



# **SHRP2 C03: Interactions between Transportation Capacity, Economic Systems, and Land Use**

**DTFH6 I -06-H-00009**

Phase II, Tasks 15b, 17, and 18

## **Transportation Project Impact Case Studies (TPICS): Data Dictionary**

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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.

**TPICS Web Tool.** One of the products is a web-based database tool that contains 100 case studies of the economic and development impacts of highway projects, along with analysis tools for screening, viewing and analyzing them. That web site can be accessed in two ways.

- Via the SHRP2-sponsored web site: Transportation for Communities - Advancing Projects through Partnerships (TCAPP), which can be found at [www.transportationforcommunities.com](http://www.transportationforcommunities.com)  
(click on the TPICS link at the bottom of the page)
- Directly from the project web site: Transportation Project Impact Case Studies, which can be found at: [www.tpics.us](http://www.tpics.us)

**Technical Documents.** The project also produced a series of technical reports, which can all be viewed and downloaded from the internet. They can also be accessed from the TPICS web page by selecting the tab on top labeled “More Info.” These reports include:

### Case Study Analysis

- TPICS Web Tool: User Guide (Instructions for Use)
- Description and Interpretation of Case Studies: Handbook for Practitioners
- Case Study Design and Development
- Case Study Dataset Documentation

### Research Methods and Findings

- Economic Impact Data Analysis Findings
- Economic Impact Performance Metrics
- Working Paper: Stakeholder Needs, Limitations of Available Tools and Future Research

## **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 Andrie 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 and Susan Moses & Associates.

The 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.

# 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 case studies of highway projects, 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, 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 of 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.)

**TPICS Web Tool.** The case studies were put into a web-based viewing and analysis system called “TPICS” – “Transportation Project Impact Case Studies.” This system includes: (a) a 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. (For further information on this system, readers are referred to a separate document, TPICS Web Tool User Guide, which can be accessed as described in the Preface.)

The TPICS 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 TPICS Web Tool

The Transportation Project Impact Case Study (TPICS) 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 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 Search** – which accesses the database of case studies of highway 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, Intermodal Rail 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.

- **My Project Tools** – 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.

### 1.3 Guide to this Document

This technical documentation provides an overview of the data gathered for the SHRP II case studies (presented on the TPICS website). This document outlines sources of data, range of values, hierarchical classifications, and overall definitions in order to assist the user to properly understand and use the data.

IT is composed of three further sections:

- Section 2 provides a summary of dataset content and properties
- Section 3 provides a more in-depth explanation of data fields including the field type, source, missing values and definition.
- Section 4 provides guidance on using impact estimates, explains how economic impact estimates were derived and how to appropriately use this information.
- The Appendix provides a “data dictionary” summary of data fields, measurement units and sources

Further discussion on interpreting and using economic impacts in decision making are found in the separate *Users Guide* and *Practitioners Handbook*.

# 2 DATASET CONTENT AND PROPERTIES

This section provides a summary of the dataset content and properties; a more in-depth explanation of individual data fields is provided in a later section.

## 2.1 Dataset Overview

### *Number of records*

There are 108 different data categories for 100 case studies, totaling 10,800 records.

### *Content of records*

The data fields fall within five category groups that provide a specific type of description. They are: **Characteristics, Settings, Pre-Project Conditions, Post Project Conditions, and Economic Impacts**. Each data field is identified by a unique ID number, contains a column location identifier (alpha field) where the data is located in the exported Comma Delimited File, and whether the field is considered to be qualitative or quantitative in nature.

## 2.2 Data Field Characteristics

There are 40 fields, listed in Table 1, that provide a general description of the project's location, motivation for construction, cost, time period, and other categories that define the nature, scope, and scale of the project.

