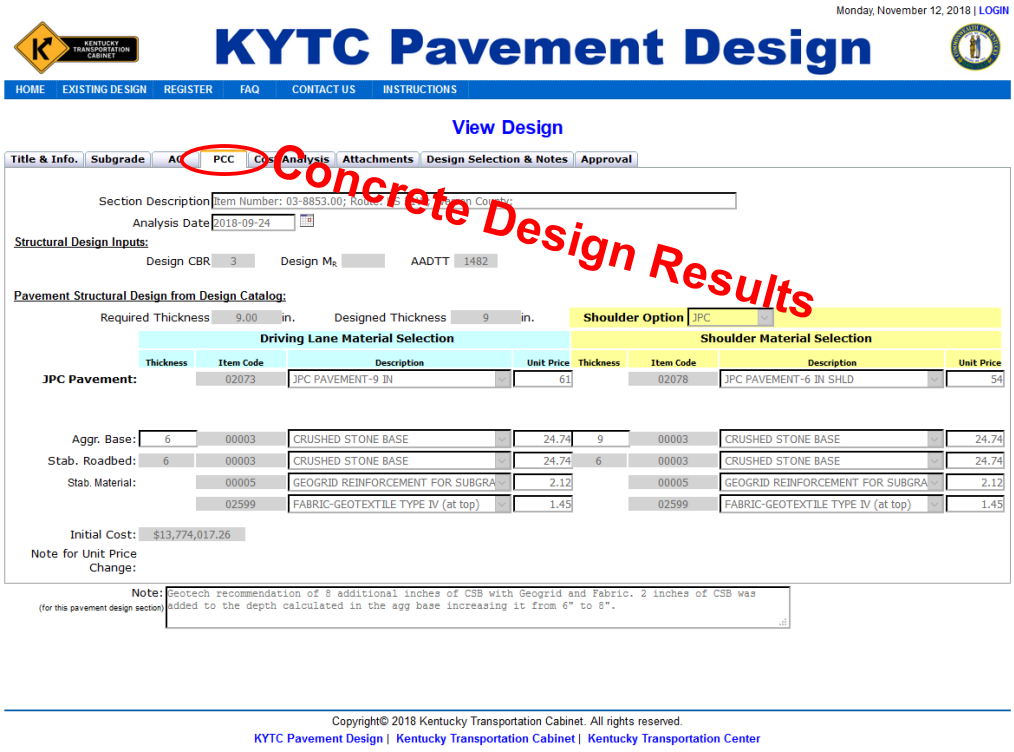


Figure 12. Concrete Pavement Design results for non-registered users

3.7.5 Cost Analysis -- Showing Cost Analysis for both Asphalt and Concrete Designs

The **Cost Analysis** tab provides cost analysis results for asphalt and concrete pavement designs (Figure 13). Results include initial construction item, initial construction, and for certain years rehabilitation costs.

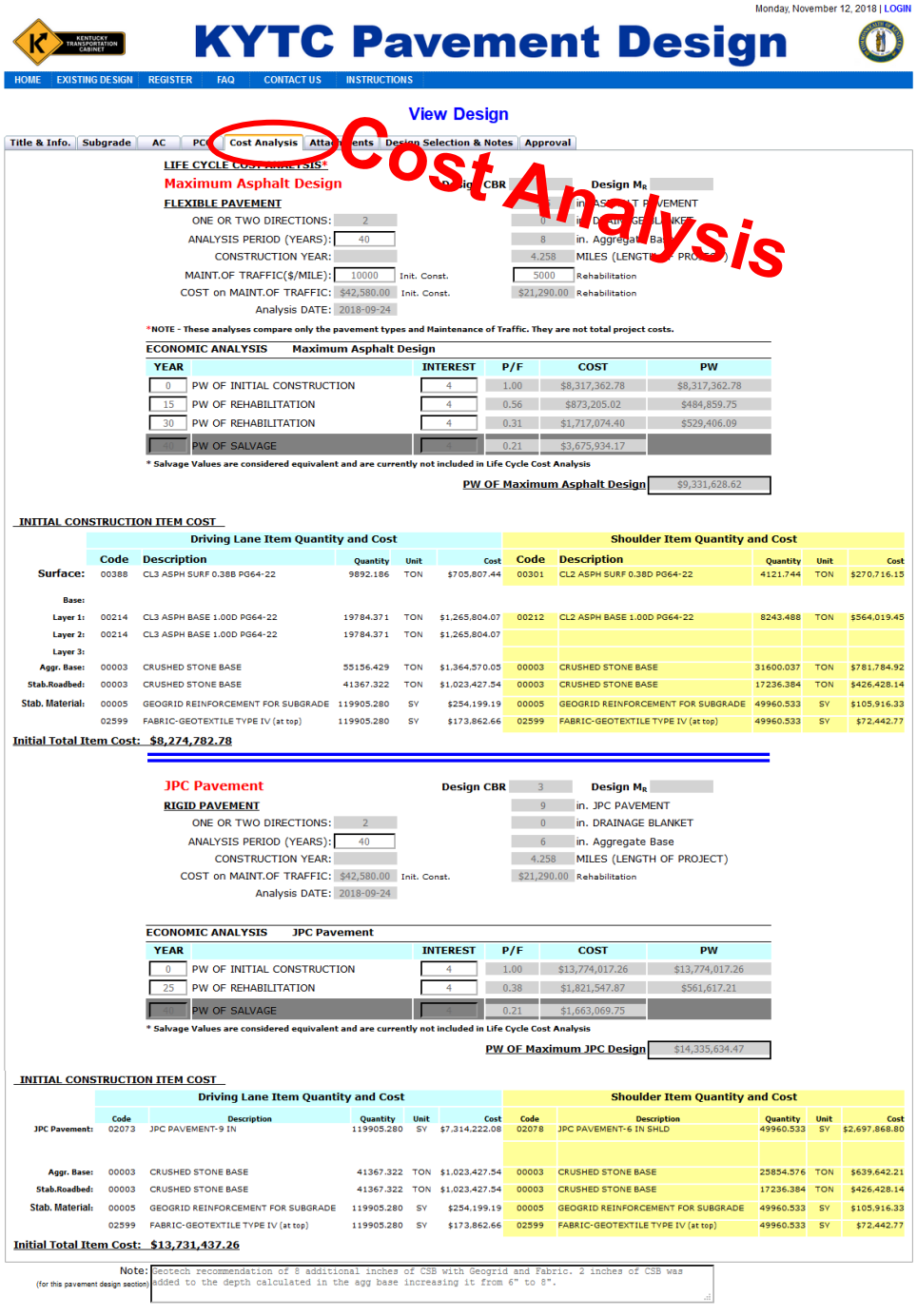


Figure 13. Cost Analysis on AC and PCC designs for non-registered users

3.7.6 Attachments -- Showing Uploaded Attachments by Designer

On the **Attachments** tab, the user may view or download attachments uploaded by the designer (Figure 14).

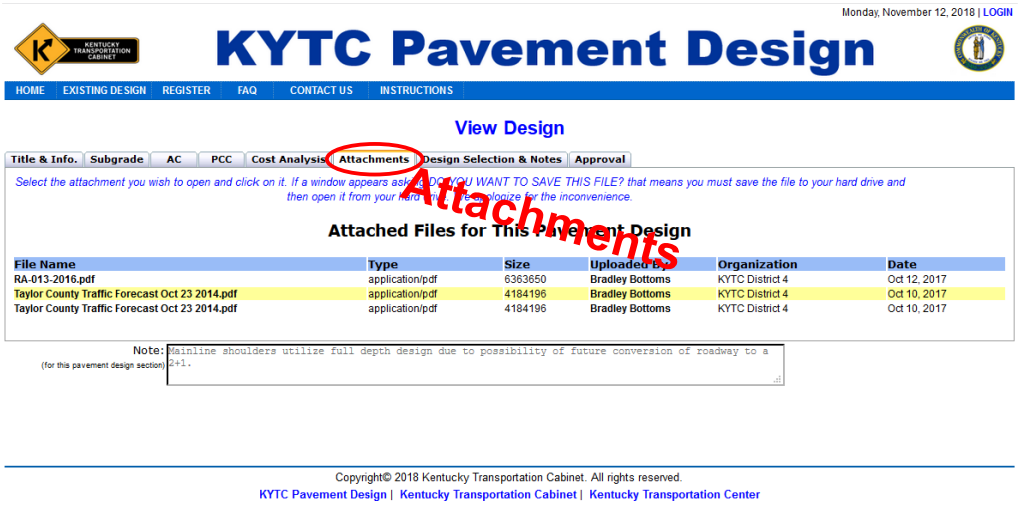


Figure 14. Pavement design attachments for non-registered users

3.7.7 Design Selection & Notes -- Showing Selected Design and Notes

The **Design Selection & Notes** tab presents the selected design and what notes have been selected for the pavement design project (Figure 15). Asphalt and concrete pavement adjustments will show up when ***Alternate Pavement*** is selected as pavement design. Design notes include the Common Plan Notes, Special Notes for ASPHALT, JPC PAVEMENT, and OTHERS.

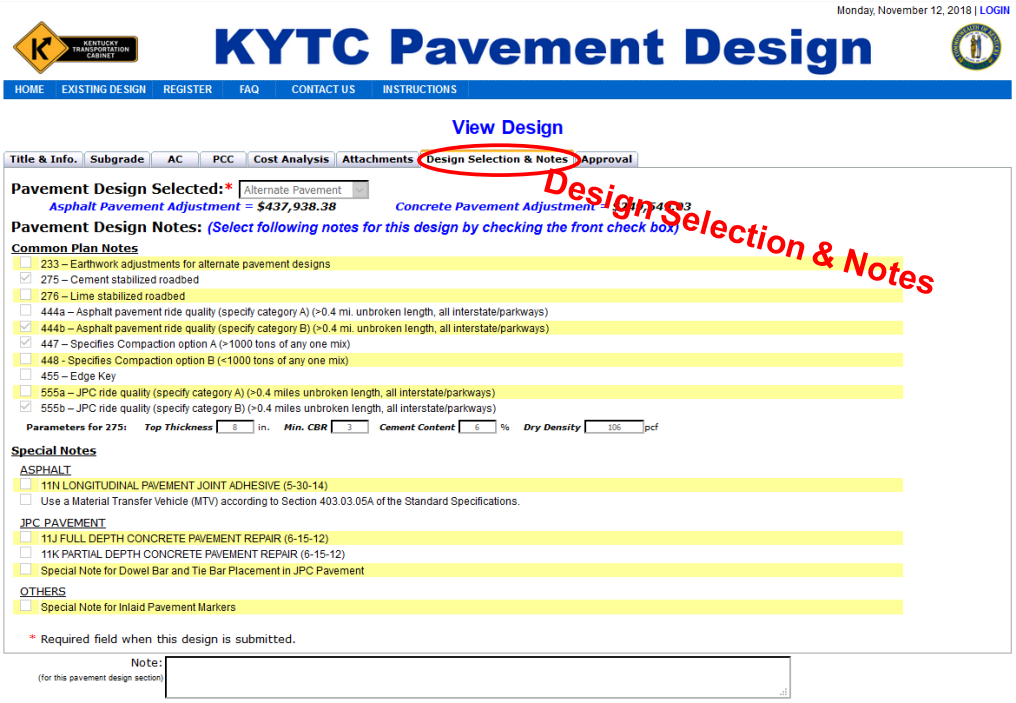


Figure 15. Pavement design selection and notes for non-registered users

3.7.8 Approval

Clicking the **Approval** tab brings up the stage of the pavement design (Figure 16). Visible information includes the pavement designer, who approved the design at different stages if applicable, and dates on which approvals were issued.

