EconWorks
Improved Economic Insight

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EconWorks Users Guide

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AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AASHTO

SHRP2 SOLUTIONS
TOOLS FOR THE ROAD AHEAD

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PREFACE

P1. Project Products and Reports

This document is one of a series of technical products from SHRP2 Project C03, *Interactions between Transportation Capacity, Economic Systems, and Land Use.*

As of June 2015, the original web tool Transportation Project Impact Case Studies (TPICS) was rebranded into the web tool EconWorks. To provide guidance on the new web tool format, this user guide has been updated to reflect the new changes, although other resources documents may still refer to the original TPICS web tool.

EconWorks Web Tool. One of the products is a web-based database tool that contains 132 case studies: 100 original case studies, 5 added in 2014, 7 added in 2016, and 20 added in 2017. These cases include the economic and development impacts of highway and transit projects, along with analysis tools for screening, viewing and analyzing them. The web site can be accessed via the EconWorks web site sponsored by the:

- American Association of State Highway and Transportation Officials (AASHTO) found at: https://planningtools.transportation.org/13/econworks.html

Technical Documents. The project also produced a series of technical reports, which can all be viewed and downloaded from the EconWorks web page by selecting the Research Reports button under the Project Tools category within the green banner on top. These reports include:

Case Study Analysis

- EconWorks Users Guide (current document)
- Handbook for Practitioners: Description and Interpretation of Case Studies
- Case Study Design and Development
- Data Dictionary

Research Methods and Findings

- Economic Impact Data Analysis Findings
- Highway Economic Impact Case Study Database Analysis Findings
- SHRP2 C03 Final Report (TRB format)

P2. Acknowledgements

Contract. This project was conducted under a contract from the National Academy of Sciences and Engineering, through the Strategic Highway Research Program II (Capacity Program, Project C03), to Economic Development Research Group, Inc.

Supervision. The project was undertaken with oversight from staff of the Strategic Highway Research Program, with direction from Stephen Andrle and David Plazak. The project benefitted from review provided by Oversight Panel of the SHRP2 Capacity Program.

Contractors. The case studies and technical reviews were conducted by a team comprised of Economic Development Research Group and subcontractors: Cambridge Systematics, Wilbur Smith Associates, Texas Transportation Institute (TTI) and Susan Jones Moses & Associates.

The original TPICS (Transportation Project Impact Case Studies) data base and web tool were designed and developed by Economic Development Research Group and implemented by ICF Consulting.

The EconWorks web tool was designed and developed by CH2MHill and will be managed by AASHTO.

1 INTRODUCTION

1.1 Project Background and Overview

The Strategic Highway Research Program II (SHRP2), Capacity Project C03 was entitled: *Interactions between Transportation Capacity, Economic Systems, and Land Use*. This project produced a series of reports on methods, models and case studies that examined the economic and development impacts of highway capacity investments projects. This report is one volume in that series.

Project Objective. The intent of this project and its research products and web tool is to further public and transportation agency understanding of the range of economic impacts that occur from various types of highway projects. This information can aid both technical research and public discussion of the topic. It can also help define the broad range of impacts and factors affecting them, to assist transportation agencies in their planning processes. And it can help refine public debate about highway projects by establishing boundaries of the likely positive and negative impacts that typically occur from such projects.

The products of this study were designed to help the collaborative decision-making process for transportation planning, by providing a background context on the range of observed results from past highway projects. Such information can potentially be of substantial use in early stages of the planning process, in which alternative project concepts are being suggested and screened.

Of course, one cannot assume that every proposed project will have the same results as the average observed from past projects of a similar type that were previously implemented elsewhere. That is precisely why local data is collected and models are applied developed in later stages of the planning process, to identify expected changes in local traffic characteristics and subsequent economic development. Thus, this project should be viewed as a complement and not a replacement for local-specific transportation and economic impact analysis that may be necessary in later phases of the planning process.

Case Study Database. The most notable accomplishment of this project was the development of 100 original highway, freight, and transit-oriented case studies, with 32 additional cases added which (a) compared pre-project and post-project changes in economic and land development conditions, (b) contrasted them with corresponding conditions for a base of comparison, and (c) included both quantitative impact measures and qualitative assessments based on local interviews.

This collection of case studies, completed in 2010, 2014, 2016, and 2017, was compiled with the goal of including all known pre-post highway impact studies in the US, plus available English language studies from Canada and abroad. Members of the project team then conducted

additional quantitative and qualitative data collection and analysis to bring all the cases up to a similar standard of comparability. (For further information on the case study development process, readers are referred to report entitled *Case Study Design and Development*, which can be accessed as described in the Preface.)

EconWorks Web Tool. The case studies were put into a web-based viewing and analysis system called "EconWorks." This system includes: (a) a *case study search function* that allows for user-defined screening and selection of relevant cases, (b) a *case study viewer* that provides user access to impact measures, discussion text, maps and related documents, and (c) an *impact estimation calculator* that shows the average and expected range of impact associated with any user-defined project profile. In addition, the web tool provides access to d) *Wider Economic Benefit (W.E.B.) Analysis tools (SHRP2 C11)* for evaluating Accessibility, Connectivity, and Reliability.

The EconWorks system was designed to assist transportation agencies in project planning and evaluation, by providing agency staff and interested stakeholders with a means for establishing the range of job, income and development impacts typically associated with various types of transportation projects in different settings.

1.2 Objective of the EconWorks Web Tool

The EconWorks web tool was designed for the user to do the following:

- Review, select, and analyze case studies based on criteria selection
- Understand the relationship between project characteristics and economic impacts
- Compare and evaluate projects by specified criteria
- Develop a range of anticipated impacts for your customized project

The tool's user interface is structured around two different approaches to analyzing projects, which are outlined on the next page:

- **Case Study Search—**which accesses the database of case studies of highway and transit projects, allowing the user to:

  1) Filter the cases they want to see based on many factors (type, region, cost, etc).

  2) Select cases to view separately or compare based on the user's criteria.

  3) View pre and post conditions, project area settings, project characteristics, AADT, cargo or passenger volume (if applicable) and economic impacts for each case.

  4) Read a short narrative on the case that provides background on how the project came to be built, its influence on the local area, and other non-transportation factors that enhanced or mitigated the economic impacts of the project.

  5) View a google map image of where the project is located.

- **Assess My Project—**which provides an estimate of economic impacts for a

hypothetical project based on:

1) The type, length, and setting of the project chosen by the user.
2) The magnitude of AADT (Average Annual Daily Traffic), miles, and project cost—which are all estimated based on the type, length, and setting but can be changed by the user.
3) The extent to which there is supporting business climate, infrastructure, and land-use policies to encourage economic development.

- **Analysis Tools—**includes five tools to help practitioners use economic analysis in project decision making. These tools are designed to fill the gap between the screening stage where the Case Studies may be useful and later stages where agencies may employ detailed economic models. The analysis tools include:
  1) Accessibility: tools designed to explain the benefits and impacts of a project to the labor and buyer-supplier markets.
  2) Reliability: tool designed to explain the benefits and impacts of projects designed to improve system reliability (e.g., ITS projects).
  3) Connectivity: tool designed to explain the benefits and impacts of improved intermodal connectivity.
  4) Accounting Framework: provides a place to assemble the results for all three tools along more traditional benefit categories.

The rest of this document is an instruction manual that explains the logic of the EconWorks web tool and how the system should be used. A separate document, entitled *Handbook for Practitioners*, provides further guidance on the interpretation of EconWorks results.

2 INSTRUCTIONS FOR USING THE ECONWORKS ONLINE DATABASE AND PROJECT TOOL

2.1 Home Page

To access the EconWorks website, the user should type the EconWorks website URL directly into the web browser (https://planningtools.transportation.org/13/econworks.html). Figure 1 shows how the EconWorks home page appears. From the homepage, the user can navigate to other sections of the EconWorks website using the green menu bar on the top of the webpage and the Resources links at the bottom of the webpage.