**Table 1: Data Field Characteristics**

ID	Field Name	Column location	Type of Data
1	Case study name	A	Quantitative
2	ID	B	Quantitative
3	State	C	Quantitative
4	City	D	Quantitative
5	Impact Area	E	Quantitative
6	Description	F	Qualitative
7	Classification/Type	G	Quantitative
8	Project Motivation - Air Access	H	Qualitative
9	Project Motivation - Rail Access	I	Qualitative
10	Project Motivation - Int'l Border Access	J	Qualitative
11	Project Motivation -Marine Port Access	K	Qualitative
12	Project Motivation -Site Development	L	Qualitative
13	Project Motivation -Labor Market	M	Qualitative
14	Project Motivation -Delivery Market	N	Qualitative
15	Project Motivation -Tourism	O	Qualitative
16	Project Motivation -Congestion Mitigation	P	Qualitative
17	Planned Cost (YOES's)	Q	Quantitative
18	Actual Cost (YOES's)	R	Quantitative
19	Actual Cost (2008\$)	S	Quantitative
20	Length (miles)	T	Quantitative
21	Initial Study Date	U	Quantitative
22	Construction Start Date	V	Quantitative
23	Construction End Date	W	Quantitative
24	Post-Construction Study Date	X	Quantitative
25	GIS lat Coordinates	Y	Quantitative
26	GIS long Coordinates	Z	Quantitative
27	AADT	AA	Quantitative
30	BEA Region	AB	Quantitative
97	General & Bulk Cargo Volume (Metric Tons) (IM only)	AC	Quantitative
98	Container Volume (Metric Tons) (IM only)	AD	Quantitative
99	Container Volume (TEUS) (IM only)	AE	Quantitative
100	Passenger Ridership per year (TOD only)	AF	Quantitative
101	Parking Spaces	AG	Quantitative
102	Intermodal Project Actual Cost (YOES's)	AH	Quantitative
103	Highway/road access improvement costs (YOES's)	AI	Quantitative
104	Intermodal Project Actual Cost (2008\$'s)	AJ	Quantitative
105	Highway/road access improvement costs (2008\$'s)	AK	Quantitative
106	Project Year of Expenditure (YOE \$'s)	AL	Quantitative
107	Lanes	AM	Quantitative
108	Lane Miles	AN	Quantitative

**Settings**

There are 11 fields classified as “Settings” in Table 2 that provide descriptive information regarding the nature of the geographic area in which the project is located. This includes information in areas of socio-economic (e.g. unemployment, population, income growth, market size), topographical, (terrain type), and transportation access (distance to airport, interstate, and major market).

**Table 2: Settings Fields**

<b>ID</b>	<b>Field Name</b>	<b>Column location</b>	<b>Type of Data</b>
28	Class Level	CT	Quantitative
29	Economically Distressed	CV	Quantitative
31	Population Density	CW	Quantitative
32	Population Growth Rates	CX	Quantitative
33	Employment Growth Rate	CY	Quantitative
34	Income Growth Rate	CZ	Quantitative
35	Market Size (population within 40 minutes, etc)	DA	Quantitative
36	Airport Travel Distance	DB	Quantitative
37	Interstate Travel Distance	DC	Quantitative
38	Major Market Travel Distance	DD	Quantitative
39	Extent of mountain terrain	DE	Quantitative

**Pre Year Conditions**

Eight fields describe the economic conditions at the local, county, or state levels. Data was collected for the year before the construction start year in order to prevent any influence construction might have on the local, county or state economy. These fields represent the “Pre Year Conditions” and provide context to understand the economic conditions of the surrounding economy and are listed in Table 3.

**Table 3: Pre Year Conditions**

<b>ID</b>	<b>Field Name</b>	<b>Column location</b>	<b>Type of Data</b>
40	Pre - Personal Income Per Capita - Local	BV	Quantitative
41	Pre - Personal Income Per Capita - County	BX	Quantitative
42	Pre - Personal Income Per Capita - State	BY	Quantitative
43	Pre- Economic Distress - Local	BZ	Quantitative
44	Pre - Economic Distress - County	CA	Quantitative
45	Pre - Economic Distress - State	CB	Quantitative
46	Pre - Number of Jobs - Local	CC	Quantitative
47	Pre - Number of Jobs - County	CD	Quantitative
48	Pre - Number of Jobs - State	CE	Quantitative
49	Pre - Business Sales - Local	CF	Quantitative
50	Pre - Business Sales - County	CG	Quantitative
51	Pre - Business Sales - State	CH	Quantitative
52	Pre- Tax Revenue- Local	CI	Quantitative
53	Pre- Tax Revenue-County	CJ	Quantitative
54	Pre- Tax Revenue-State	CK	Quantitative
55	Pre - Population- Local	CL	Quantitative
56	Pre - Population - County	CM	Quantitative
57	Pre - Population - State	CN	Quantitative
58	Pre - Property Value - Local	CO	Quantitative
59	Pre - Property Value - County	CP	Quantitative
60	Pre - Property Value - State	CQ	Quantitative
61	Pre - Density - Local	CR	Quantitative
62	Pre - Density - County	CS	Quantitative
63	Pre - Density - State	CT	Quantitative

***Post Year Conditions***

The same 8 fields describing the economic conditions at the local, county, or state levels are repeated for the Post Year Conditions (Table 4). The Post Year date usually ranges from 2-5 years after the construction completion year. Post Years vary due to different construction timelines and the need to allow enough time for economic results to be manifested.