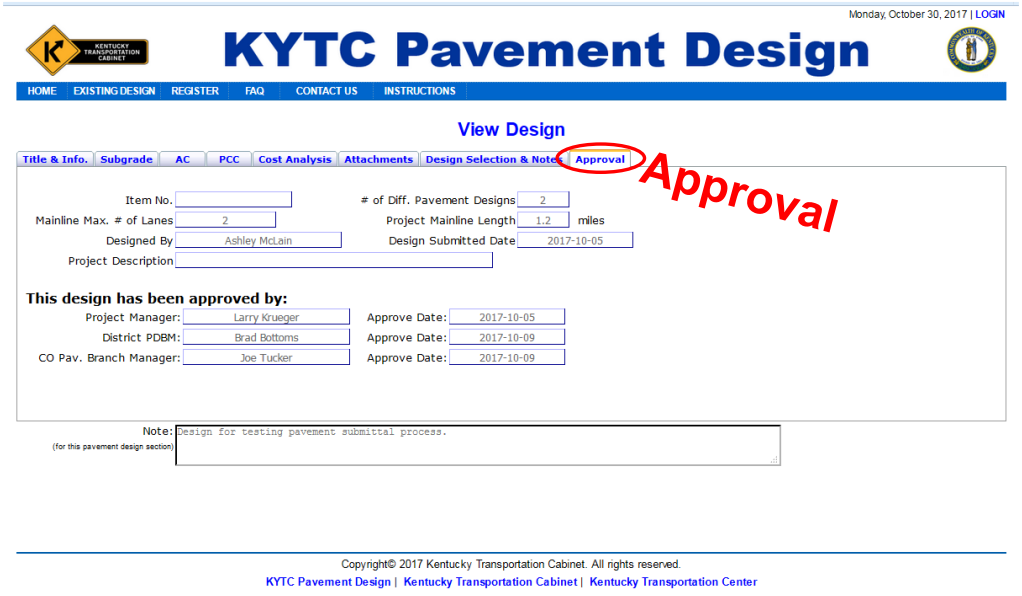


Figure 16. Design and approval information for non-registered users

4. USER AS A DESIGNER

Designer is a registered user and belongs to a major group on the web application. They can instantly activate their account after registering and following directions shown on the screen. If the **Designer** does not activate their account, the administrator can send them a notification email with the activating link or activate the account on their behalf. Personal information can be modified by clicking on the **MY ACCOUNT** link. Unlike non-registered users, a **Designer** can access approved pavement designs as well as all the designs in different stages, such as **Design Initiated, Submitted, Project Manager Approved, District Manager Approved, Approved Design,** and **All Existing Designs** (Figure 17). A **Designer** also can design their pavement or share designs with other designers who are in the same group, submit their design online, and upload attachments.

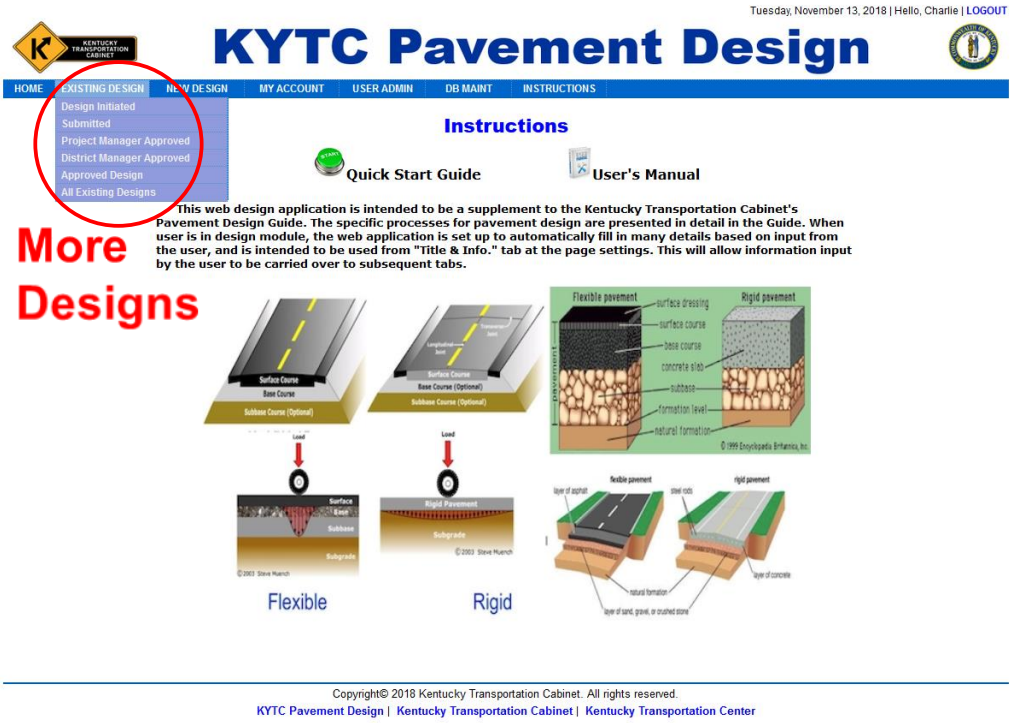


Figure 17. Designers can view all the designs at different stages

4.1 LOGIN

Figure 18 displays the **LOGIN** page. This page is the gateway for registered users to access the web application. A **Designer** may **Sign In** by entering their email address and password into the appropriate fields in the **Login** area.

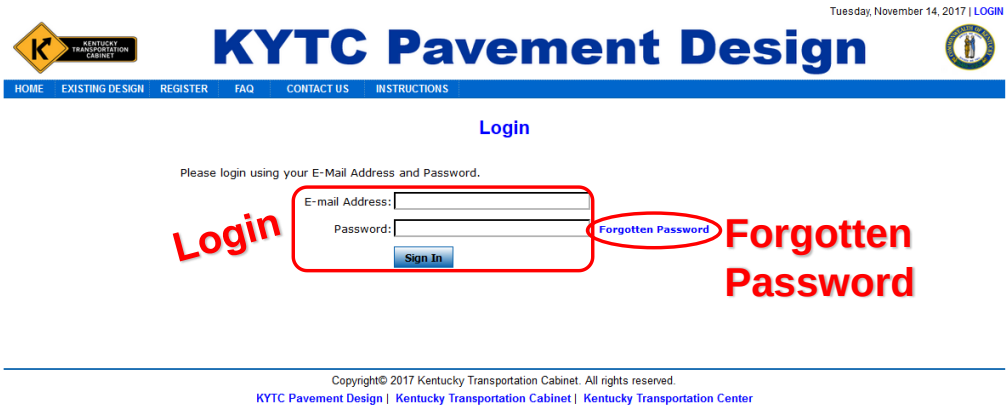


Figure 18. **LOGIN** page

4.2 FORGOTTEN PASSWORD

If user forgets their login password, they can click **Forgotten Password** link shown in Figure 18. Clicking this link takes the user to a page where they can reset their password (Figure 19). On the **Forgotten Password** page, a user enters their registered email address and clicks the **Reset Password** button. This creates a temporary, randomly generated password and emails it to the user. Once the user logs in with their temporary password, the user is prompted to immediately proceed to the **MY ACCOUNT** page and update their password.

Figure 19. **Reset Password** screen

4.3 MY ACCOUNT -- Modify Personal Information

Clicking **MY ACCOUNT** brings up the page depicted in Figure 20. A registered user can update their profile and change their password or contact information on this page (except for their email address, which serves as the user ID).

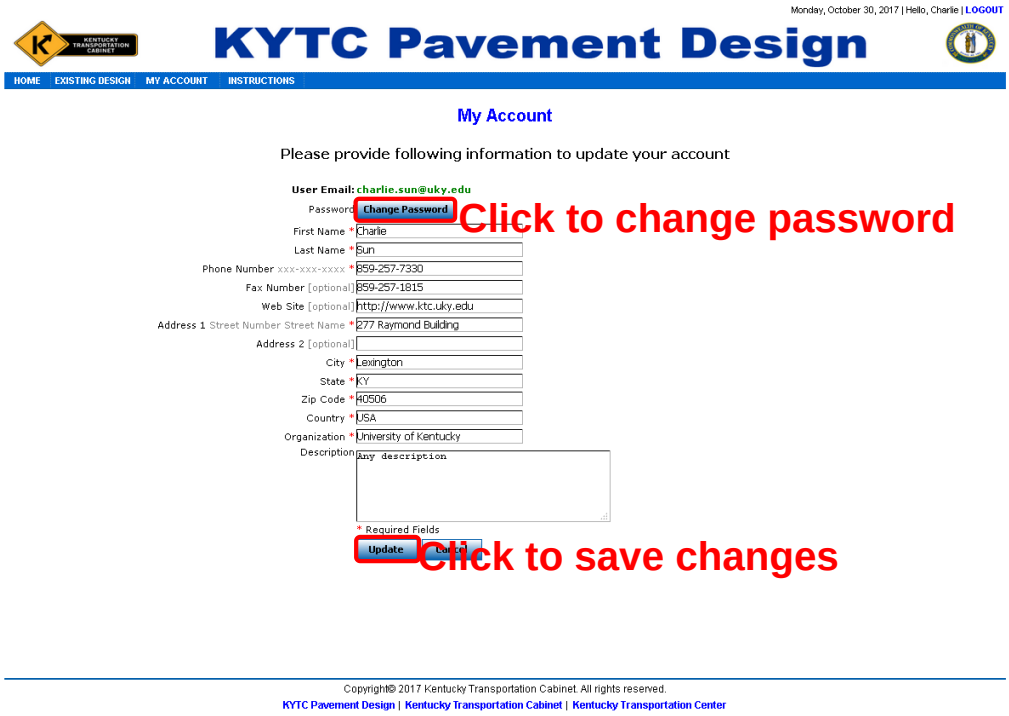


Figure 20. Update user's account from **MY ACCOUNT** link

4.4 Starting Page after LOGIN

The **INSTRUCTIONS** page (Figure 21) appears following login. The **Designer** has access to an extra link — **NEW DESIGN** to create new designs; they can edit their own and their group's existing designs which have not been submitted from the design list. The user's manual is linked at the upper right of this starting page.

Figure 21. Starting page after a Designer logs in

4.5 NEW DESIGN – Create and Submit a New Pavement Design

The **Designer** can establish a new pavement design by clicking the **NEW DESIGN** link. The page displayed in Figure 22 appears once a user clicks this link. Two tabs, **Title & Info** and **Subgrade**, are visible once the link is opened.

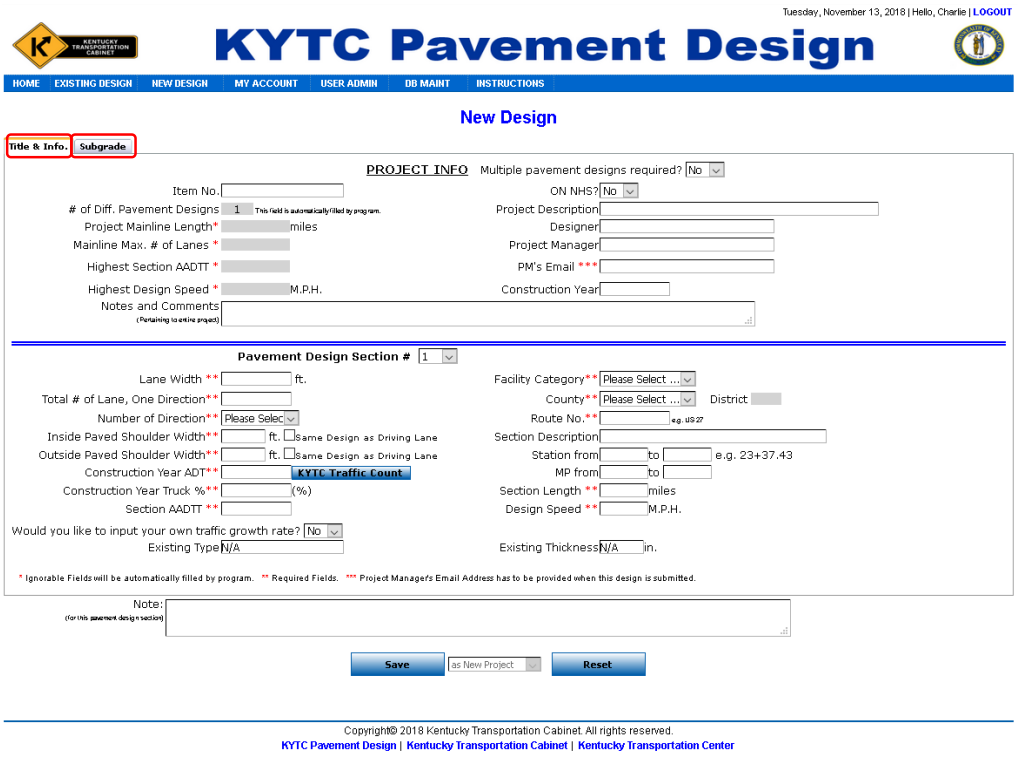


Figure 22. Screen for inputting new project and section information

The tabs contain five kinds of entry fields:

1. Required Fields are denoted with *
   - Ignorable Fields will be automatically filled by program when user enters section information.
2. Required Fields are denoted with **
   - Required fields must be completed to view design results, cost analysis, or save their design.
3. Field with ***
   - Information must be provided if the designer submits their design.
4. Fields with #:
   - Optional fields where one option must be selected. A designer has to enter data in at least one of these fields.
5. Fields without any mark:
   - Optional fields — information can be entered in them, or they can be left blank.