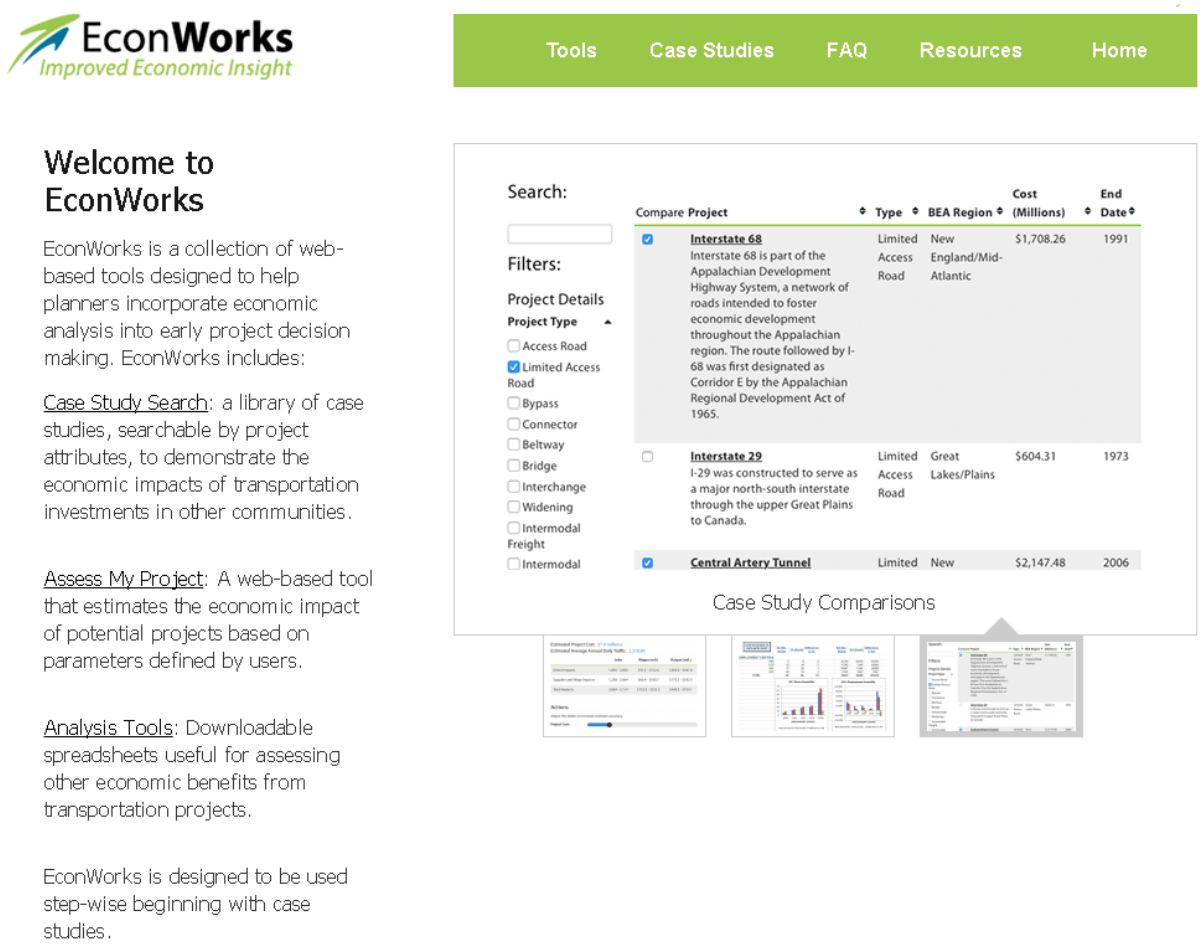


Figure 1: EconWorks Home Page

The menu item 1) "Tools" has six subcategories: A) Case Study Search, B) Assess My Project, C) Analysis Tools, D) Economic Analysis Training, E) Research Reports, and F) 2017 Webinar Series. "Case Study Search" should be selected if the user wants to view case studies of actual projects which have been completed and subsequently researched through ex post analysis. "Assess My Project" should be selected if the user hopes to estimate by analogy the impacts of a hypothetical project based on the cases in the database. To access the Wider Economic Benefits (W.E.B) tools then the user selects "Analysis Tools". Economic Analysis Training link provides access to a course on how to apply economic analysis in the transportation planning process. The Research Reports page provides a list of linked reference documents, reports, and presentations. The 2017 Webinar series page provides a brief summary of each webinar and if applicable, a PDF of the presentation slides.

The other four menu items are: 2) Case Studies, 3) FAQ (Frequently Asked Questions) 4) Resources, and 5) Home. Selecting "Case Studies" provides access to the page where new case studies are entered into the website and the link below "Case Study Development Training" provides access to 13 training modules that guides users on how to develop new case studies. Frequently Asked Questions ("FAQ"), provides a list of questions commonly asked about EconWorks and its content. Clinking on "Resources" provides the user access to on-line training and a variety of documents, reports, and brochures. Clicking on "Home" will lead the user to the SHRP2 Planning Tools main webpage (e.g. PlanWorks, Travel Works, and EconWorks).

First, we will walk through the **Case Study Search** option. In this section of the EconWorks Website, the user selects a series of project characteristics and parameters. EconWorks then provides a list of project cases that meet the selected criteria for the user to explore.

2.2 Tools

2.2.1 Case Study Search Page

On the Case Study Search webpage (see Figure 2), the user can search for case studies using specific words or filtering for project characteristics. The user can also select case studies to read or multiple ones to compare, as well as print and export the results of their query.

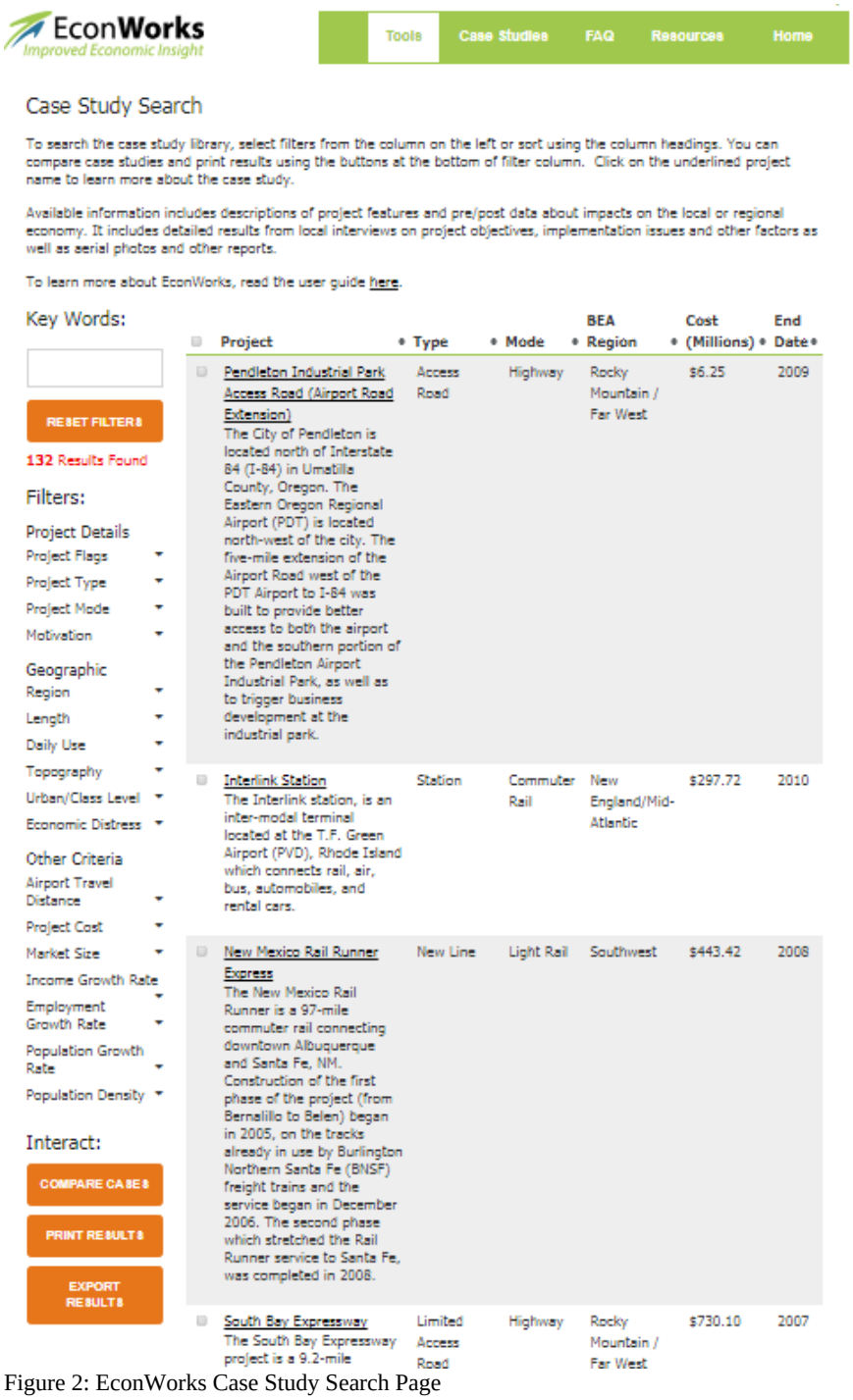


Figure 2: EconWorks Case Study Search Page

Search Box and Filters

There are two, non-exclusive ways for a user to search for a project. The user can search for words or phrases in the search box. This option will find words in the title or summary description of the case study. Users can also search for a wide range of projects by using the filters. These filters have been organized into 3 main groups: Project Details, Geographic, and Other Criteria. As the user filters the results, the number of cases shown will decrease. To reset the filters and view the complete list (or reselect filters), click on the "Reset Filters" button.

Below, we explain what is in each of these filter groups—including definitions.

Project Details

Project Flags: This category allows the user to filter any project classified as "intermodal" for highway-based multi-modal freight or transit-oriented projects.

Project Type: This category allows the user to filter for all the case studies project types they desire to view. The types of projects include: Access Road, Limited Access Road, Bypass, Connector, Beltway, Bridge, Interchange, Widening, Freight Terminal, Station, Service Improvement, Line Extension, and New Line.

Project Mode: This category allows the user to select highway only projects or one of 4 different types of transit projects (Bus Rapid Transit, Light Rail, Heavy Rail, and Commuter Rail).

Motivation: This category describes nine different reasons for which the project was built, such as: air access, rail access, border access, marine port access, site development, labor market, delivery market, tourism, and congestion mitigation / air quality. Note that a project can have multiple motivations.

Geographic

Region: There are six geographic regions where the case studies were located which are based on BEA (Bureau of Economic Analysis) defined regions.

Length: This criterion describes the distance (in miles) of the project. A user can use either the sliders or manually type in the range of project length—ranging from 0 to 325 miles.

Daily Use: Average Annual Daily Traffic (AADT) or Weekday Riders counts for the project. The user can use either the sliders or manually type in the range of values - ranging from 0 to 500,000.

Topography: This criterion measures the type of terrain within the case study. The user can use either the sliders or manually type in the range of Topography—ranging from 1 (Flat) to 21 (Mountainous).

Urban/Class level: Based on US Census classifications by county, this criterion defines if a project is located in Metropolitan (Metro), Rural, Mixed (both), or Core (Transit) environment.

A user can select one of these classifications by checking the appropriate checkbox.

Economic distress: Here the user can choose to select or not select case studies where the local/regional unemployment levels are higher than the national average ("distressed") or lower ("non-distressed").

Other Criteria

Airport Travel Distance: This metric describes (in miles) the distance required to travel to the nearest commercial airport. The user can use either the sliders or manually type in the range of miles—ranging from 0 to 143 miles.

Project Cost: The cost of a project is measured in 2013$'s dollars and is periodically updated to the most recent year of expenditure (YOE).

The user can use either the sliders or manually type in the dollar ranges—from $0 to greater than $1B

Market Size: This measure describes (in thousands) the size of the population within a 40-minute drive time of the study area (a proxy for a labor market area), ranging from 0 to 12,703 (12.7 million). The user can use either the sliders or manually type in their range.