**Table 4: Post Year Conditions**

<b>ID</b>	<b>Field Name</b>	<b>Column location</b>	<b>Type of Data</b>
64	Post - Personal Income Per Capita - Local	AX	Quantitative
65	Post - Personal Income Per Capita - County	AZ	Quantitative
66	Post - Personal Income Per Capita - State	BA	Quantitative
67	Post - Economic Distress - Local	BB	Quantitative
68	Post - Economic Distress - County	BC	Quantitative
69	Post - Economic Distress - State	BD	Quantitative
70	Post - Number of Jobs- Local	BE	Quantitative
71	Post - Number of Jobs - County	BF	Quantitative
72	Post - Number of Jobs - State	BG	Quantitative
73	Post - Business Sales - Local	BH	Quantitative
74	Post - Business Sales - County	BI	Quantitative
75	Post - Business Sales - State	BJ	Quantitative
76	Post - Tax Revenue - Local	BK	Quantitative
77	Post - Tax Revenue - County	BL	Quantitative
78	Post - Tax Revenue - State	BM	Quantitative
79	Post - Population- Local	BN	Quantitative
80	Post - Population - County	BO	Quantitative
81	Post - Population - State	BP	Quantitative
82	Post -Property Value- Local	BQ	Quantitative
83	Post - Property Value - County	BR	Quantitative
84	Post - Property Value - State	BS	Quantitative
85	Post - Density - Local	BT	Quantitative
86	Post - Density - County	BU	Quantitative
87	Post - Density - State	BV	Quantitative

# 3

## DATA FIELD DOCUMENTATION

### 3.1: Data Field Elements

This chapter provides a dictionary of the data fields, in terms of their key elements: name, description, the type of data, unit of measurement, source, and time period covered, and specified terms for declaring missing values.

**Field Name:** Name of data field category

**Description:** An expanded explanation of the data field content.

**Field Type:** The type of information contained in the data field (e.g. text, number, and currency)

**Units of Measurement:** Units included in the data include dollars, miles, years, lat/long, daily trips, and percentages to name a few. Several data fields do not have a unit measurement but instead are descriptive in nature of the data field, such as State, City, impact area, classification type among others.

**Source of Data:** Information was collected from a variety of federal, state, and local government organizations as well as private industry sources which are identified in this category. A significant amount of information describing the project characteristics and economic impacts of the project were gathered from interviews with Metropolitan Planning Organizations, Regional Planning Commissions, and State Departments of Transportation, Economic Development Corporations, Chambers of Commerce, local developers, and Planning Commissions. In some cases, the case researcher may have used information gathered from these interviews to estimate certain values based on their professional judgment and assimilation of data. All of the data fields that contain data determined by the case researcher are listed under the “Interviews” category.

**Time Period Min:** The earliest Pre Year Conditions date data was collected for fields that span a range of years.

**Time Period Max:** The latest Post Year Conditions date data was collected for data fields that span a range of years.

**Missing Values (where applicable):** Data is not available for each field due to a variety of reasons. In many cases projects are at a county or multi-county level and therefore by nature will not have local information. However other data fields may have missing values for a variety of reasons. For example, county-level unemployment information is only available after 1990, and per capita income is derived from the US Census. For more details on the methodology on

estimating in missing data for the TPICS web tool, see the separate *Practitioners Handbook* section called “Interview Guide.”

**Dollar Adjustment:** In order to compare projects that span different time periods, all currency fields were converted into 2008 dollars using the Consumer Price Index (CPI-U) from the Bureau of Labor Statistics. The equation used to convert Year of Expenditure Dollars (YOES’s) into 2008 dollars (2008\$’s) is the following:  $YOES's * (CPI\ 2008)/(CPI\ in\ YOE) = 2008\$'s$ .

## 3.2 Table of Data Fields and Definitions

Table 5, provided on the pages which follow, shows documentation details for each specific data field.

**Table 5: Explanation of Data Fields**

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Case study name	Text	Description	Interviews	Name of Case study				
ID	Number	1-100	Interviews	Project ID#				
State	Text	Description	Project Location	State where the project was located				
City	Text	Description	Project Location	City where the project was located				
Impact Area	Text	Description	Project Location	Relevant Counties				
Description	Text	Description	Interviews	Text description of the project to give the reader a quick understanding of the project and results				
Classification/Type	Text	Description	Interviews	Code for the type of transportation project				
Project Motivation - Air Access	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Project Motivation - Rail Access	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				
Project Motivation - Int'l Border Access	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				
Project Motivation -Marine Port Access	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				
Project Motivation -Site Development	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				
Project Motivation -Labor Market	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				
Project Motivation -Delivery Market	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				
Project Motivation -Tourism	Number	1 - Motivation, 0- Not a Motivation	Interviews	Purpose for project investment				