4.5.1 Title & Info – Entering Pavement Design Project and Section Info

When the **NEW DESIGN** is clicked, some fields are pre-selected or have default values. The default values for "Multiple pavement designs required?", "ON NHS?" and "Would you like to input your own traffic growth rate?" are "No." The default value for "# of Diff. Pavement Designs" is "1"; the default values for "Existing Type" and "Existing Thickness" are "N/A". ON NHS is defined as "On National Highway System". Clicking on the

hot link under the **Title & Info.** tab opens KYTC's Traffic Count Reporting System web page, where users can gather ADT data. The default **Traffic Growth Rate** is 2.0%. Users can input their **Traffic Growth Rate** by selecting answer "**Yes**" to the question, "***Would you like to input your own traffic growth rate?***" to make **Traffic Growth Rate** input area available.

PROJECT INFO and **Pavement Design Section** information are under the **Title & Info** tab. A user can ignore data entry in shaded areas in the **PROJECT INFO** section. Data in these shaded areas are automatically entered by program as the data entered in **Pavement Design Section** portion. Number of **Section AADTT** can be calculated when **Construction Year ADT** and **Construction Year Truck %** are entered. **Section AADTT** data can be overwritten by typing in data after calculation. The **District** field is automatically populated after making a **County** selection. Please note, the prices for bid items are assigned by district. **Section Length** is calculated when data are entered in the **MP from** and **MP to** fields. **Section Length** can be overwritten by typing in data after calculation as well.

4.5.2 Subgrade -- Entering Subgrade Condition and Stabilization Method

On the **Subgrade tab** (Figure 23), **Chemical Stabilization** is the default selection. This option is unchecked if the **Design CBR** entered is greater than 5 or the **Design M_R** exceeds 7,500. Either **Design CBR** or **Design M_R** is required for pavement design. The pavement design is based on **Design CBR** if both **Design CBR** and **Design M_R** are entered.

Three (3) inches of asphalt credit are allocated if any one of three stabilization methods — **Chemical Stabilization**; **Geogrid, Fabric, & 6 additional inches of DGA/CSB**; and **12" 2s, 3s, or 23s underlain with TY V fabric and TY IV Fabric on Top** — is adopted.

After entering the required data, four additional tabs — **AC** (Asphalt design results) **PCC** (Concrete design results), **Cost Analysis**, and **Design Selection & Notes** — appear (Figure 24). The content of the four tabs is transferred over from the previous two tabs, obtained from drawn designs, pavement thickness design catalog tables, or calculated from entered data from drawn designs, pavement thickness design catalog tables, or calculated from entered data.

Figure 23. Screen for inputting subgrade information

4.5.3 AC (Asphalt Pavement Design) -- Adjusting Asphalt Design

Under the **AC** tab (Figure 24), data like **Section Description**, **Layer Thickness**, and **Item Prices** can be modified; users can reselect **Layer Item** from each layer dropdown list. More AC items appear in each layer dropdown list if the user clicks on **More AC Item Selections**. Drainage Blanket is *not selected* by default. It reduces up to two (2) inches of asphalt thickness if Drainage Blanket is used. Six (6) inches of aggregate base is the default thickness since all the AC pavement designs incorporate this base. Four (4) inches of aggregate base is the minimum thickness and is increased to 0.7 inches thickness of asphalt if four (4) inches of aggregate base are used. If the aggregate base's thickness exceeds six (6) inches, asphalt thickness is proportionally lowered to a minimum thickness of 7.5 inches (Route Class 3 or 4) and 5.5 inches (Route Class 2) using a ratio of 0.14/0.44. **Layer of Stab. Roadbed** is automatically selected by program on the **Subgrade** tab. Users can select different items in the Stabilization Roadbed dropdown list and modify the item price if needed. **Stab. Material** is selected accordingly by program when the Stabilization Roadbed item has been selected. By default, AC design is not user defined (Figure 24). Polish-resistant check for surface layer and violated warrants check for selecting asphalt mixtures and compaction options are run programmatically when layer thickness or layer item is modified. Check result message is shown on screen after those checks. When AC design is shifted to user defined by user, (by selecting "***Yes***" as an answer to question "*User Defined AC Design?*"), both polish-resistant and violated warrants checks are not performed when layer thickness or layer item is modified. No warning message is shown on screen either.

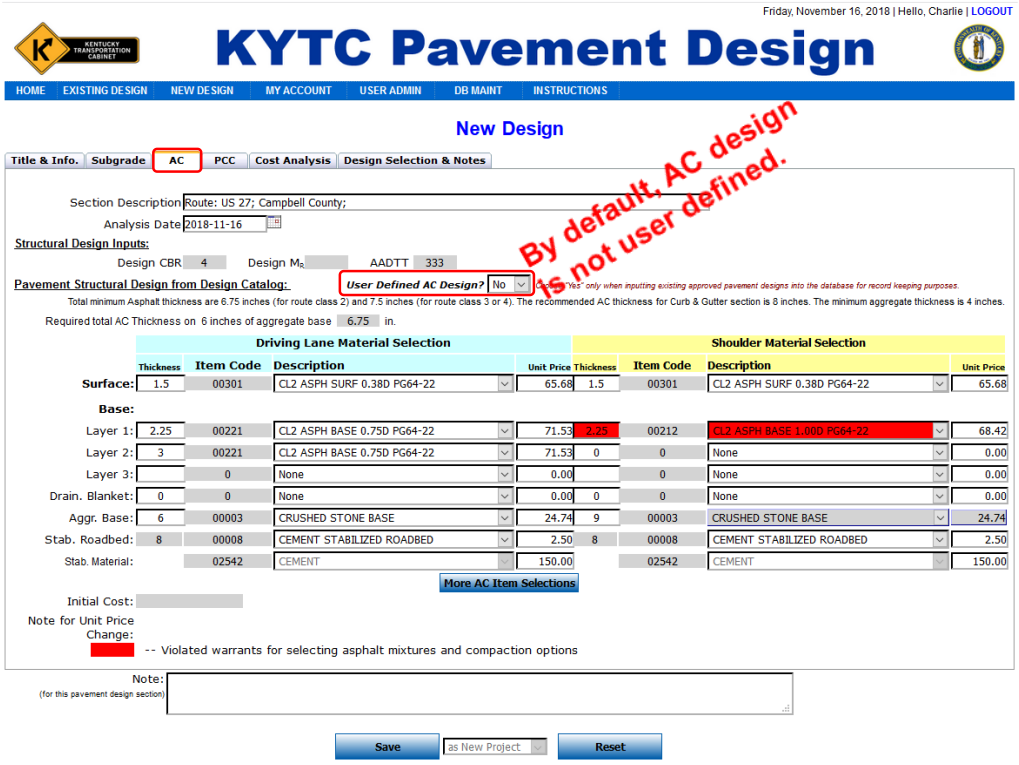


Figure 24. Screen for adjusting AC (Asphalt pavement design) results

If either checkbox associated with the **Same Design as Driving Lane** for **Inside Paved Shoulder Width** or **Outside Paved Shoulder Width** in the Pavement Design Section is left unchecked, the **Shoulder Material Selection** portion appears. AC surface layer and only one AC base layer is the default shoulder design layout. The thickness of the aggregate base on the shoulder portion balances the total difference in thickness between the driving lane and shoulder. Shoulder design is adjustable as well. If both checkboxes of **Same Design as Driving Lane** for **Inside Paved Shoulder Width** and **Outside Paved Shoulder Width** on Pavement Design Section portion are checked, the **Shoulder Material Selection** portion remains blank. The message, "*Shoulder Material Selection Same as Driving Lane*," appears in that area.

4.5.4 PCC (Concrete Pavement Design) -- Adjusting Concrete Design

On the **PCC tab** (Figure 25), JPC is the default shoulder design. Six (6) inches of JPC Pavement Shoulder is the default shoulder type when the width of shoulder is greater than six (6) feet. The thickness of the shoulder's aggregate base balances the total difference in thickness between driving lane and shoulder. Asphalt shoulder design is an optional selection for PCC design (Figure 26). Under this scenario, the shoulder design is identical to the design in the AC shoulder design.

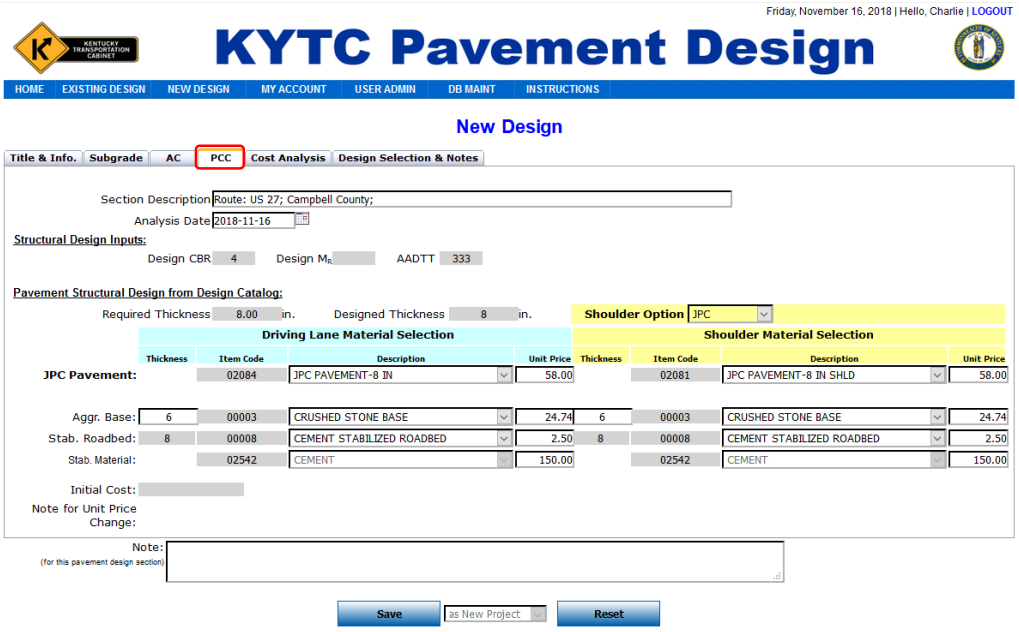


Figure 25. Screen for adjusting PCC (Concrete pavement design) results with default JPC shoulder