Income Growth Rate: Based on the case studies in the database, this describes the percentage growth (or decline) of average incomes in the study region from 2001 to 2006. For all case studies added in 2014 and after, these growth rates are calculated using data from six years prior to the project construction year and the pre-construction year. The user can use either the sliders or manually type in their range.

Employment Growth Rate: This describes the percentage growth (or decline) of employment in the study region from 2001 to 2006. For all case studies added in 2014 and after, these growth rates are calculated using data from six years prior to the project construction year and the pre-construction year. The user can use either the sliders or manually type in their range.

Population Growth Rate: This describes the percentage growth (or decline) of the population in the study region from 2001 to 2006. For all case studies added in 2014 and after, these growth rates are calculated using data from six years prior to the project construction year and the pre-construction year. The user can use either the sliders or manually type in their range.

Population Density: Defines the population per square mile which ranges from 0 to 16,200. The user can use either the sliders or manually type in their range.

Case Study Search Results

Once the user has filtered for their project criteria, a list of projects in table format will remain based on the parameters that were chosen. At this point, the use has several options to analyze the cases:

1. **Sorting by Case Study category description—**EconWorks allows users to sort each case by clicking on the category description headers. Cases can be sorted by project

title, project type, mode, BEA region, project cost, and year of completion.

2. **Compare Cases—**In order to compare cases, select the boxes in the upper left-hand corner of the project summary next to the project title for the cases to be compared, and then select the **"Compare Projects"** button under the title "Interact" on the lower left side of the screen.

3. **View Case—**To view a specific individual case, select the **linked name of the case under the "Project"** column.

Other options on this screen include:

- **Export Results -** This feature allows the user to export the project case studies captured by the criteria that was selected for the search results as a Microsoft Comma Separated Values Files (CSV).
- **Print Results -** This option prints out the project information listed on this page after setting the search parameters in the filters.
- **Reset Filters -** If changes to the search criteria are required, clicking on the link in the upper left resets all the filters.

Comparing Case Results

After selecting the two or more projects under the **"Compare"** column and selecting the **"Compare Projects"** button, the user will see a screen like the one shown in Figure 3. This view provides an example of the economic impact categories and provides a high-level comparison between the selected projects. This sortable summary view gives the user a better idea of which cases should be examined in more depth.

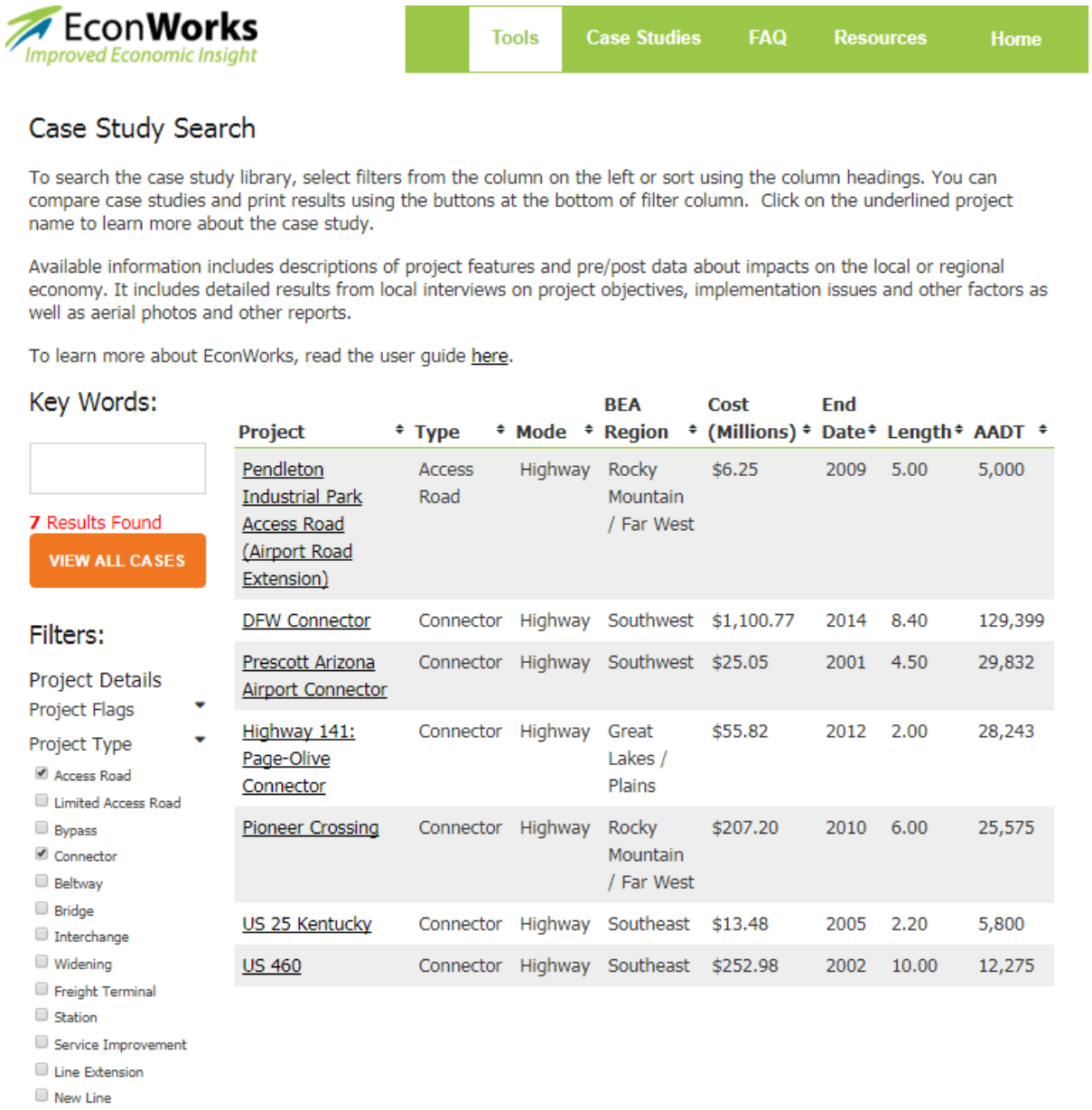


Figure 3: Case Study Search—Compare Projects Page

Viewing a Case

To view a specific case, simply click on the Case Study name under the "Project" column, and you will be redirected to the individual case study page (Figure 4). This screen provides all available information regarding the case study, sorted by category. If at any point the user wishes to return to the case study search page, this is done by simply returning to the previous page in your browser (using the arrow). Also, if the user desires to print the information on the individual case study, this can be done by pressing the "Print Case Study" button.

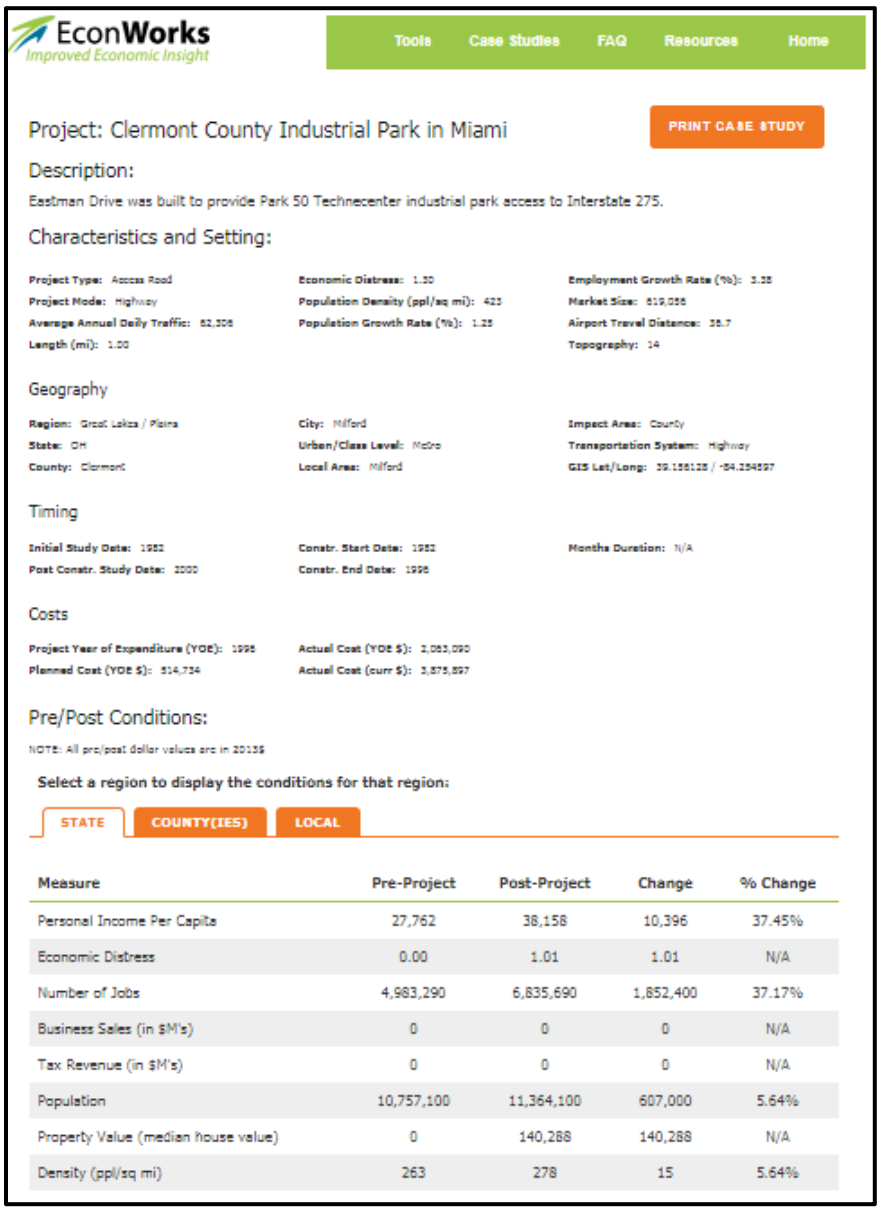


Figure 4: Case Study Search—Individual Case Study Page

Characteristics and Setting

After a short description of the project, the first section of the Case Study Page is labeled "Characteristics and Setting". It provides a summary of the search parameters with a few additional points of data about the project (geography, timing, and costs).