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Planned Cost (YOES's)	Number	1 - Motivation, 0-Not a Motivation	Interviews	Initial planned cost of the project			Cost estimates not located	
Actual Cost (YOES's)	Number	1 - Motivation, 0-Not a Motivation	Interviews	Final actual cost of the project (YOES's)				YOE
Actual Cost (2008\$)	Currency	Dollars	Interviews	Final actual cost of the project (2008\$'s)				2008\$'s
Length (miles)	Number	Miles	Interviews	Length of the construction in miles			Length not included for Interchanges	
Initial Study Date	Number	Year	Interviews	Date of initial study on the proposed project	1969	2005		
Construction Start Date	Number	Year	Interviews	Date construction began - Year	1957	2006		
Construction End Date	Number	Year	Interviews	Date construction ended - Year	1969	2007		
Post-Construction Study Date	Number	Year	Interviews	Date of post-project impact study	1992	2008	Some post construction study dates were not captured	

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
GIS long/lat Coordinates		Longitude & Latitude Coordinates	Google Earth	Set of GIS coordinates defining the geospatial center of the project				
AADT	Number	Average Annual Daily Trips	Interviews/ESRI	Average Annual Daily Traffic			Some Freight and Passenger Intermodal Rail cases did not have AADT	
Class Level	Text	Description	CBSA as defined by OMB-classification developed by Interviews (see Practitioners Guide Chapter 5 for further explanation)	Code of the population size surrounding the project				
Economically Distressed	Number	Ratio of local to national unemployment rate	BLS	Local unemployment rate relative to national rate	1992	2008	Econ Distress not available for some international cases	

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Population Density	Number	Population per square mile	Census	Population per square mile	1992	2008		
Population Growth Rates	Number	Percentage	U.S. Census	Population growth rate at the time of project operation	2001	2006		
Employment Growth Rate	Number	Percentage	Economic Census	Income growth rate at the time of project operations (% change in employment relative to state or nat'l levels)	2001	2006		
Income Growth Rate	Number	Percentage	IMPLAN assembled data from US Bureau of Economic Analysis Regional Economic Information Service and the US Dept of Labor.	Employment growth rate at the time of project operations (% change in employment relative to state or national levels)	2001	2006		

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Airport Travel Distance	Number	Miles	ESRI ARC-View Geographic Information System and Federal Aviation Administration information	Distance to major airports (time)			Airport travel distance not available for some international cases	
Interstate Travel Distance	Number	Miles	Interviews	Minutes to nearest interstate (not sure if this will be available) (time)			Several cases were either 1) an interstate or 2) connected to an interstate (values were 0)	
Major Market Travel Distance	Number	Miles	Interviews	Minutes to nearest major market (not sure if this will be available) (time)			Several cases were located within a major market and therefore values were 0	
Extent of mountain terrain	Number	Classification 1-21	U.S. Geological Survey	Topography Rating				
Pre Project Key Industries	Text	Industries	Interviews	Important industries before the project				
Post Project Key Industries	Text	Industries	Interviews	Important industries after the project				
Pre - Personal Income Per Capita - Local	Currency	Dollars	<a href="http://www.city-data.com">www.city-data.com</a>	Per Capita Income at the local level (pre-project)	1969	2005	Some local data not avail for county or multi-county cases	2008\$'s

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Pre - Personal Income Per Capita - County	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the county level (pre-project)	1969	2005	Per Capita income not available for some international cases	2008\$'s
Pre - Personal Income Per Capita - State	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the state level (pre-project)	1969	2005	Per Capita income not available for some international cases	2008\$'s
Pre- Economic Distress - Local	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics & U.S. Census	Local unemployment rate relative to national rate (pre-project)	1969	2005	Some data not available at the local level, county or multi-county in scope	
Pre - Economic Distress - State	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics	State unemployment rate relative to national rate (pre-project)	1969	2005	State level unemployment data not available prior to 1976 & international data not available	

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Pre - Number of Jobs - Local	Number	Jobs	County Business Patterns (CBP) & U.S. Economic Census	Total number of jobs at the local level (by place of employment: pre-project)	1969	2005	Some data not available at the local level or for cases that are county or multi-county in scope	
Pre - Number of Jobs - County	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the county level (by place of employment: pre-project)	1969	2005	Employment data not available for some int'l cases	
Pre - Number of Jobs - State	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the state level (by place of employment: pre-project)	1969	2005	Employment data not available for some international cases	
Pre - Business Sales - County	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the county level (pre-project)	1969	2005	Business sales data difficult to locate - only select cases have information	2008\$'s
Pre - Business Sales - State	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the state level (pre-project)	1969	2005	Business sales data difficult to locate - only select cases have information	2008\$'s