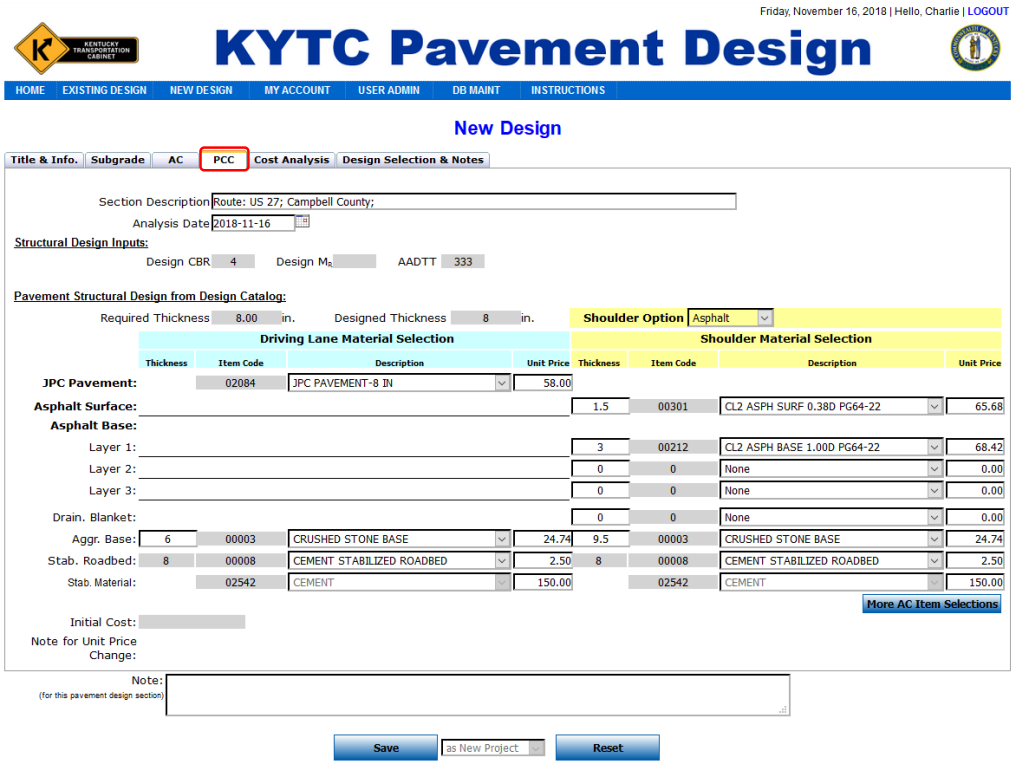


Figure 26. Screen for adjusting PCC (Concrete pavement design) results with Asphalt shoulder

4.5.5 Cost Analysis -- Adjusting Cost Analysis for both Asphalt and Concrete designs

On the **Cost Analysis** tab (Figure 27), users may adjust the costs for asphalt and concrete pavement designs. The **DESIGN NUMBER OF YEARS**, **MAINT. OF TRAFFIC ($/MILE) - Init. Const.** and **Rehabilitation**, and, **INTEREST** rates are adjustable variables for cost analysis. **INITIAL CONSTRUCTION ITEM COST** and **Initial Total Item Cost** for both AC and PCC designs are available for user's quick check.

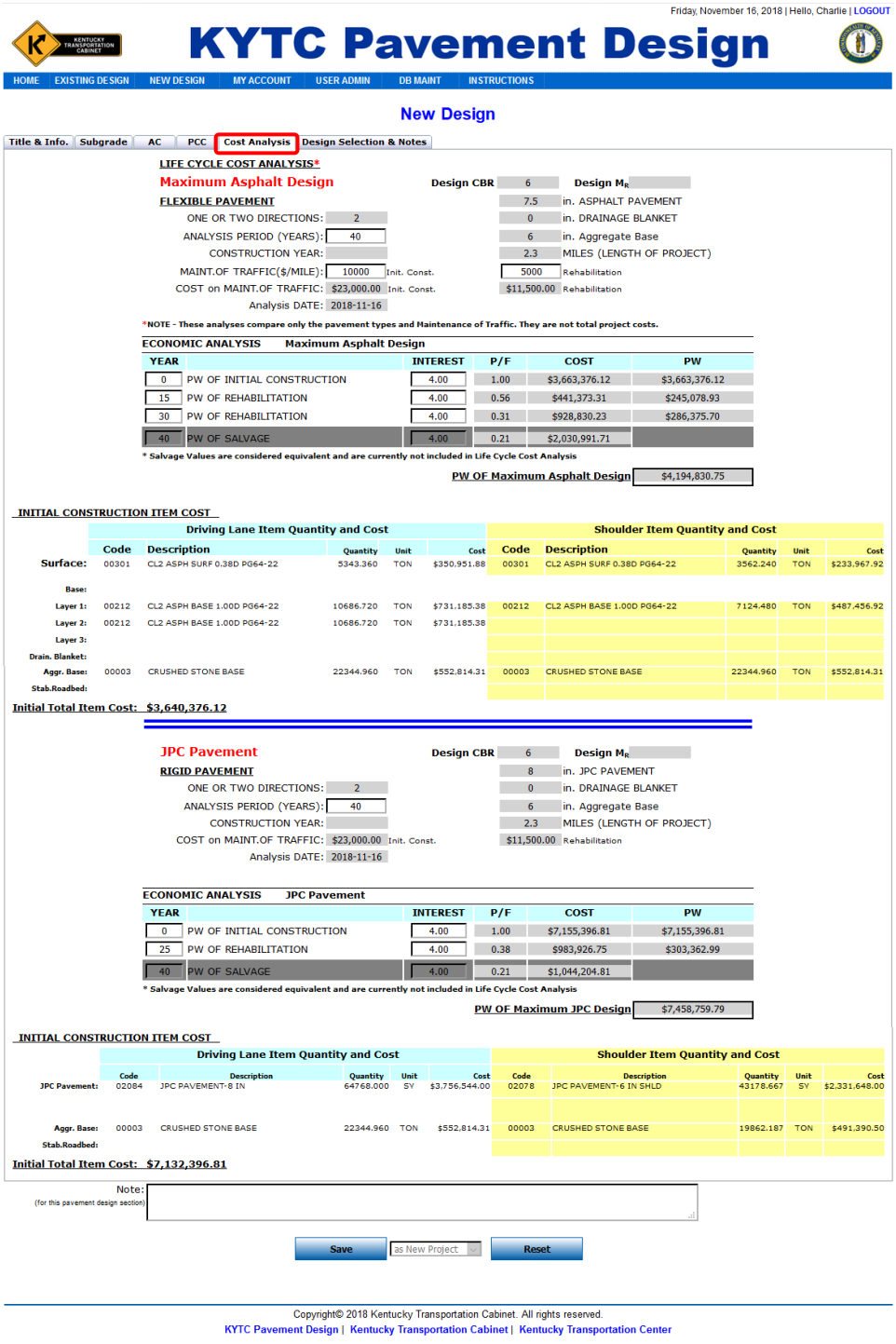


Figure 27. Screen for adjusting cost analysis on both asphalt and concrete pavement designs

4.5.6 Design Selection & Notes

On the **Design Selection & Note** tab (Figure 28), some Common General Notes are automatically selected by program based on what designs are specified on previous tabs. Some parameters with default data appear when corresponding notes are checked. Notes 276 and 447, for example, in Figure 28 are selected because *Lime Stabilized Roadbed* was chosen along with a single mix greater than 1,000 tons. Four parameters for Note 276 also appear. They are associated with Note 276. Users can select any other notes associated with this route section on this tab. Designer has to select a pavement design for submitting. Pavement adjustment costs for AC and PCC designs are shown up if designer select ***Alternate Pavement*** as their submission.

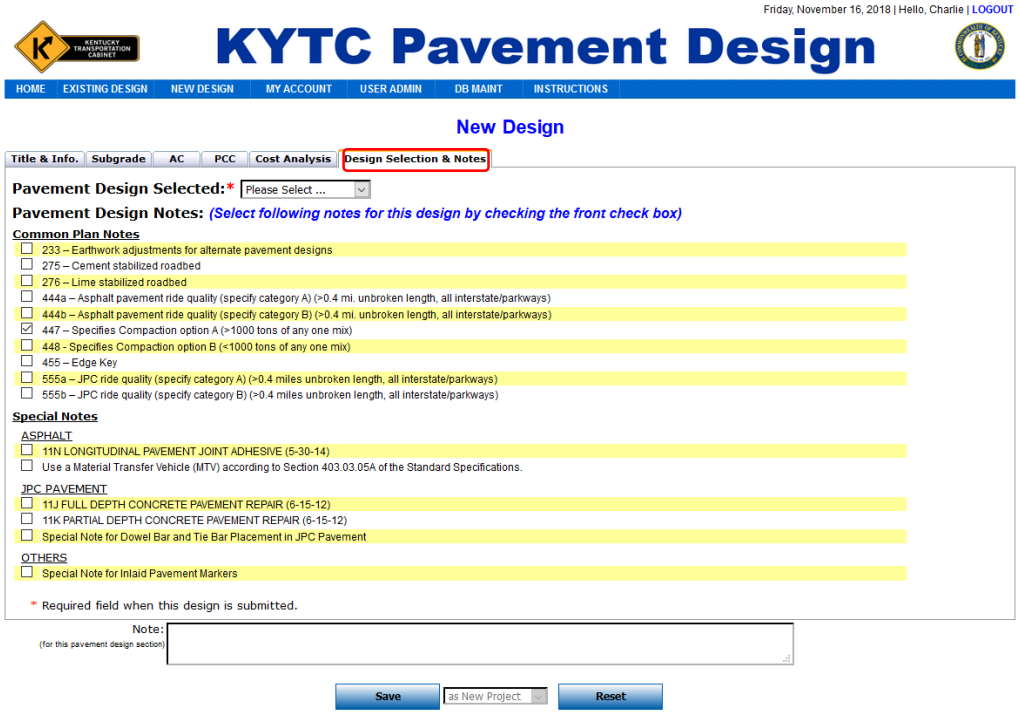


Figure 28. Screen for design selection and notes associated with this route section

4.5.7 Save Button

Clicking the **Save** button saves a pavement design after all required data have been entered. One more tab, one dropdown list, and three more buttons are brought up after the **Save** button is clicked (Figure 29). Users can upload attachments to the server by using functions on the **Attachments** tab. They can save the design ***as Update***, ***as New Section***, or ***as New Project*** by choosing the appropriate option in the dropdown list. Users can delete the current design by clicking **Delete**, submit designs by clicking **Submit**, and print out the Pavement Design Form by clicking **Print Design Form**.

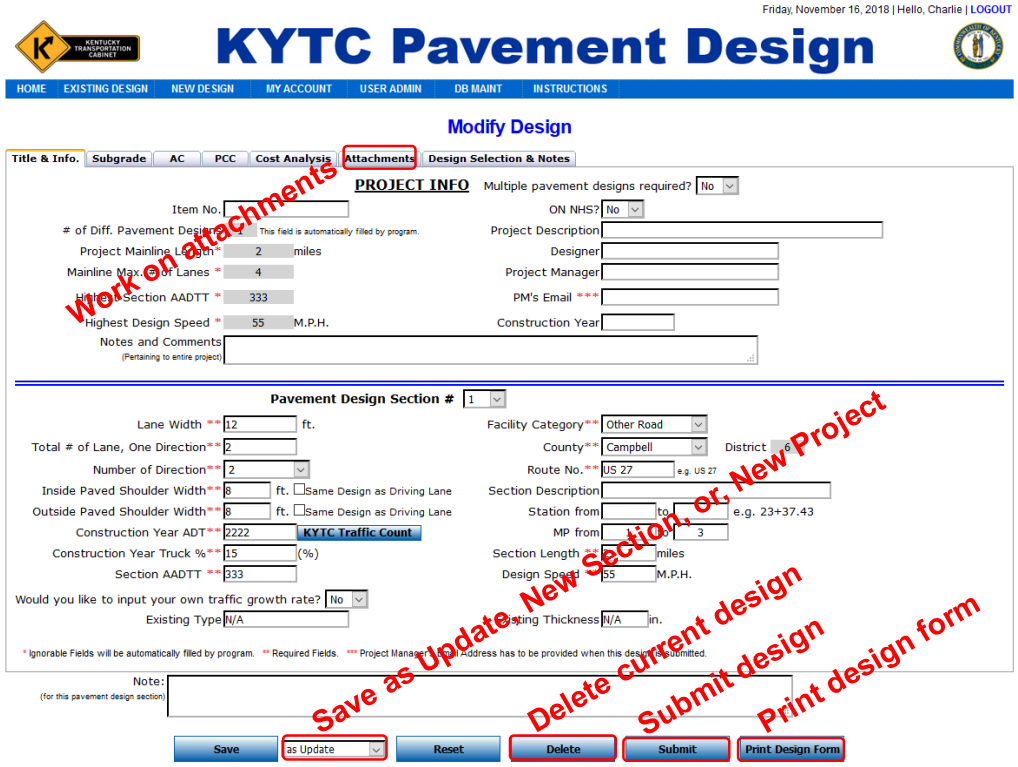


Figure 29. More functions show up after **Save** Button is clicked

4.5.8 Attachments – Uploading and managing Attachments

After saving a pavement design, designers can upload design attachments (e.g., pictures; PDF, .doc, or .zip files) using the page shown in Figure 30 and following these steps:

1. Click **Browse** to identify a file to upload.
2. Check the **Check Box** if the chosen file is to be viewed by registered users only.
3. Click **Upload** to send the selected file to the web application server.