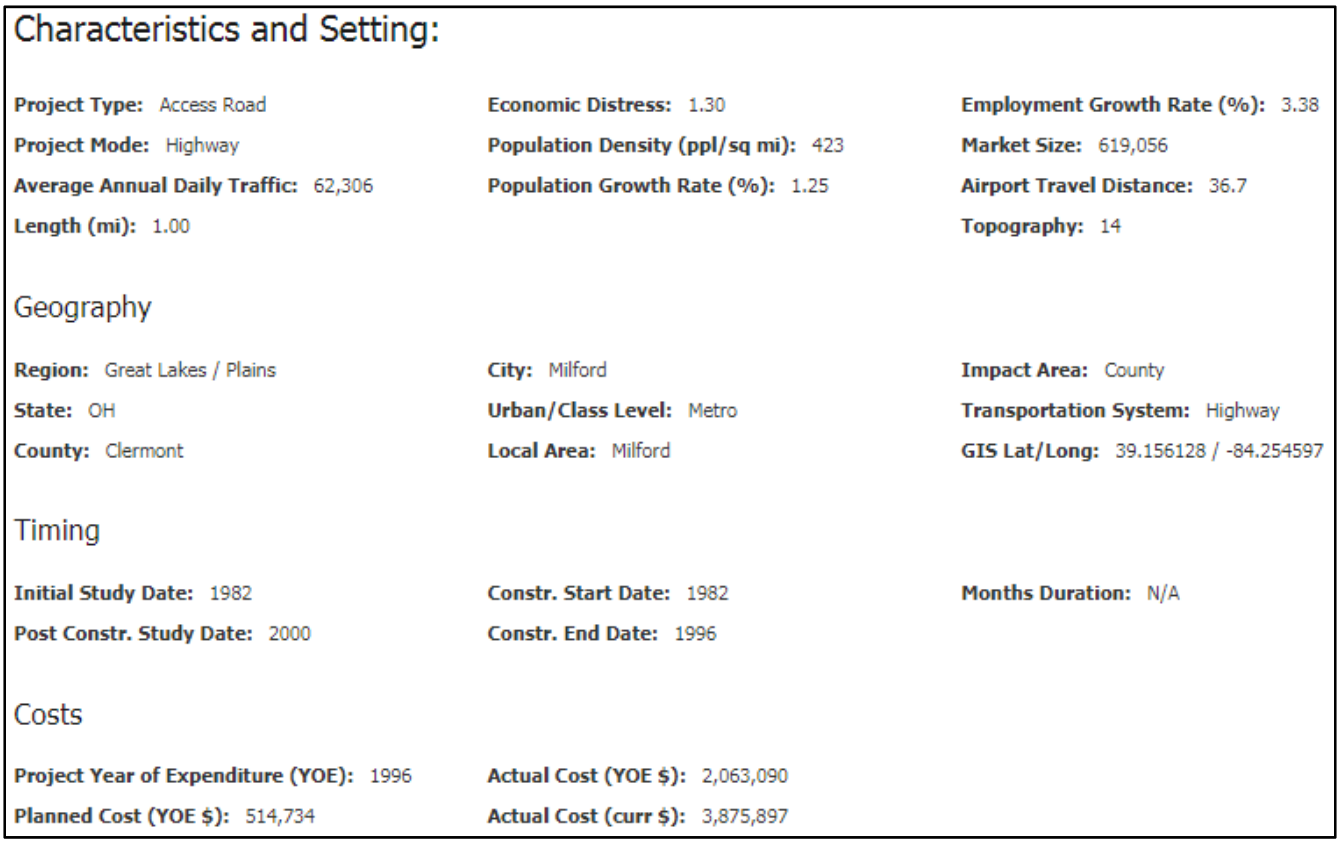


Figure 5: Case Study Search—Individual Case Study Page—Characteristics and Setting

Pre/Post Conditions

The next section on the Case Study Page (Figure 6) shows a variety of economic condition measurements at a local (city or municipality), county (or multiple counties), or state level before the project and many years after the project's impacts began to have taken effect. This section shows several relevant economic measures and is useful in establishing the overall trends in the study region's local, county and state economies. These measurements are indicators at the scale of measurement selected (e.g., local, county or state), and should not be viewed as "economic impacts"—these effects are farther down the page. The default view shows local economic metrics; however, the user can toggle between local, county, and state conditions by clicking on the respective tabs for the desired geographic detail. Please note that some measures have not been collected by the case study researcher (or are truly not applicable if the study region extends beyond local metrics— multiple county studies) and are marked as not applicable "N/A". The dollar values are comparable since they have been adjusted to post year equivalent dollars (i.e., pre-year dollars were adjusted using the appropriate CPI to rescale the values).

Pre/Post Conditions:

NOTE: All pre/post dollar values are in 2013$

Select a region to display the conditions for that region:

STATE | COUNTY(IES) | LOCAL

Measure	Pre-Project	Post-Project	Change	% Change
Personal Income Per Capita	27,762	38,158	10,396	37.45%
Economic Distress	0.00	1.01	1.01	N/A
Number of Jobs	4,983,290	6,835,690	1,852,400	37.17%
Business Sales (in $M's)	0	0	0	N/A
Tax Revenue (in $M's)	0	0	0	N/A
Population	10,757,100	11,364,100	607,000	5.64%
Property Value (median house value)	0	140,288	140,288	N/A
Density (ppl/sq mi)	263	278	15	5.64%

Figure 6: Case Study Search—Individual Case Study Page—Pre/Post-Project Conditions

Impacts

The next section of the page is labeled "Impacts" (Figure 7). This section lists the economic impacts that were estimated for the selected case. These are meant to capture the net economic impacts (i.e. only those impacts that can be attributed to the project). These impacts include): **Number of Jobs, Income/Wages, and Output[1].** They are broken down in terms of:

- **Direct Impacts** – which are those directly attributed to the project
- **Indirect Impacts** – which capture the multiplier effects (from suppliers and worker re-spending of wages) in the local economy generated by the direct impacts.
- **Total Impacts** – which are the sum of direct and indirect impacts. Thus, they are a measure of the "economic footprint" of the project.

[1] Other impact information such as**,** Investment (in square feet), New Construction, Property Value, Local Taxes, and State Taxes should be added to the spreadsheet template as explained in the on-line training modules but are not currently included on the EconWorks case study page.

County Impacts for: Clermont

NOTE: All impact dollar values are in 2013$

Measure	Direct	Indirect	Total
Jobs	300.00	178.00	478.00
Income (in $M's)	14.39	8.54	22.93
Output (in $M's)	43.96	26.09	70.05

Figure 7: Case Study Search—Individual Case Study Page—Project Impacts

Case Location

The next section of the Case Study page, “Case Location", connects the user to an interactive Google Maps link that highlights the area where the project was developed (Figure 8). It provides a visual assistance to understand the relationship between the project, other transportation linkages, and the surrounding development. Many of the Google links to case images can be viewed at the street level – providing the user with a flexible and informative view of current on-the-ground conditions for each case.