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Pre- Tax Revenue-Local	Currency	Dollars	Auditors, tax reports, & department of revenues	Total annual local tax revenue (pre-project)	1969	2005	Some data not available at the local level or for cases that are county or multi-county in scope	2008\$'s
Pre- Tax Revenue-County	Currency	Dollars	Tax Revenue Division	Total annual county tax revenue (pre-project)	1969	2005	Tax Revenue data difficult to locate - only select cases have information	2008\$'s
Pre - Population-Local	Number	Population	U.S. Census & local data	Population of the local area (pre-project)	1969	2005	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	
Pre - Population - County	Number	Population	U.S. Census	Population of the county area (pre-project)	1969	2005		
Pre - Population - State	Number	Population	U.S. Census	Population of the state area (pre-project)	1969	2005		

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Pre - Property Value - Local	Currency	Dollars	U.S. Census & County Appraiser	Median SF House Price at the local level (pre-project)	1969	2005	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	2008\$'s
Pre - Property Value - County	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the county level (pre-project)	1969	2005	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008\$'s
Pre - Property Value - State	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the state level (pre-project)	1969	2005	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008\$'s
Pre - Density - Local	Number	Population per square mile	Local data & U.S. Census	Density of the local area (pre-project)	1969	2005	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Pre - Density - County	Number	Population per square mile	U.S Census	Density of the county area (pre-project)	1969	2005	Pre-Density not available for international cases	
Pre - Density - State	Number	Population per square mile	U.S Census	Density of the state area (pre-project)	1969	2005	Pre-Density not available for international cases	
Post - Personal Income Per Capita - Local	Currency	Dollars	www.city-data.com	Per Capita Income at the local level (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	2008\$'s
Post - Personal Income Per Capita - County	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the county level (post-project)	1992	2008	Per Capita income not available for some international cases	2008\$'s
Post - Personal Income Per Capita - State	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the state level (post-project)	1992	2008	Per Capita income not available for some international cases	2008\$'s
Post - Economic Distress - Local	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics & U.S. Census	Local unemployment rate relative to national rate (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Post - Economic Distress - County	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics	County unemployment rate relative to national rate (post-project)	1992	2008	County level unemployment data not available prior to 1990 & international data not available	
Post - Economic Distress - State	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics	State unemployment rate relative to national rate (post-project)	1992	2008	State level unemployment data not available prior to 1976 & int'l data not available	
Post - Number of Jobs- Local	Number	Jobs	County Business Patterns (CBP) & U.S. Economic Census	Total number of jobs at the local level (by place of employment: post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	
Post - Number of Jobs - County	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the county level (by place of employment: post-project)	1992	2008	Employment data not available for some international cases	
Post - Number of Jobs - State	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the state level (by place of employment: post-project)	1992	2008	Employment data not available for some international cases	

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Post - Business Sales - Local	Currency	Dollars	County Business Patterns, U.S. Economic Census, & local comptroller	Total revenue of businesses at the local level (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	2008\$'s
Post - Business Sales - County	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the county level (post-project)	1992	2008	Business sales data difficult to locate - only select cases have information	2008\$'s
Post - Business Sales - State	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the state level (post-project)	1992	2008	Business sales data difficult to locate - only select cases have information	2008\$'s
Post - Tax Revenue - Local	Currency	Dollars	Auditors, tax reports, & department of revenues	Total annual local tax revenue (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	2008\$'s
Post - Tax Revenue - County	Currency	Dollars	Tax Revenue Division	Total annual county tax revenue (post-project)	1992	2008	Tax Revenue data difficult to locate - only select cases have information	2008\$'s

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Post - Tax Revenue - State	Currency	Dollars	Tax Revenue Division	Total annual state tax revenue (post-project)	1992	2008	Tax Revenue data difficult to locate - only select cases have information	2008\$'s
Post - Population-Local	Number	Population	U.S. Census & local data	Population of the local area (post-project)	1992	2008	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	
Post - Population - County	Number	Population	U.S. Census	Population of the county area (post-project)	1992	2008		
Post - Population - State	Number	Population	U.S. Census	Population of the state area (post-project)	1992	2008		
Post -Property Value- Local	Currency	Dollars	U.S. Census & County Appraiser	Median SF House Price at the local level (post-project)	1992	2008	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	2008\$'s

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Post - Property Value - County	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the county level (post-project)	1992	2008	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008\$'s
Post - Property Value - State	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the state level (post-project)	1992	2008	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008\$'s
Post - Density - Local	Number	Population per square mile	Local data & U.S. Census	Density of the local area (post-project)	1992	2008	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	
Post - Density - County	Number	Population per square mile	U.S Census	Density of the county area (post-project)	1992	2008	Pre-Density not available for international cases	
Post - Density - State	Number	Population per square mile	U.S Census	Density of the state area (post-project)	1992	2008	Pre-Density not available for international cases	