If the designer overlooks Step 2 during the upload process, they can check the ***Registered User Only*** checkbox on the file list and click the **Update Attachments** Button to restrict the use of attachments after uploading.

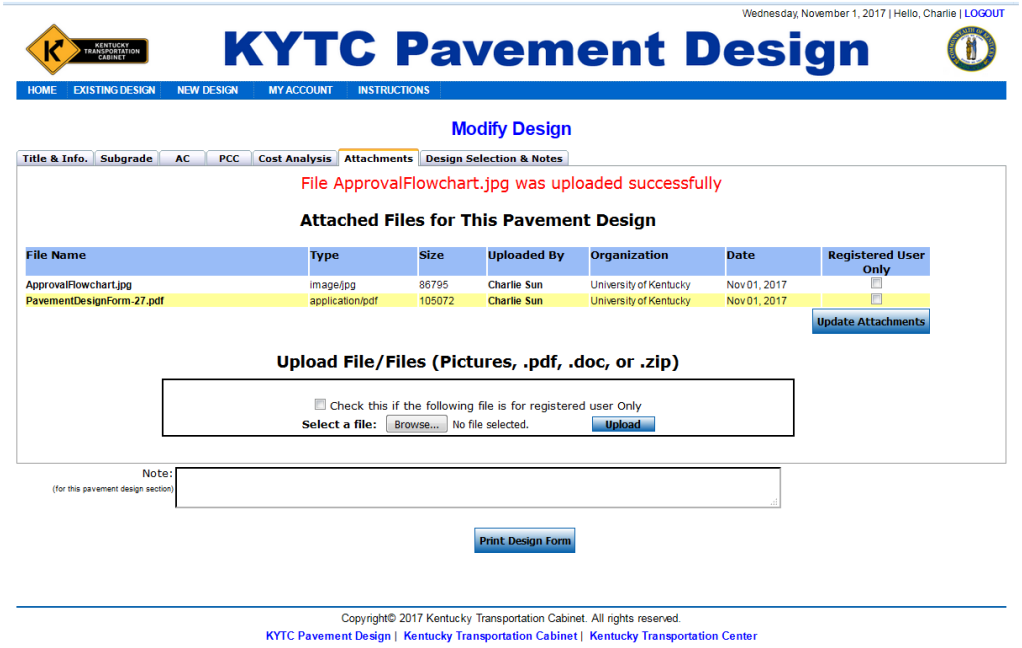


Figure 30. Upload and manage attachments under **Attachment** Tab

4.5.9 Save Option Dropdown List

The **Save Option Dropdown List** contains three save options — ***as Update***, ***as New Section***, and ***as New Project***. Save ***as New Section*** is a convenient operation when the user designs another section with some common data as current one in current project. The **PROJECT INFO** is updated after a new section is created. Similarly, save ***as New Project*** creates a new project when a user begins it with some common data as the current project.

4.5.10 View Different Section

Users can review different sections' information by choosing section number in the **Pavement Design Section #** dropdown list under **Title & Info.** Tab.

4.5.11 Reset Button

Clicking the **Reset** button starts a new **Pavement Design Section** portion if the current project has more than one section. This action initiates new portions for both **PROJECT INFO** and the **Pavement Design Section** if the current project only has one section design. In both cases, two tabs — **Title & Info** and **Subgrade** — remain after **Reset** button has been clicked. The remaining tabs disappear.

4.5.12 Delete Button

Clicking the **Delete** button deletes the current section information and moves it onto the next section if it is available. Or it moves it to the previous section if it exists. It begins a new design project if the project only has one section design available.

4.5.13 Submit Button

Users see an error message if they click the **Submit** button without providing the ***Project Manager's (PM) Email*** address. When users successfully submit their designs, emails with the **Pavement Design Form** attached as a PDF are sent to the **PM** and designer. A link to the web application is provided to the **PM**. The message "*Your pavement design has been successfully submitted. Thank you.*" appears onscreen. All the information for the current project is locked. No one can make changes.

4.5.14 Print Design Form Button

Clicking the **Print Design Form** button creates a PDF version of the **Pavement Design Form**. Users can save this file on their local hard drive or open it onscreen using software for viewing PDFs (e.g., Adobe Reader or Acrobat) and save it later. The printed form is identical to the form sent to **PM**.

4.5.15 Approval Tab

Once the user successfully submits a pavement design, the **Approval** tab appears (Figure 31). Summary information about the pavement design project appears under the **Approval** tab.

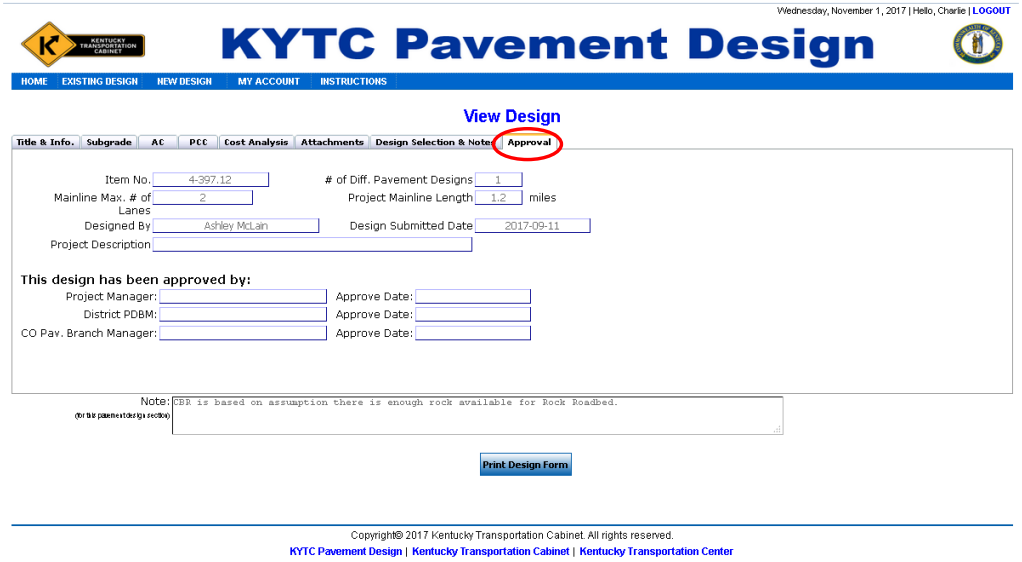


Figure 31. Approval Tab will show up after pavement design is successfully submitted

5. USER AS A PROJECT MANAGER

Any user currently registered on the web application can be designated a **Project Manager** (**PM**). A person assigned as a **PM** but who has not registered on the web application can also receive this designation. If a prospective **PM** has not registered, an email is sent to the web application administrator when a designer submits their pavement design, requesting the administrator assist with registration.

If the prospective **PM** is registered on the web application, refer following sections for details on usage and some important operations:

4.4 Starting Page after LOGIN

4.5 NEW DESIGN – Create and Submit a New Pavement Design

Upon logging in, if a pavement design is awaiting the **PM**'s approval, the **PM**'s Decision on the **Approval** tab will be active (Figure 32). When a **PM** decides whether to **Approve** or **Request Changes**, they fill out the corresponding information and name and click the **Submit** button. A PDF version of the **Pavement Design Form** is emailed to corresponding users.

If the **PM** approves the design, three emails with the **Pavement Design Form** attached in PDF format are sent out. The email recipients are 1) the corresponding District TEBM for Project Development, 2) the designer who submitted the design, and 3) the **PM** (for recordkeeping purposes). If the **PM** requests design changes, an email with suggestions is sent to designer. A copy of this email is sent to the **PM** for recordkeeping purposes.

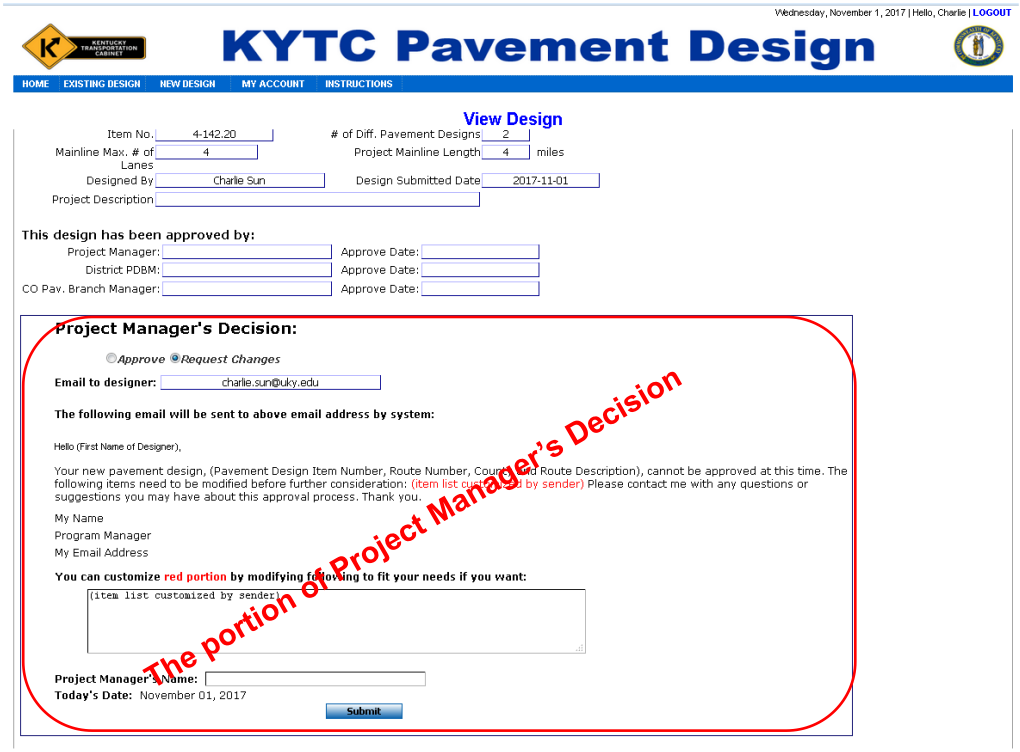


Figure 32. Project Manager submits her/his decision

6. USER AS A DISTRICT TEBM FOR PROJECT DEVELOPMENT

The **District TEBM for Project Development** is a designated user on the web application. There are 12 District TEBMs for Project Development throughout Kentucky. In addition to having all the privileges of users classified as **Designers**, the **District TEBM** can approve the design or request changes and modify the prices of bid items for their district. When the **District TEBM** logs in, an additional link appears in the **Header** section — **DB MAINT → Bid Items** (Figure 33). The **District TEBM** can refer following sections for details on use and some important operations:

4.4 Starting Page after LOGIN

4.5 NEW DESIGN – Create and Submit a New Pavement Design

Figure 33. Header settings for District TEBM for Project Development

6.1 APPROVE or REQUEST CHANGES – District TEBM's Decision

After a **District TEBM** logs in, if a pavement design in their district is awaiting approval, the portion of the **District Project Development Branch Manager's Decision** on the Approval tab will be activated (Figure 34). The **District TEBM** can decide to **Approve** or **Request Changes**. After deciding, they fill out the corresponding information, and click the **Submit** button. Emails with the **Pavement Design Form** attached in PDF format are then sent to corresponding users.

A pavement design project designated as "**On NHS,** or **AADTT** ≥ **1000,** or ≥ **5 Lane Miles**" requires approval from **Central Office TEBM Pavement**. In this scenario, after the **District TEBM** approves design, an email is sent to **Central Office TEBM Pavement**. Another email is sent to the **Program Manager**. A third email is sent to the **Designer** who submitted the project. A copy of the email goes to the **District TEBM** for recordkeeping purposes. All emails contain the **Pavement Design Form** attached in PDF format. If the pavement project is not designated as "**On NHS,** or **AADTT ≥ 1000,** or **≥ 5 Lane Miles**", the District TEBM's approval stands as the final decision.