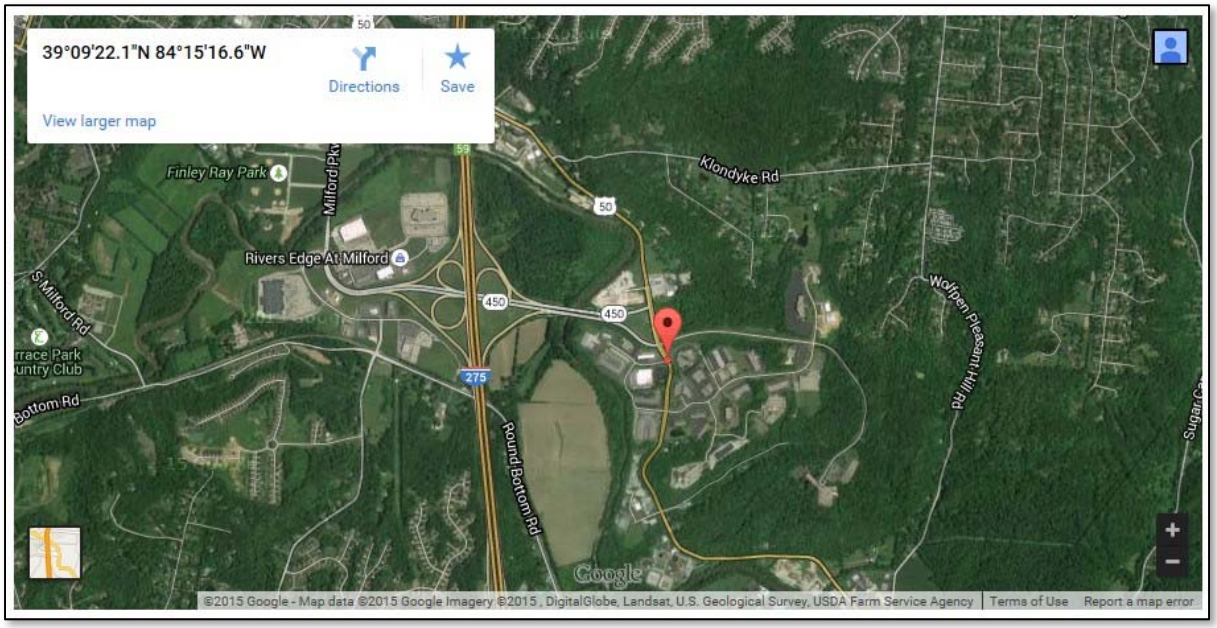


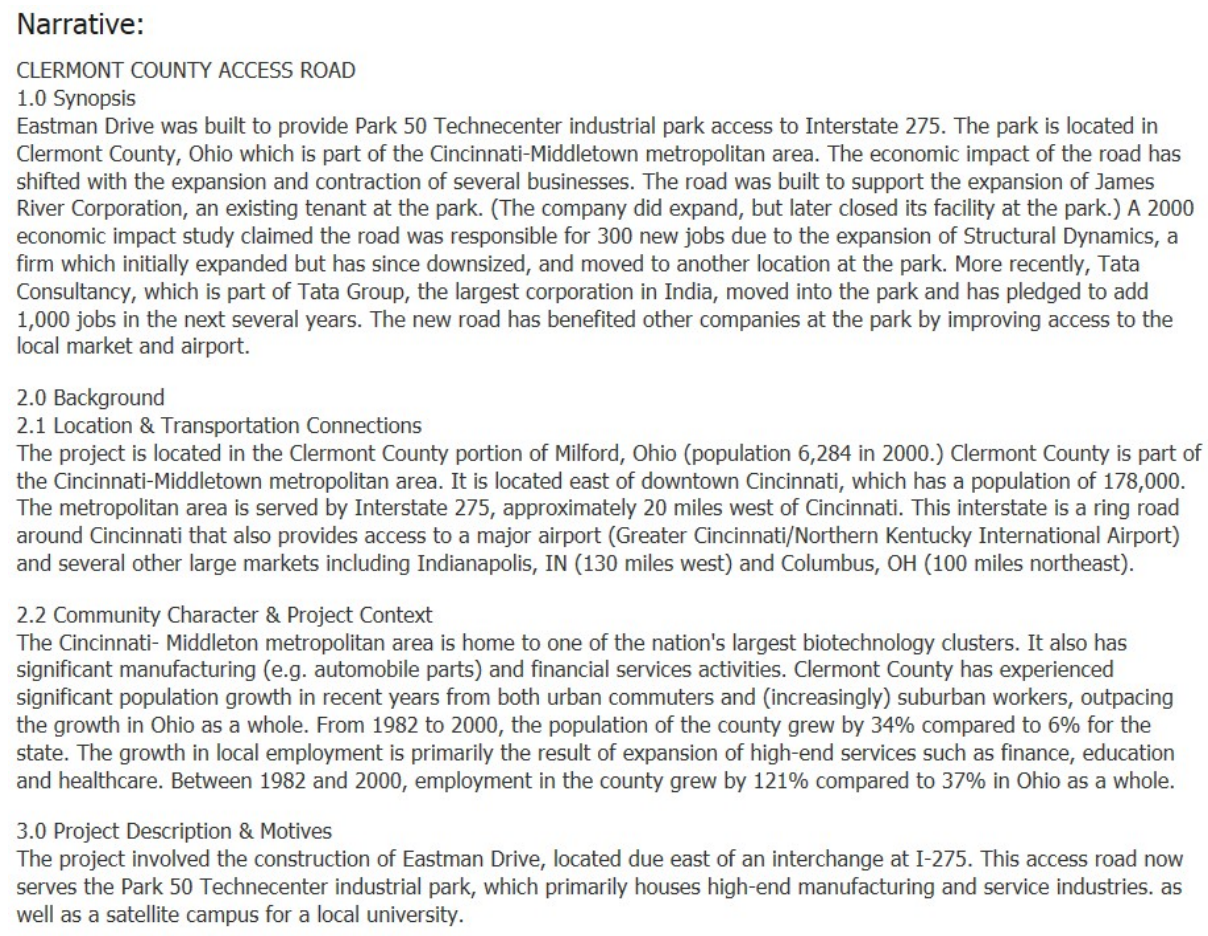
Figure 8: Case Study Search—Individual Case Study Page—Case Location

Narrative

The last section of the Case Study page is the “Narrative” (Figure 9). For each Project Case, several interviews were conducted with Municipal Planning Organizations, Economic Development Corporations, Departments of Transportation, Chambers of Commerce, Planning Departments, and local businesses. The narrative provides background information on the project and context for viewing the economic impacts. Each narrative is divided into six sections:

1) Synopsis - an overview of the project and economic impacts.
2) Background - a review of the events leading up to project construction.
3) Project Description and Motives – an in-depth description of the needs the project was meant to address and the logistics of construction.
4) Project Impacts – an analysis of the estimated economic impacts due to the project.
5) Non-Transportation Factors – describes other non-transportation related influences that affected economic development in the area.
6) Resources – a list of citations for information gathered and organizations interviewed.

At the bottom of this section, there may be linked **Attachments** for additional information in documents, reports, and other analysis regarding the project case.



Narrative:

CLERMONT COUNTY ACCESS ROAD

1.0 Synopsis

Eastman Drive was built to provide Park 50 Technecenter industrial park access to Interstate 275. The park is located in Clermont County, Ohio which is part of the Cincinnati-Middletown metropolitan area. The economic impact of the road has shifted with the expansion and contraction of several businesses. The road was built to support the expansion of James River Corporation, an existing tenant at the park. (The company did expand, but later closed its facility at the park.) A 2000 economic impact study claimed the road was responsible for 300 new jobs due to the expansion of Structural Dynamics, a firm which initially expanded but has since downsized, and moved to another location at the park. More recently, Tata Consultancy, which is part of Tata Group, the largest corporation in India, moved into the park and has pledged to add 1,000 jobs in the next several years. The new road has benefited other companies at the park by improving access to the local market and airport.

2.0 Background

2.1 Location & Transportation Connections

The project is located in the Clermont County portion of Milford, Ohio (population 6,284 in 2000.) Clermont County is part of the Cincinnati-Middletown metropolitan area. It is located east of downtown Cincinnati, which has a population of 178,000. The metropolitan area is served by Interstate 275, approximately 20 miles west of Cincinnati. This interstate is a ring road around Cincinnati that also provides access to a major airport (Greater Cincinnati/Northern Kentucky International Airport) and several other large markets including Indianapolis, IN (130 miles west) and Columbus, OH (100 miles northeast).

2.2 Community Character & Project Context

The Cincinnati- Middleton metropolitan area is home to one of the nation's largest biotechnology clusters. It also has significant manufacturing (e.g. automobile parts) and financial services activities. Clermont County has experienced significant population growth in recent years from both urban commuters and (increasingly) suburban workers, outpacing the growth in Ohio as a whole. From 1982 to 2000, the population of the county grew by 34% compared to 6% for the state. The growth in local employment is primarily the result of expansion of high-end services such as finance, education and healthcare. Between 1982 and 2000, employment in the county grew by 121% compared to 37% in Ohio as a whole.

3.0 Project Description & Motives

The project involved the construction of Eastman Drive, located due east of an interchange at I-275. This access road now serves the Park 50 Technecenter industrial park, which primarily houses high-end manufacturing and service industries. as well as a satellite campus for a local university.

Figure 9: Case Study Search—Individual Case Study Page—Narrative

2.2.2 Assess My Project

If the user wishes to estimate a range of potential economic impacts for a planned project, they should proceed to **Assess My Project** by either clicking the tab on the menu at the top of the EconWorks webpage under "Case Studies".

Project Parameters

The **Assess My Project** page (Figure 10) differs from the **Case Study Search** page in that instead of defining project criteria to match a case, the user selects parameters for a "hypothetical case" *based on the existing case studies in the database*. These parameters are used to estimate the likely ranges of economic impacts based on project cost, traffic volumes and other parameters. The initial parameters to be defined are: **1) Project Type, 2) Region, 3) Urban/Class Level, 4) Economic Distress, and 5) Length of Project.** Once these initial categories have been selected, click on the **"Get Results"** button on the lower left-hand corner of the screen. (NOTE: For Interchanges, just leave the "**Length of Project"** window blank.)

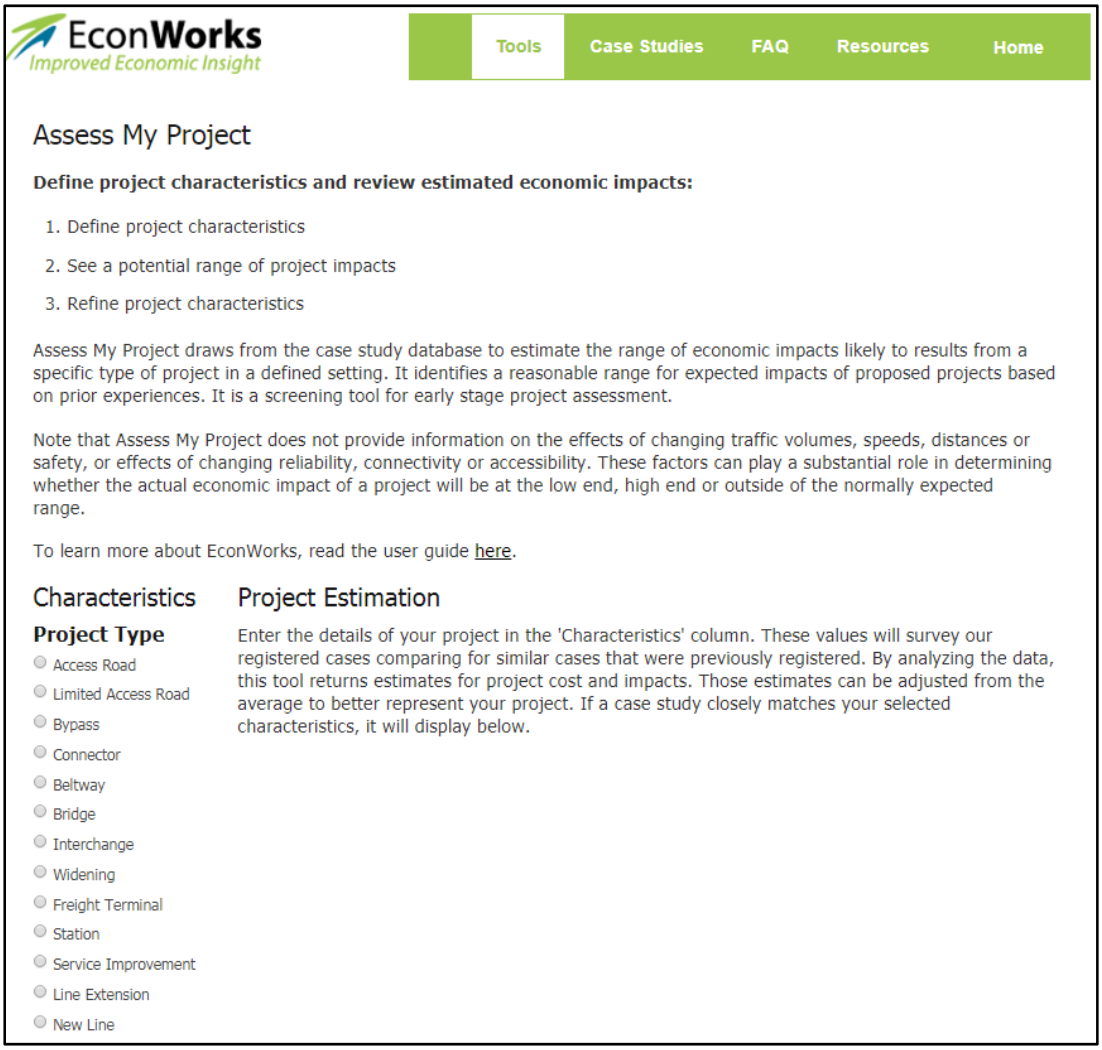


Figure 10: Assess My Project Page

Results Page and Sensitivity Analysis

With the initial criteria defined, the results page (Figure 11) estimates the ranges of economic impacts including Jobs, Wages, and Output. These three categories of impacts are divided into Direct, Supplier and Wage Impacts (i.e. Indirect), and Total Impacts (as defined in the **"Impacts"** section of the "**Case Study Search"**).