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Direct, Indirect, and Total Jobs	Number	Jobs	Interviews and IMPLAN job to income ratios	Number of Jobs attributed to the project	1992	2008	Some cases did not have any economic impact	
Direct, Indirect, and Total Income	Currency	Dollars	Interviews and IMPLAN job to income ratios	Amount of Income attributed to the project	1992	2008	Some cases did not have any economic impact	2008\$'s
Direct, Indirect, and Total Output	Currency	Dollars	Interviews and IMPLAN job to output ratios	Amount of Output attributed to the project	1992	2008	Some cases did not have any economic impact	2008\$'s
Direct, Indirect, and Total New Construction	Number	Square Feet	Interviews	Amount of New construction in square feet	1992	2008	No impact or data was not collected	
Direct, Indirect, and Total Investment	Currency	Dollars	Interviews	Amount of project Investment	1992	2008	No impact or data was not collected	2008\$'s
Direct, Indirect, and Total Property Values	Currency	Dollars	Interviews	Property Values in surrounding area	1992	2008	No impact or data was not collected	2008\$'s
Direct, Indirect, and Total Local Tax Revenue	Currency	Dollars	Interviews	Local Tax Revenue collected	1992	2008	No impact or data was not collected	2008\$'s
Direct, Indirect, and Total State Tax Revenue	Currency	Dollars	Interviews	State Tax Revenue collected	1992	2008	No impact or data was not collected	2008\$'s

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
General & Bulk Cargo Volume (Metric Tons) (IM only)	Number	Metric Tons	Interviews	Metric Tons of General & Bulk Cargo transported			For Freight Intermodal Rail cases only	
Container Volume (Metric Tons) (IM only)	Number	Metric Tons	Interviews	Metric Tons of Container Cargo transported			For Freight Intermodal Rail cases only	
Container Volume (TEUS) (IM only)	Number	Twenty-foot equivalent unit (TEU)	Interviews	Twenty-foot equivalent units (TEUs) of Container Cargo			For Freight Intermodal Rail cases only	
Passenger Ridership per year (Intermodal Passenger projects only)	Number	Passengers	Interviews	Annual passenger ridership on passenger Intermodal Rail system			For Passenger Intermodal Rail cases only	
Parking Spaces	Number	Parking Spaces	Interviews	Parking Spaces at passenger Intermodal Rail station			For Passenger Intermodal Rail cases only	
Intermodal Rail Project Actual Cost (YOES's)	Currency	Dollars	Interviews	Intermodal Rail Project Actual Cost (YOES's)	1963	2008		Year of Expenditure

### 3. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Highway/road access improvement costs (YOE\$'s)	Currency	Dollars	Interviews	Highway/road access improvement costs (YOE\$'s)	2008			Year of Expenditure
Intermodal Rail Project Actual Cost (2008\$'s)	Currency	Dollars	Interviews	Intermodal Rail Project Actual Cost (2008\$'s)	2008			2008\$'s
Highway/road access improvement costs (2008\$'s)	Currency	Dollars	Interviews	Highway/road access improvement costs (2008\$'s)	1963	2008		2008\$'s
Project Year of Expenditure (YOE \$'s)	Currency	Dollars	Interviews	Project Year of Expenditure (YOE \$'s)				Year of Expenditure
Lanes	Number	Lanes	Interviews	Number of lanes in project			Lanes not included for interchanges	
Lane Miles	Number	Lane Miles	Interviews	Number of lane miles in project			Lane miles not included for interchanges	
BEA Region	Text	Category	BEA	BEA region reclassified by EDRG				
Market Size	Number	Population	ESRI ARC (GIS)	population within 40 minutes of county centroid				

# 4

## WARNING ON COMPATIBILITY AND INTERPRETATION OF DATA

### 4.1 Data Compatibility for Analysis

Case studies, by their very nature, span a wide range of different time periods and geographic areas. Data availability also varies with time and geography. The specific database developed for this project, and used in the TPICS web tool, incorporates a set of controls intended to help users allow or adjust for such differences. This includes indicators of time and geographic differences, as well as adjustment of dollar fields from their original reported values into constant dollars. However, users must be aware of these indicators and adjustments, and use them accordingly. Key elements are noted below.