If the **District TEBM** requests changes, separate emails with suggested revisions are sent to the **Program Manager** and **Designer** who submitted the project. A copy of the email is sent to the **District TEBM** for recordkeeping purposes.

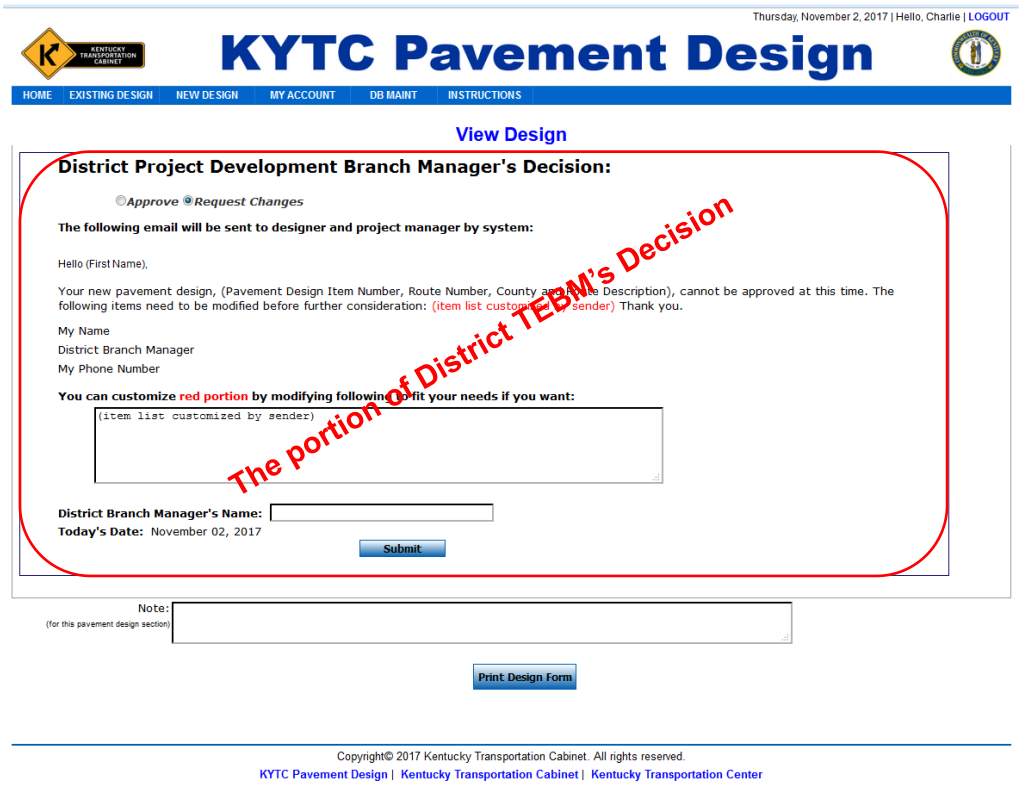


Figure 34. **District TEBM for Project Development** submits their decision

6.2 DB MAINT -- Database Maintenance on Bid Items for Their Own District

In addition to approving or requesting changes on **Program Manager**-submitted pavement design projects, the **District TEBM** can access the link in the **DB MAINT → Bid Items** for their district. Clicking this link takes the **District TEBM** to the **Database Maintenance** page. This page contains six categories of bid items — **Asphalt, Concrete, Stabilization, Aggregate, Drainage Blanket,** and **Fix Method** (Figure 35). Each category, when it is clicked, directs the **District TEBM** to a page that lets them modify existing bid items or add new bid items for their district.

To modify an existing bid item, the **District TEBM** clicks a bid item on the item list (Figure 36). Details for the bid item appear at the bottom detail area. Clicking the **Save to Database** button saves changes the **District TEBM** makes.

To add a new bid item, the **District TEBM** clicks the **Add New** button, types in detailed information for the item, and clicks the **Save to Database** button to save it in the current category.

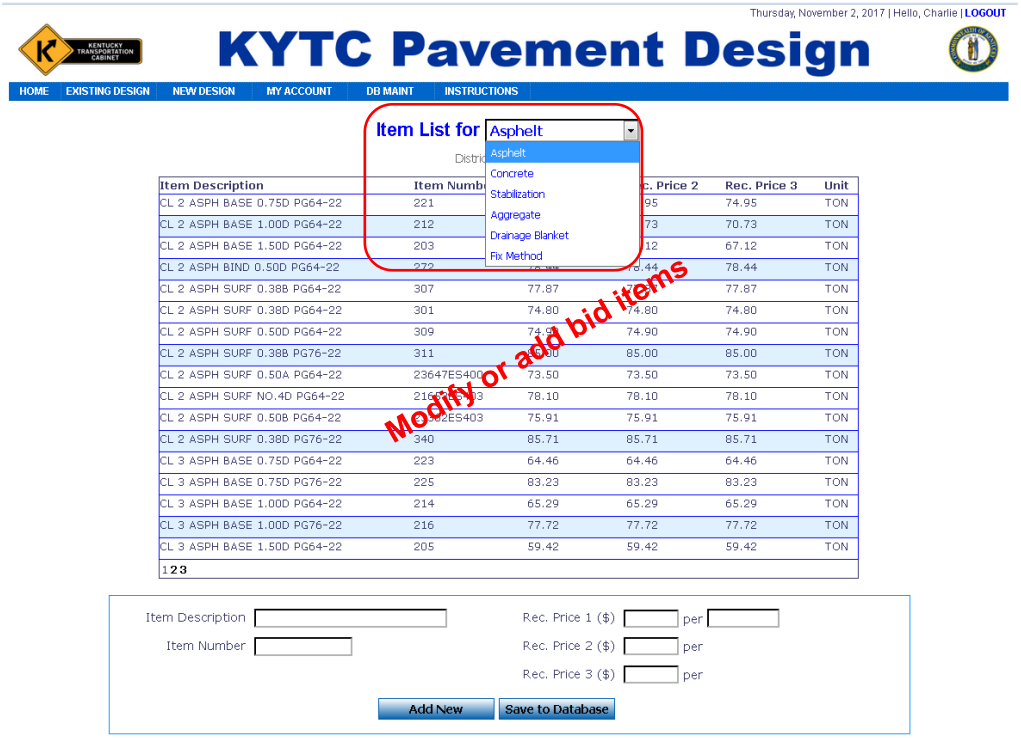


Figure 35. District TEBM has the ability to modify existing bid items or add new bid items for their own district

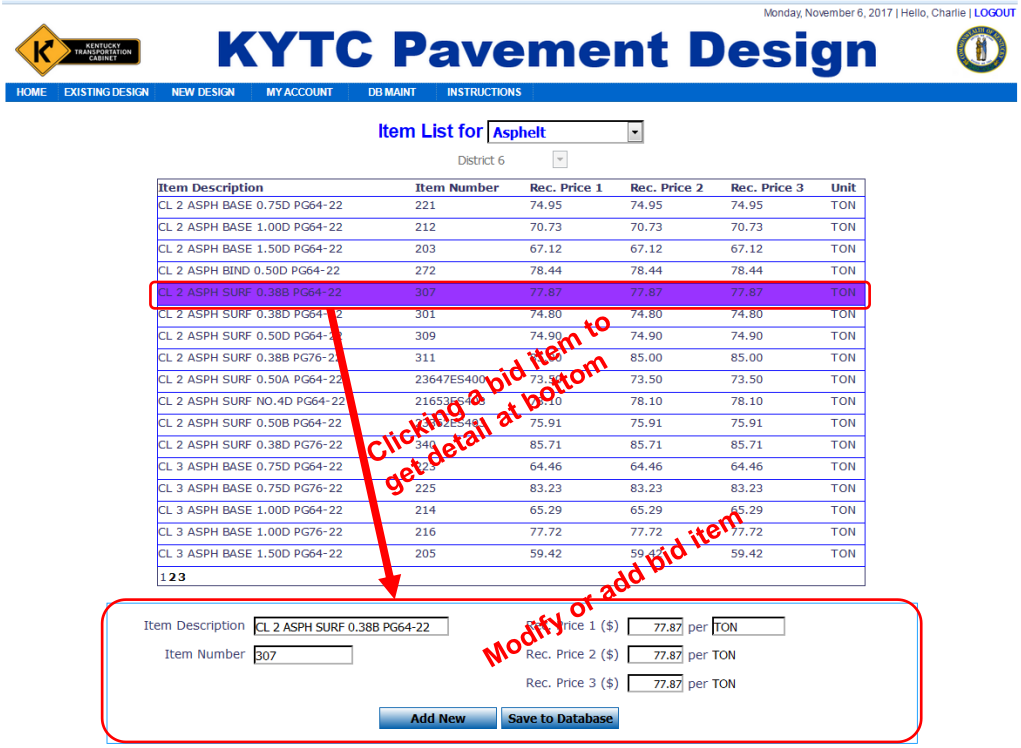


Figure 36. How to modify or add new bid items for their own district

7. USER AS A CENTRAL OFFICE TEBM PAVEMENT

The **Central Office TEBM Pavement** has the most user privileges in the web application. In addition to the links **Designers** can access, the **Central Office TEBM** sees the following links on the **Header** after logging in: **USER ADMIN → (User Admin, User List** and **Groups**) and **DB MAINT → Bid Items** (Figure 37). The **Central Office TEBM** has final authority to approve or request changes. **USER ADMIN → (User Admin, User List** and **Groups**) links to pages for maintaining all the information of registered users and groups; on these pages, new users can be added and information for existing users can be modified. **DB MAINT → Bid Items** links to a page on which bid items can be updated or added. A **Central Office TEBM** can modify existing bid items or add new bid items for all KYTC districts. On all pages listing existing pavement design projects, the **Central Office TEBM** can activate or archive projects. Attachments can be managed on the **Attachments** tab. To understand how to navigate privileges available to **Designers**, refer to the following sections:

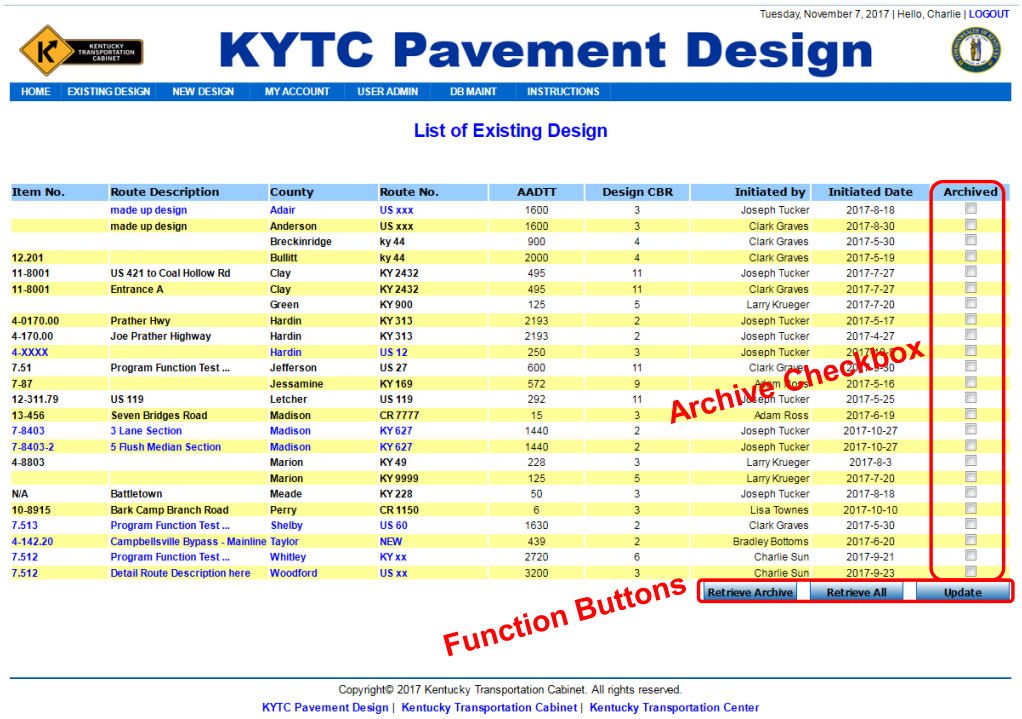
4.4 Starting Page after LOGIN

4.5 NEW DESIGN – Create and Submit a New Pavement Design

Figure 37. **Header** – after a **Central Office TEBM Pavement** logs in

7.1 Screen for Managing Existing Project List

On the page listing existing pavement design projects the **Central Office TEBM** can archive or activate a pavement design project by checking or unchecking the archive checkbox and clicking the **Update** Button (Figure 38). The **Central Office TEBM** can click on **Retrieve Archive** or **Retrieve All** to view different groups of pavement design projects.