Figure 11: Assess My Project Page–Impacts Results

Above the ranges of economic impacts are listed a variety of additional project parameters that can be adjusted with a specific range. EDR Group analyzed the relationships between project characteristics and the resulting economic impacts and calculated the sensitivity of how changes in these variables would ultimately affect the economic impact outcomes. The option

to adjust these parameters allows the user to adjust costs, traffic estimates, and other economic development factors to properly reflect the project's local environment. In turn, these adjustments will drive changes in expected economic impacts of the project. They are comprised of the following:

1) **Project Cost—**the cost of construction in 2013$'s[1], default setting is the median based on the project parameters. The project cost determines the maximum economic impacts so, if this has been reached, toggling with other parameters will not allow the impacts to increase.
2) **Average Annual Daily Travel (AADT)—**current AADT, along with mileage is a main driver of economic impacts, default setting is median based on project parameters.
3) **Land Use Policies—**a measure of how restrictive or supportive the local area is to land development according to current zoning policies. The default setting is "Average" but moving to either side will increase or decrease economic impacts by a factor ratio (shown by hovering the mouse over the circle dot slider).
4) **Infrastructure—**a measure of supporting infrastructure to serve development associated with the project (e.g. water/sewer). The default setting is "Average" but moving to either side will increase or decrease economic impacts by a factor ratio (shown by hovering the mouse over the circle dot slider).
5) **Business Climate—**a measure of how supportive the local area is in allowing development (e.g. tax breaks, financing). The default setting is "Average" but moving to either side will increase or decrease economic impacts by a factor ratio (shown by hovering the mouse over the circle dot slider).

These impacts should not be viewed as final since they are a "best guess" ***based on the information from the case studies in the case study database***. However, they should be viewed as capturing the appropriate magnitude of impacts given the project specifications. The shifts in impacts should also accurately capture the relationship between economic impacts and the effects of project parameters and local conditions.

Certain selected criteria match specific cases which are listed below the sliders. These cases are included to inform the researcher cases the range of economic impacts are based on as well as case recommendations for narrative reading.

2.2.3 Analysis Tools

The third menu item on the EconWorks, "Analysis Tools", gives the user access to a set of 5 tools that were developed under the SHRP2 Project C11: *Development of Improved Economic Tools Based on Recommendations from project C03*. (Figure 12). These tools enable users to incorporate Wider Economic Benefits (W.E.B.) into their analysis and decision making. These tools are web-based and require registering a user name and password to gain access.

[1] Current dollars are updated by the EconWorks administrator as Consumer Price Index (CPI) data is available from the Bureau of Labor Statistics (BLS).

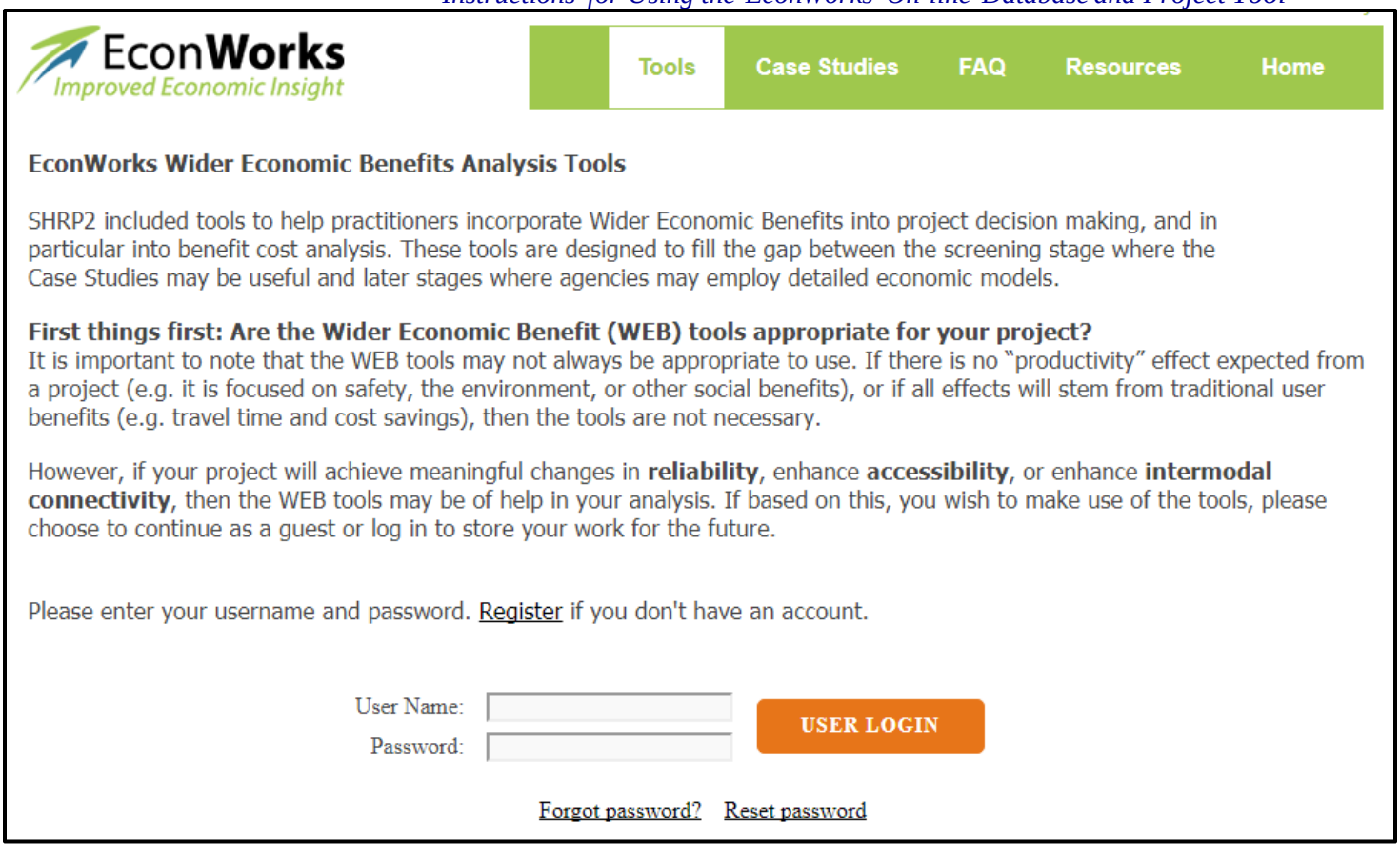


Figure 12: Analysis Tools Page

Next, create a project and then click on the button "Access Project" in the upper right hand of the screen. You will then be presented with a series of questions. Your responses will help determine which tool should be used based on your objectives and the expected impacts your project addresses. The tools that are highlighted in orange will be relevant to your project while those greyed out should not be applied to your analysis. A list of all the tools available depending on your responses to the diagnostic questions) are shown in Figure 13. Click on the tool you wish to use.