1. **Year of Expenditure Dollars versus Constant Dollars:** Because some of the data expressed in dollars can vary across time periods, we have adjusted all currency data to 2008 dollars using the Consumer Price Index (CPI-U) published by the Bureau of Labor Statistics (BLS).
2. **Local, County, or Multi-County Level Geographies:** Cases vary in their geographic scope. Some are at a municipal, county, or multi-county level. In making comparisons between cases, it is important to consider the relative geographic scale of each, in order to make an accurate assessment. Two projects equal in cost and other characteristics can vary in scale of economic impacts if one is confined to a local municipal area versus another that covers multiple counties.
3. **Sources of information:** Data was gathered from a variety of published sources and reports. However, different published sources are available for state, county, metro, municipal and tract or zip code data. This is a source of some potential noise; as not all of the data sources adopt identical definitions of the same concept, and they do not all use exactly the same data collection methods. In addition, some information on observed impacts is derived from local interviews and locally-available data sources, which may also vary in their data collection methods and inclusiveness. More detailed information on published data sources is found in the Appendix to this document. More information on interview data collection is provided in the separate *Practitioners Handbook*.
4. **Post Year Conditions:** Users should note that each case has a different construction period and post analysis year. More information on pre- and post-construction conditions can be found in the *Practitioners Guide* section on “Pre and Post-Project Data.”

## 4.2 Calculation and Interpretation of Economic Impact Data Measures

One of the key objectives of the case study database and TPICS web tool is provide information enabling better improve estimates of the job economic impact of highway investment projects. Yet to use that information properly, it is important for the user to understand the source and derivation of the impact data fields, and thus appreciate their uses and limitations.

For each case study project, pre- and post-project information was collected for a variety of available economic indicators. The actual impact estimates, however, also drew considerable input from local interviews. For each case study project, local public and private sector organizations were contacted and interviewed to gather perspectives and insight regarding the degree to which each project attracted development and new businesses resulting in new jobs to the area. Efforts were made to net out any external economic trends or conditions that did not have anything to do with the project in order to isolate job creation impacts. This was accomplished by combining locally collected data, trends, interview insights, and economic development patterns to synthesize and derive an estimate of net job creation impacts.

Some impact data fields were calculated from other data fields. The output and wage impacts were based off of employment impact numbers, using average output/job and wage/job ratios for a composite of manufacturing and business service industries in each county. The data used to calculate these ratios was provided by IMPLAN, and was based on BEA (Bureau of Economic Analysis) data. To calculate total job impacts (direct job impacts plus estimated of indirect and induced effects), multipliers were applied to the direct impact numbers obtained from the case study data collection process. The ratios and multipliers represented the time period of 2004-2008.

It is also important to note that the economic impact estimates provided in the database were developed for specific project characteristics and settings. Each case study is unique in regard to its impacts and should only be used as a reference to the type of impacts than can be expected. A good rule of thumb is to combine several cases of the same project type to gain a spectrum of values, characteristics, settings, and economic impacts to help users understand the range of potential results for particular projects in order to align economic development goals and outcomes. Nonetheless, these cases should only be used as preliminary guide and not as a substitute for an in-depth economic impact analysis that is usually required for project funding.

A more in-depth discussion of the scope, range, and limitations of using these impact results can be found in the chapter on “Lessons Learned for Interpretation of Case Study Findings” in the separate *Practitioner’s Handbook*.

# APPENDIX: LIST OF CASE STUDY RECORDS

**Table 6: List of Case Records by Project Name, Type, & Location**

Project Name	Project Type	City or County	County(ies)	Location	BEA Region
Hammondsport	Access Road	Hammondsport	Steuben	NY	New England/ Mid-Atlantic
Clermont County Industrial Park in Miami	Access Road	Milford	Clermont	OH	Great Lakes/ Plains
Cattaraugus Economic Development Zone Infrastructure	Access Road	Allegany	Cattaraugus	NY	New England/ Mid-Atlantic
Carolina Factory Shops Infrastructure	Access Road	Gaffney	Cherokee	SC	Southeast
Columbus - Lowndes County Riverside	Access Road	Columbus	Lowndes	MS	Southeast
New Phalen Boulevard Corridor	Access Road	St. Paul	Ramsey	MN	Great Lakes/ Plains
State Route 126, Fenton Lake Bridge	Access Road	Jemez Springs	Sandoval	NM	Southwest
Richmond, Virginia, I-295 Bypass	Beltway	Richmond	Henrico, Hanover, Chesterfield, Prince George	VA	Southeast
Appleton, Wisconsin, Route 441 Bypass	Beltway	Appleton	Winnebago, Outagamie, Calumet	WI	Great Lakes/ Plains
Fort Wayne, Indiana, I-469 Bypass	Beltway	Fort Wayne	Allen	IN	Great Lakes/ Plains
Danville, Virginia, I-785 Bypass	Beltway	Danville	Danville	VA	Southeast
Beltway 8 Houston segments	Beltway	Houston	Harris	TX	Southwest
E470 Denver	Beltway	Denver	Boulder, Adams, Denver, Douglas, Arapahoe	CO	Rocky Mtn./ Far West
Arizona Route 101	Beltway	Phoenix	Maricopa	AZ	Southwest