Item No.	Route Description	County	Route No.	AADTT	Design CBR	Initiated by	Initiated Date	Archived
	made up design	Adair	US xxx	1600	3	Joseph Tucker	2017-8-18	
	made up design	Anderson	US xxx	1600	3	Clark Graves	2017-8-30	
		Breckinridge	ky 44	900	4	Clark Graves	2017-5-30	
12.201		Bullitt	ky 44	2000	4	Clark Graves	2017-5-19	
11-8001	US 421 to Coal Hollow Rd	Clay	KY 2432	495	11	Joseph Tucker	2017-7-27	
11-8001	Entrance A	Clay	KY 2432	495	11	Clark Graves	2017-7-27	
		Green	KY 900	125	5	Larry Krueger	2017-7-20	
4-0170.00	Prather Hwy	Hardin	KY 313	2193	2	Joseph Tucker	2017-5-17	
4-170.00	Joe Prather Highway	Hardin	KY 313	2193	2	Joseph Tucker	2017-4-27	
4-XXXX		Hardin	US 12	250	3	Joseph Tucker	2017-10-27	
7.51	Program Function Test ...	Jefferson	US 27	600	11	Clark Graves	2017-5-30	
7-87		Jessamine	KY 169	572	9	Adam Ross	2017-5-16	
12-311.79	US 119	Letcher	US 119	292	11	Joseph Tucker	2017-5-25	
13-456	Seven Bridges Road	Madison	CR 7777	15	3	Adam Ross	2017-6-19	
7-8403	3 Lane Section	Madison	KY 627	1440	2	Joseph Tucker	2017-10-27	
7-8403-2	5 Flush Median Section	Madison	KY 627	1440	2	Joseph Tucker	2017-10-27	
4-8803		Marion	KY 49	228	3	Larry Krueger	2017-8-3	
		Marion	KY 9999	125	5	Larry Krueger	2017-7-20	
N/A	Battletown	Meade	KY 228	50	3	Joseph Tucker	2017-8-18	
10-8915	Bark Camp Branch Road	Perry	CR 1150	6	3	Lisa Townes	2017-10-10	
7.513	Program Function Test ...	Shelby	US 60	1630	2	Clark Graves	2017-5-30	
4-142.20	Campbellsville Bypass - Mainline	Taylor	NEW	439	2	Bradley Bottoms	2017-6-20	
7.512	Program Function Test ...	Whitley	KY xx	2720	6	Charlie Sun	2017-9-21	
7.512	Detail Route Description here	Woodford	US xx	3200	3	Charlie Sun	2017-9-23	

Figure 38. Archive/active projects by a **Central Office TEBM**

7.2 Screen for Managing Attachments

The **Central Office TEBM** can review or download attachments that have been uploaded by the **Designer** on the **Pavement Design** page's **Attachment** tab. Following review, they can decide whether to delete the attachment by checking the appropriate box. They can also restrict access to registered users only. Once a **Central Office TEBM** has made their selection(s), they should click the **Update Attachments** button (Figure 39).

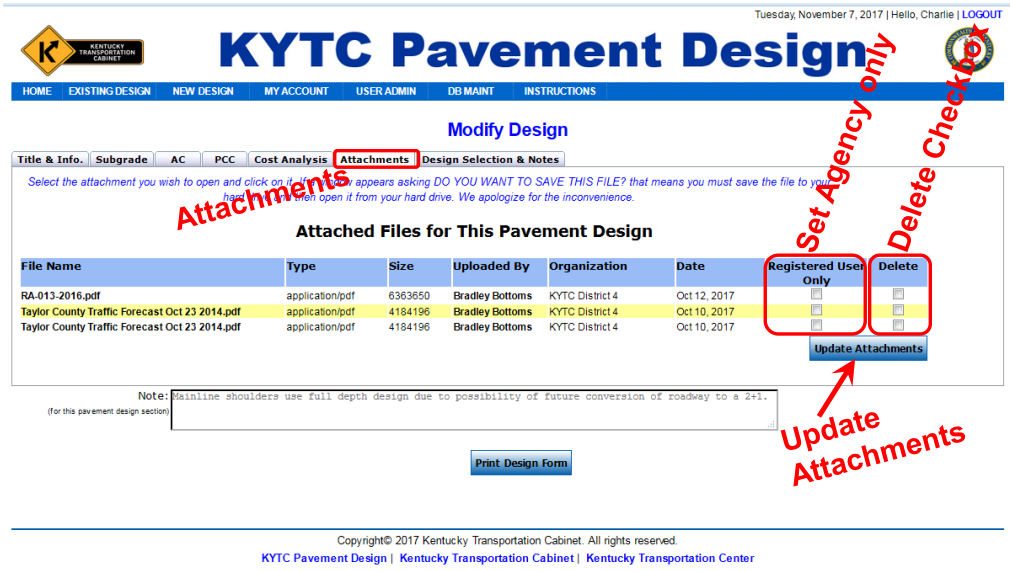


Figure 39. Manage attachments by **Central Office TEBM**

7.3 Approve or Request Changes – Central Office TEBM's Decision

After the **Central Office TEBM** logs in, if a Pavement Design Project already approved by a **District TEBM** is awaiting their approval, the portion of **Central Office Pavement Branch Manager's Decision** under **Approval** tab will be active (Figure 40). After deciding to **Approve** or **Request Changes**, the **Central Office TEBM** fills out the corresponding information and clicks the **Submit** button. Once submitted, individual emails containing the **Pavement Design Form** in PDF format are sent to the **District TEBM**, **PM**, and **Designer** who submitted the design. A copy of this email is sent to the **Central Office TEBM** for recordkeeping purposes.

If the **Central Office TEBM** requests changes, emails which include the suggestions or modifications for further consideration are sent to the **District TEBM**, **PM**, and **Designer**.

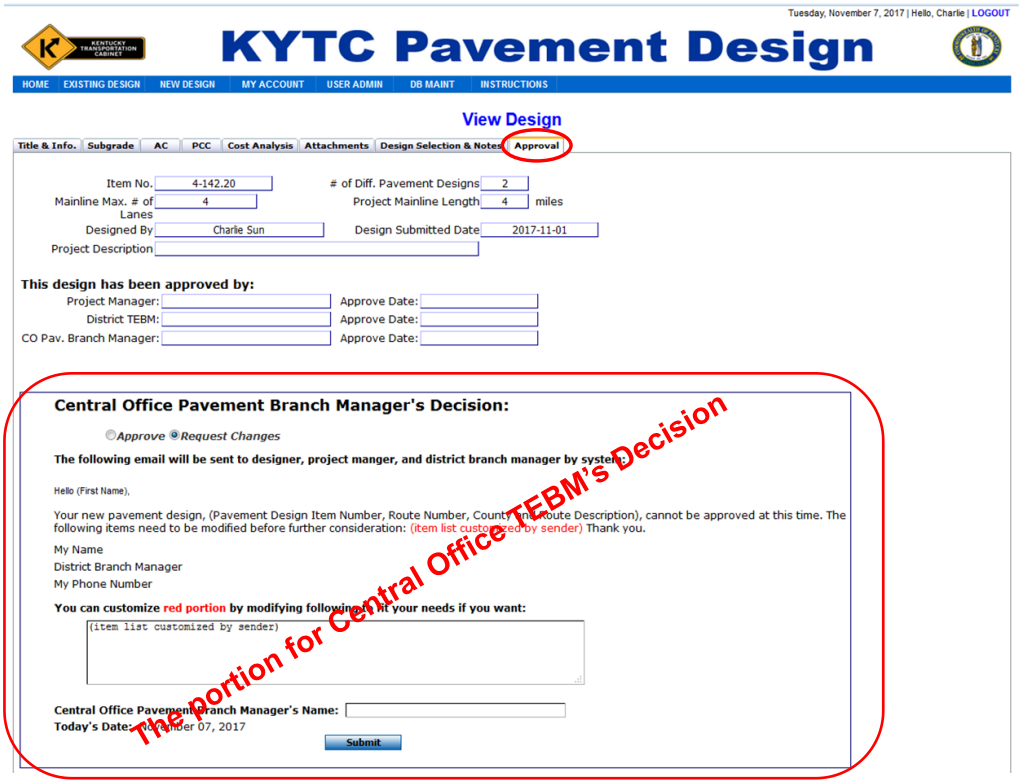


Figure 40. **Central Office TEBM** submits their decision

7.4 USER ADMIN – User Administration

In the **Header** section, the **Central Office TEBM** has access to **USER ADMIN → User Admin**. Clicking on this link brings up the **User Administration** page. This page contains three tabs — **Pending Designer**, **All Existing Users**, and **Add New User**. Figure 41 displays the **Pending Designer** tab, which lets the **Central Office TEBM** approve or delete pending requests for **Designer** users by clicking the corresponding buttons.

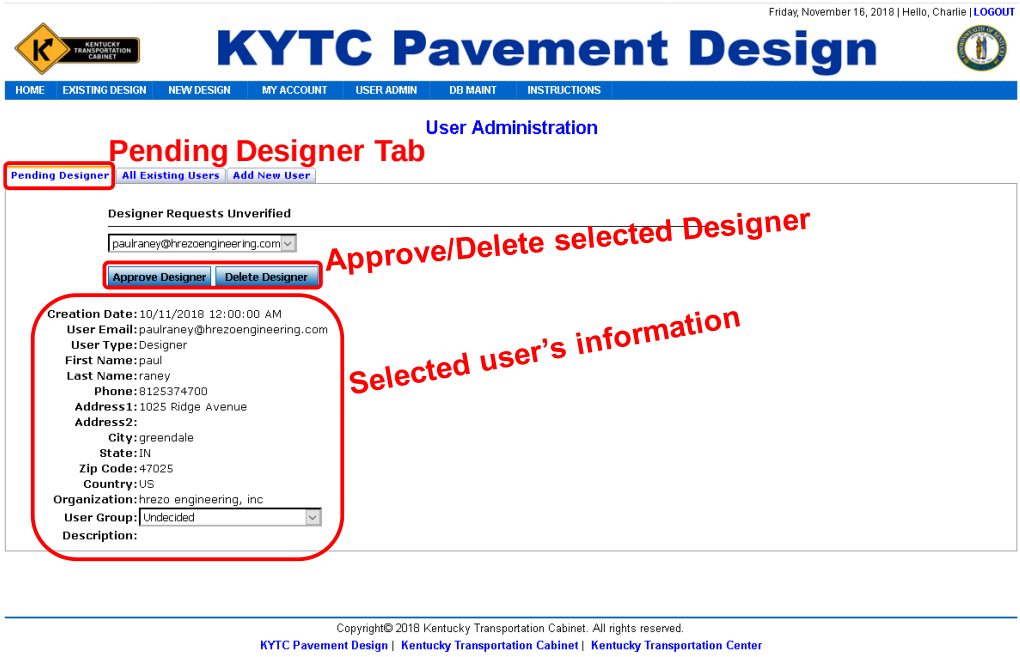


Figure 41. **User Administration** page with **Designer** in pending

7.4.1 Pending Designer -- Approve/Reject Pending Designer

The area on this tab depend on whether **Designer** requests are pending. These situations arise only when a user has registered on web application management system but not activated their account yet. If there are users who have not activated their accounts, dropdown lists appear. When the dropdown list under **Designer Requests Unverified** is clicked and a user is selected, the user information appears as seen in Figure 41.