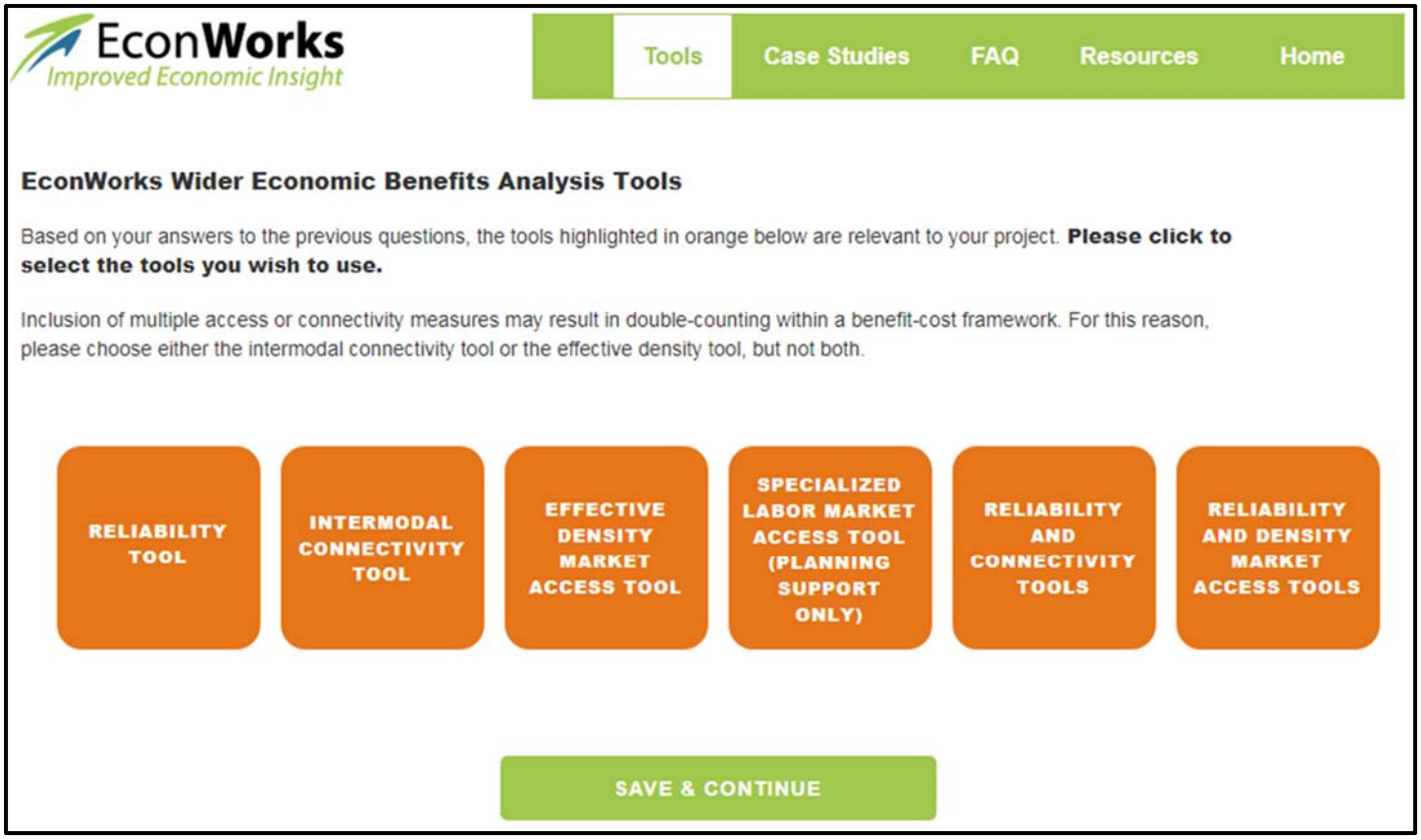


Figure 13: Analysis Tools Page

Once the desired tool has been selected, the user is provided with a brief introduction, objective, and a link to access the user guide and technical documentation (Figure 14).

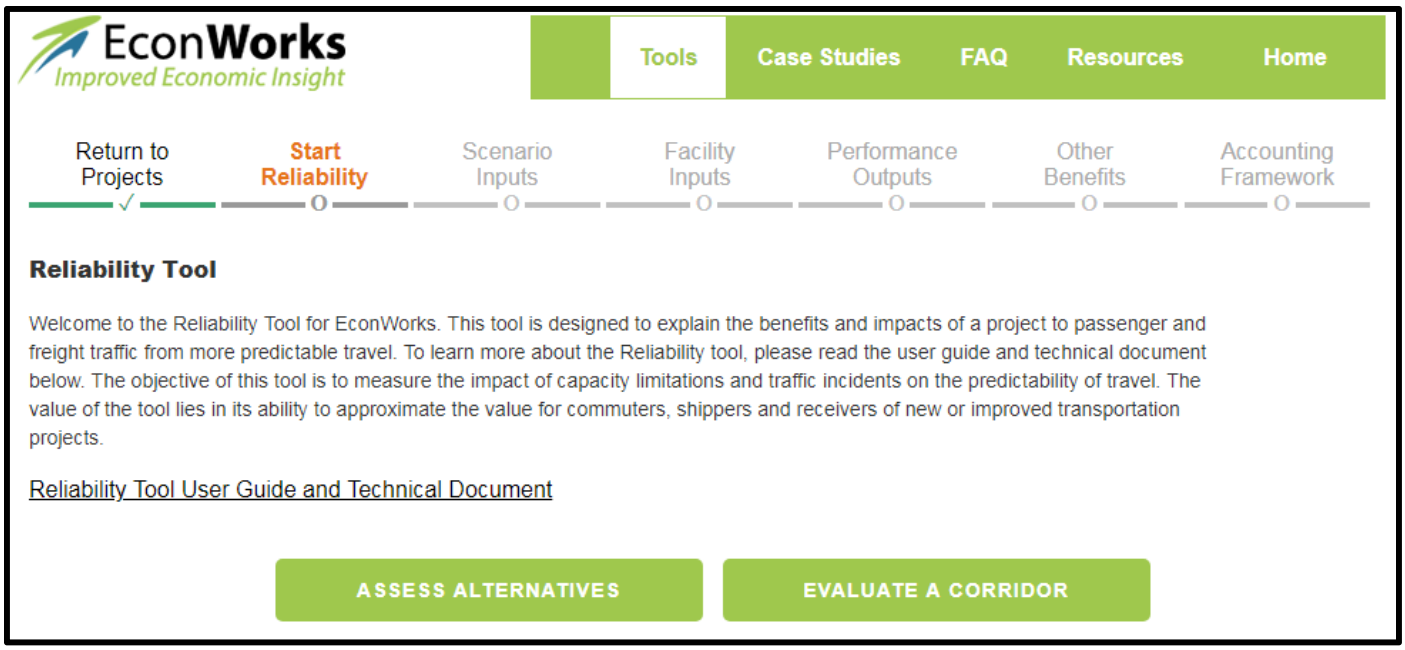


Figure 14: Reliability Tool Page

2.3 Case Studies

By clicking on the "Case Studies" tab, EconWorks users can access the case study submission page (Figure 15) after registering by filling in an on-line form (including a password) with contact and organizational information. Once complete, the user will have access to submit a case study.

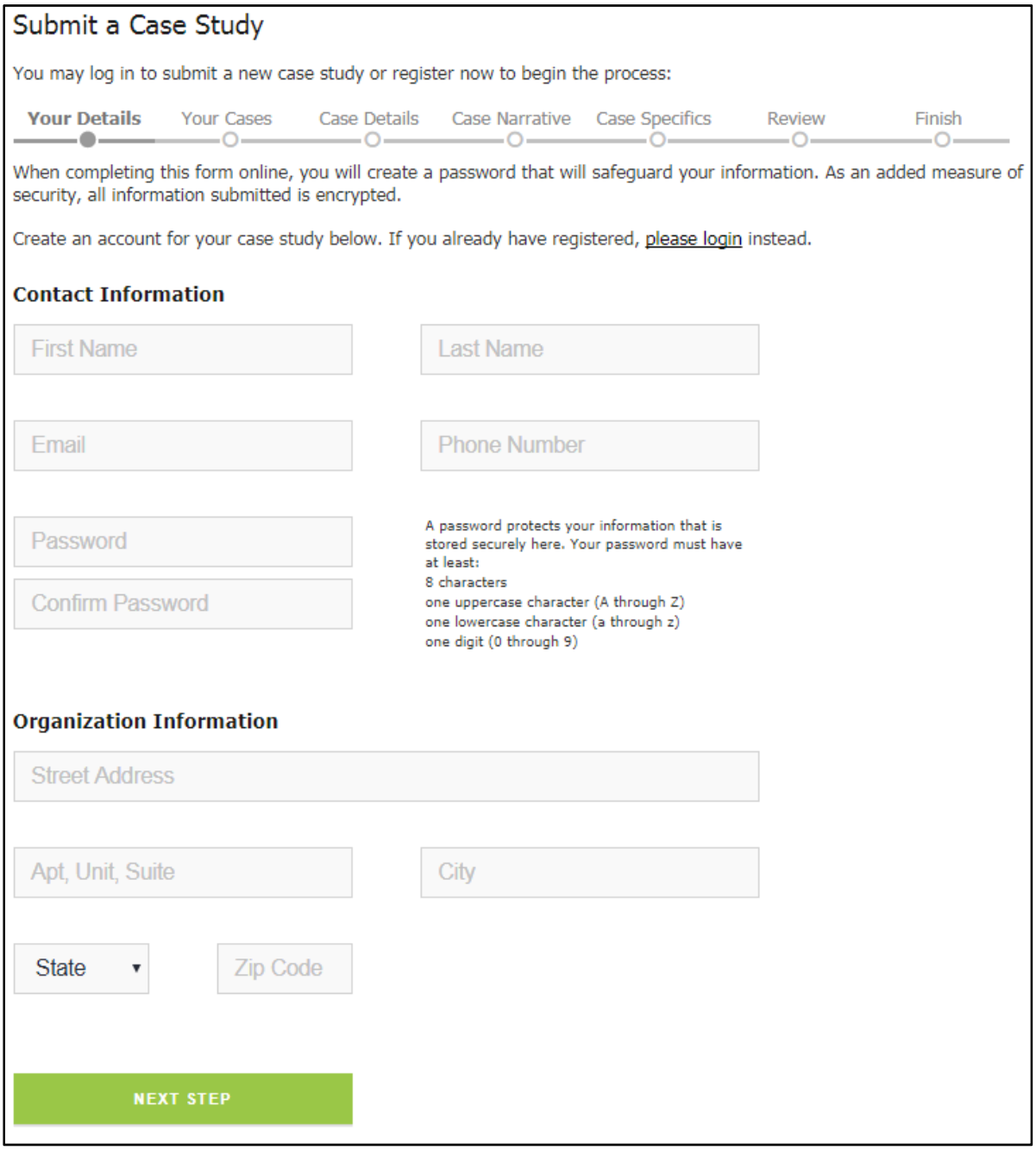


Figure 15: EconWorks Registration Form to Submit a Case Study

The case study submission home page is show below in Figure 16. To initiate the process of submitting a new case study, the user clicks on the link "Add New Case". A case study status bar provides a tracking profile of the stages of completion. Once all data or text is entered within the stage and submitted, the line section underneath the title of the stage turns green indicating completion.

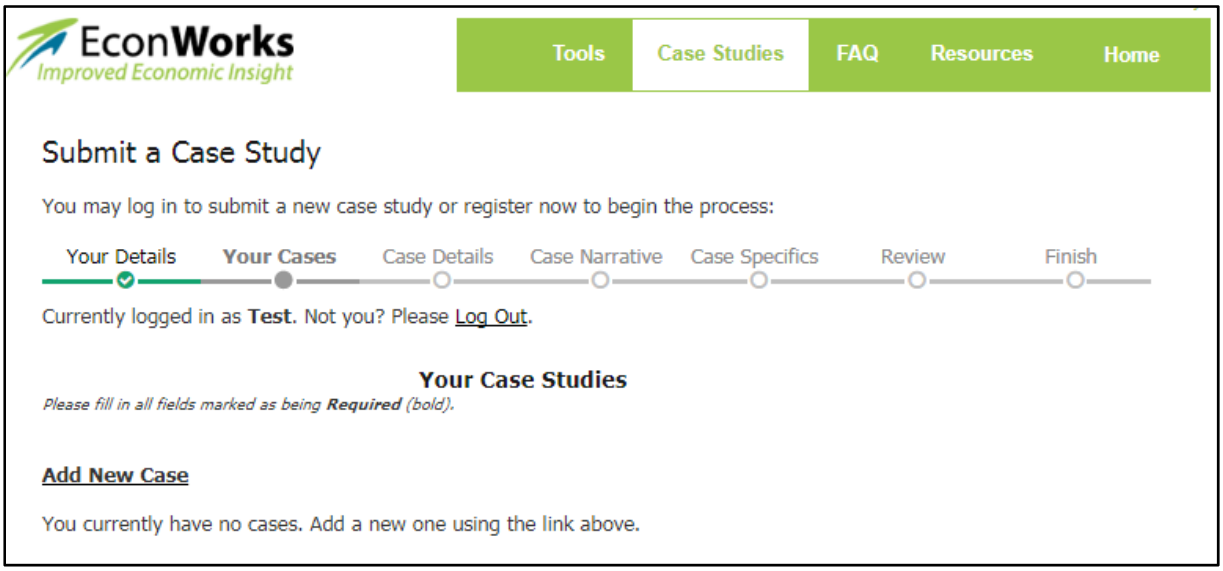


Figure 16: EconWorks Case Study Status Bar

Once all stages are completed, the user submits the case study for final review. An AASHTO or other designated contact will review the case study and follow up with the research for any outstanding questions or issues. Once approved, the case study will be added to the database and available for review on EconWorks.

2.4 FAQ (Frequently Asked Questions)

Based on user inquiries and feedback, many frequently asked questions and corresponding answers have been posted under the FAQ section (Figure 17) to provide support and clarification to interested users. Clicking on any question will expand the view to provide the response. A search term box is also provided to filter the results.

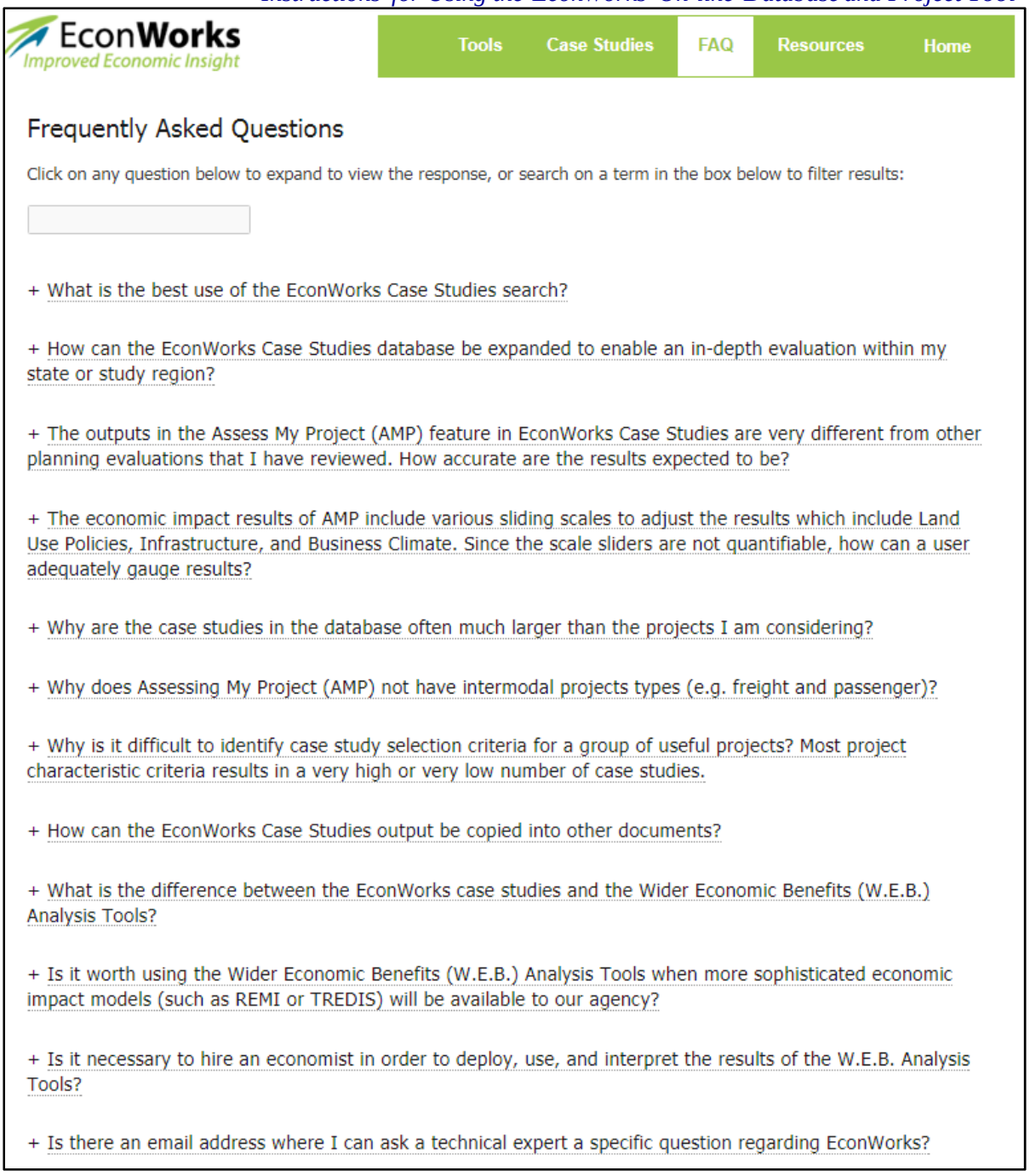


Figure 17: EconWorks FAQ page

2.5 Resources

A Resource tab provides access to a list of available supporting material including:

- **Online Training**: webinars & training modules
- **Marketing Brochures, Documents and Reports**: Including reference documents, award recipient reports, and other research documents and presentations

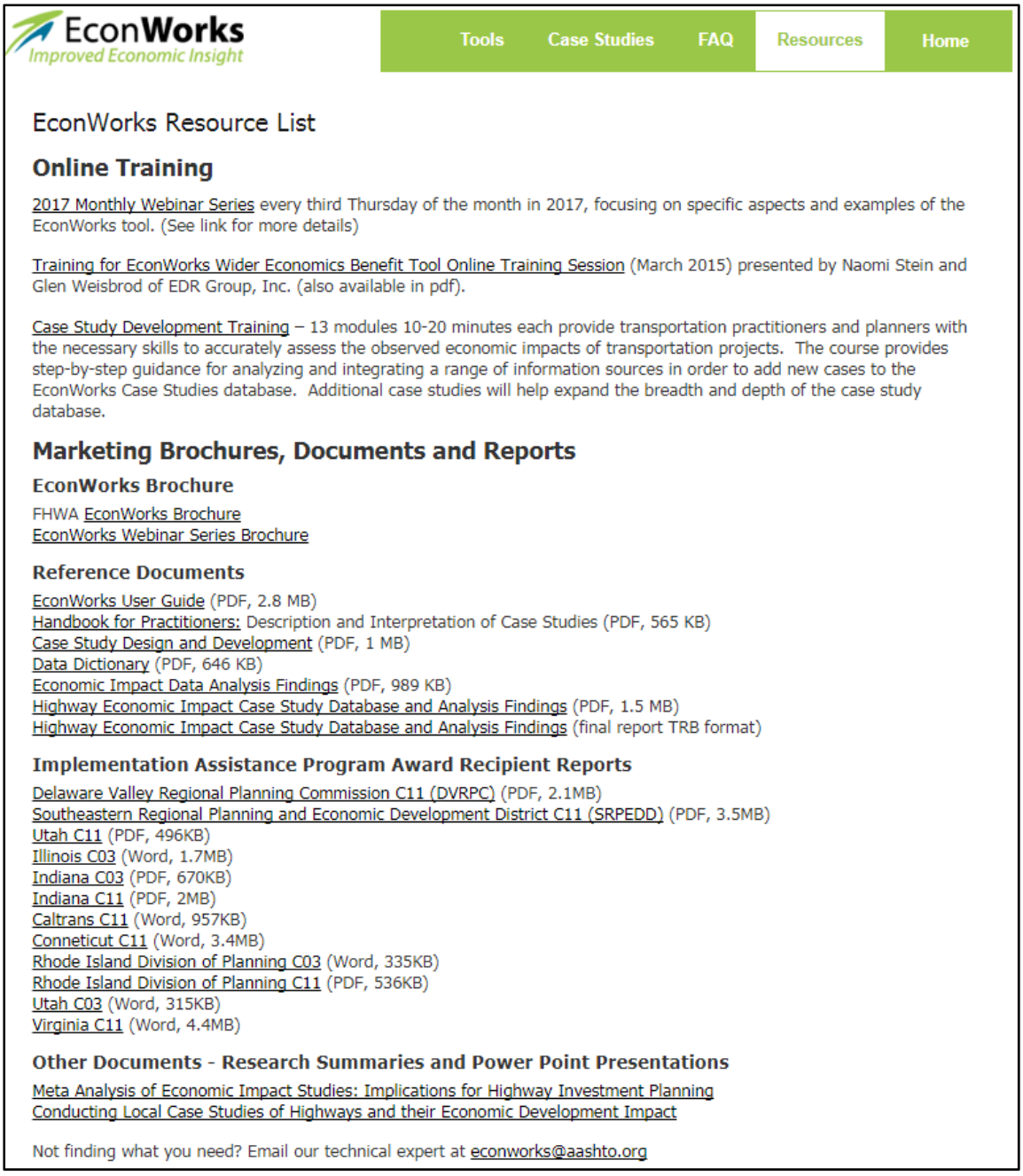


Figure 18: EconWorks Resource page

Inquiries for any additional material not found can be emailed to: econworks@aashto.org