The **Central Office TEBM** may approve a **Designer**'s request by clicking the **Approve Designer** button. They can reject or delete a request by clicking the **Delete Designer** button. If a **Designer** is approved, the web application management system sends an email to the **Designer** notifying them of the approval. If there are no requests pending, "No Approval pending" appears under **Designer Requests Unverified**.

7.4.2 All Existing Users -- Maintain All Registered User's Information

A second tab — **All Existing Users** — provides the **Central Office TEBM** with a dropdown list of all existing registered users. When a user is selected from the dropdown

list, their personal information appears beneath the dropdown list, which the **Central Office TEBM** can modify (Figure 42). The **Central Office TEBM** can save changes to a user's profile by clicking the **Update** button; change their status by clicking the **Change Status** button; or reset their password by clicking the **Reset Password** button. Clicking the **Reset Password** sends the selected user an email with a new password automatically generated by the system.

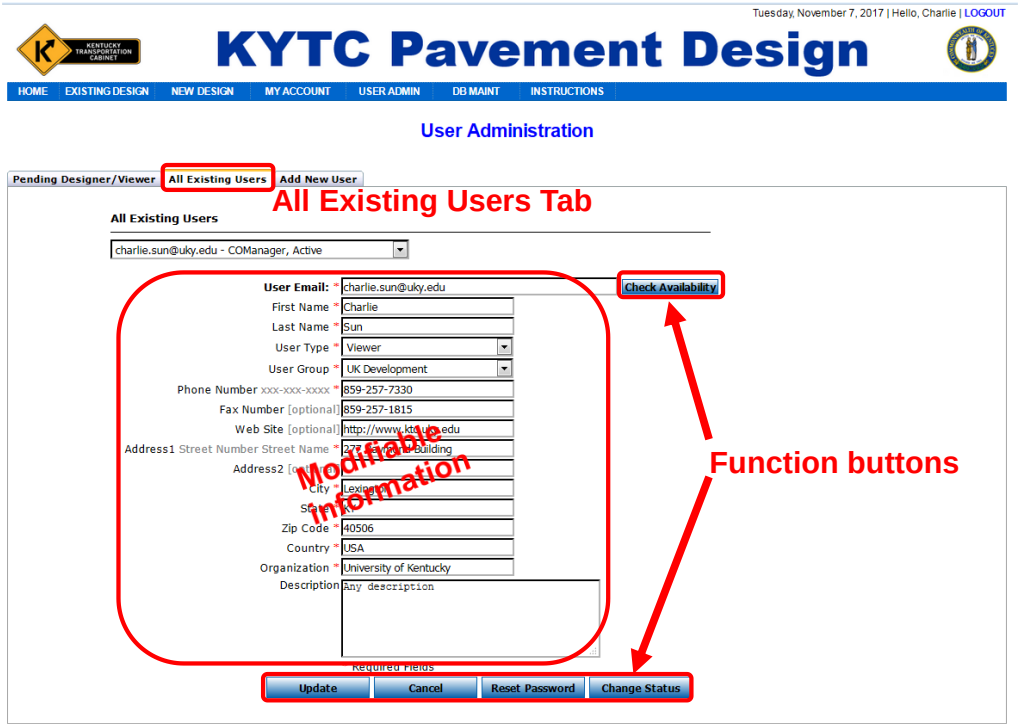


Figure 42. User info appears when user is selected on **All Existing Users** tab

7.4.3 Add New User -- Add/Invite New User

Clicking the **Add New User** button lets the **Central Office TEBM** register and activate a new user on their behalf (Figure 43). This user does not need to activate their account and can directly login to the web application management system via the **LOGIN** link. This page looks nearly identical to the **Registration** page seen in Figure 3 except the **Central Office TEBM** can select **User Type** and **Group** for the invited user. No activation from user's side is needed. After clicking **Register**, the web application management system instantly sends an email to the invited user that includes the **LOGIN** link.

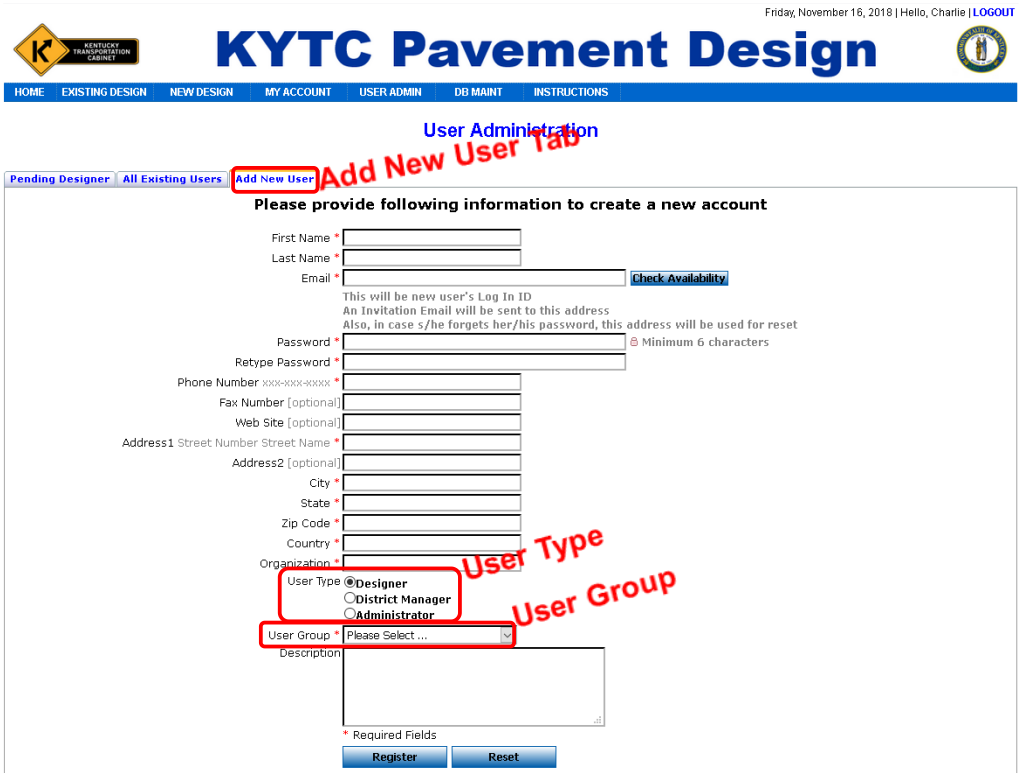


Figure 43. **Add New User** tab lets **Central Office TEBM** to add/invite new users

7.5 USER List

The **Central Office TEBM** has access to the **USER ADMIN → User List** link in the **Header**. Clicking this link takes the **Central Office TEBM** to the **User List** page (Figure 44). On this page, the **Central Office TEBM** can search users by using any string included in any fields. All titles of columns function like "**sort by**" key when any title is clicked. The **Central Office TEBM** can copy users' email addresses by selecting the checkboxes in the front of users and clicking the button of **Copy Selected Email Addresses**. They can go to user detail page and modify their data by clicking on a user.

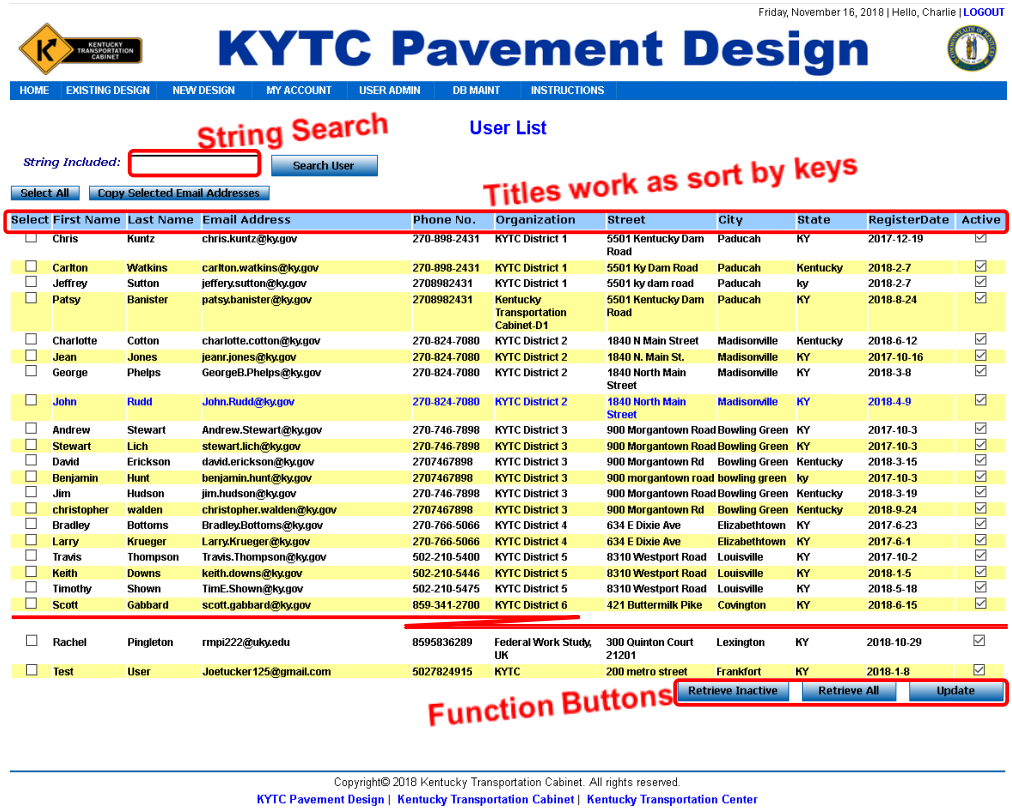


Figure 44. **USER ADMIN → User List** page provides CO TEBM an interface maintaining user information and copy user email addresses

7.6 GROUP ADMIN – Group Administration

The **Central Office TEBM** has access to the **USER ADMIN → Groups** link in the **Header**. Clicking this link takes the **Central Office TEBM** to the **Group Administration** page (Figure 45). On this page, the **Central Office TEBM** can modify existing groups' information and add new groups.

Figure 45. **USER ADMIN → Groups** page provides CO TEBM an interface maintaining group information

7.7 DB MAINT -- Database Maintenance

In addition to **USER ADMIN**, the **Central Office TEBM** can access the link in the **DB MAINT → Bid Items** for all 12 KYTC districts. Clicking this link brings the **Central Office TEBM** to the **Database Maintenance** page. Unlike the page for the **District TEBM**, bid items for Central Office and the 12 districts are accessible for the **Central Office TEBM** on this page (Figure 46). It has the same layout as the one for the **District TEBM**; there are six categories of bid items — **Asphalt, Concrete, Stabilization, Aggregate, Drainage Blanket,** and **Fix Method**. Each category, when clicked, loads a page where the **Central Office TEBM** can modify existing bid items or add new bid items for all the state.

Figure 46. **DB MAINT --> Bid Items** page provides CO TEBM an interface maintaining bid items for all the state

To modify an existing bid item, the **Central Office TEBM** clicks a bid item on the item list (Figure 46). The details for the bid item then appear at the bottom of the detail area. Clicking **Save to Database** button saves the changes if the **Central Office TEBM** makes any.

To add a new bid item, the **Central Office TEBM** must first select an item category from **Item List**. Next, click the **Add New** button and input detailed information for the new bid item. Lastly, clicking **Save to Database** button saves the new item in the current selected category. If any item needs to be added to all 12 districts, ***Central Office*** should be picked in second dropdown list. This adds the new bid item to the 12 districts at same time.

8. USER AS AN ADMINISTRATOR

An **Administrator** is an assistant to the **Central Office TEBM** in the web application. The **Administrator** can perform all functions available to the **Central Office TEBM** except approving pavement design projects.

9. LOGOUT

The **LOGOUT** link appears in the upper right corner of every page of the web application. When a user clicks a **LOGOUT** link, the system deletes all session variables and a fresh session begins. The user is then redirected to the original **HOME** page. To reenter the site, the user must click the **LOGIN** link in the upper right corner of the page and enter their **Email Address** and **Password**.

If you have questions or need assistance with the KYTC Pavement Design web application, please contact:

Joseph Tucker, Email: Joseph.Tucker@ky.gov; Phone: (502) 564-3280

Charlie Sun, Email: charlie.sun@uky.edu; Phone: 859-257-7330