*Appendix : List of Case Studies*

<b>Project Name</b>	<b>Project Type</b>	<b>City or County</b>	<b>County(ies)</b>	<b>Location</b>	<b>BEA Region</b>
I-476 Blue Route	Beltway	Philadelphia	Delaware	PA	New England/ Mid-Atlantic
World Trade Bridge	Bridge	Laredo	Webb	TX	Southwest
Oresund Bridge	Bridge	Copenhagen, Denmark, Malmö, Sweden		Denmark, Sweden	International
The Gene Hartzell Memorial Bridge,	Bridge	Bethlehem	Northampton	PA	New England/ Mid-Atlantic
Third Bridge (Route 3)	Bridge	Augusta	Kennebec	ME	New England/ Mid-Atlantic
Mo. Route 370 Bridge	Bridge	St. Charles	St. Charles and St. Louis	MO	Great Lakes/ Plains
Isle of Palms Connector (SC 517)	Bridge	Mt Pleasant, Isle of Palms	Charleston	SC	Southeast
The Neuse River Bridge,	Bridge	New Bern	Craven	NC	Southeast
Lexington Bridge between I-5 and SR 411	Bridge	Kelso-Lakeview	Cowlitz	WA	Rocky Mtn./ Far West
Potato Hill Bridge	Bridge	Moses Lake	Grant	WA	Rocky Mtn./ Far West
Lake Natoma Crossing Bridge	Bridge	City of Folsom	Sacramento	CA	Rocky Mtn./ Far West
Yass Bypass	Bypass	Yass	Yass Shire	Australia	International
Karuah Bypass	Bypass	Karuah		Australia	International
Eastern Washington - SR 195 Bypass	Bypass	Rosalia	Whitman	WA	Rocky Mtn./ Far West
Fort Atkinson Bypass	Bypass	Fort Atkinson	Washburn	WI	Great Lakes/ Plains
Verona Bypass	Bypass	Verona	Dane	WI	Great Lakes/ Plains
Stonewall Bypass	Bypass	Stonewall	Pontotoc	OK	Southwest
Wichita Northeast Bypass	Bypass	Wichita	Grady & Kiowa	KS	Great Lakes/ Plains
Hollister SR156	Bypass	Hollister	San Benito	CA	Rocky Mtn./ Far West

*Appendix : List of Case Studies*

<b>Project Name</b>	<b>Project Type</b>	<b>City or County</b>	<b>County(ies)</b>	<b>Location</b>	<b>BEA Region</b>
Sonora & East Sonora SR49 & SR108	Bypass	Sonora	Tuolumne	CA	Rocky Mtn./ Far West
US-400 Parsons Bypass	Bypass	Parsons	Labette	KS	Great Lakes/ Plains
Georgetown Bypass	Bypass	Georgetown	Scott	KY	Southeast
Mercer Co. KY, US-127 Bypass	Bypass	Harrodsburg	Mercer	KY	Southeast
Bennington Bypass, VT 279	Bypass	Bennington	Bennington	VT	New England/ Mid-Atlantic
US Highway 281, San Antonio (Extension)	Connector	San Antonio	Bexar	TX	Southwest
I-705 Connector in Washington	Connector	Tacoma	Pierce	TX	Rocky Mtn./ Far West
Branson W (Ozark Mt. Highroad)	Connector	Branson	Stone, Teney	Branson	Great Lakes/ Plains
Southern Connector	Connector	Greenville	Greenville	SC	Southeast
Ted Williams Freeway	Connector	San Diego	San Diego	CA	Rocky Mtn./ Far West
Topsham Bypass/Connector	Connector	Topsham	Sagadahoc & Cumberland	ME	New England/ Mid-Atlantic
US 460	Connector	Blacksburg and Christiansburg	Montgomery	VA	Southeast
US 25 Kentucky	Connector	Dry Ridge	Grant	KY	Southeast
I-70 and 110th Street Interchange	Interchange	Kansas City	Wyandotte	KS	Great Lakes/ Plains
Blue Route and Schuylkill interchange	Interchange	Conshohocken	Montgomery	PA	New England/ Mid-Atlantic
Commerce Parkway Interchange	Interchange	Hays, KS	Ellis	CA	Great Lakes/ Plains
I-95 and Route 128 Peabody	Interchange	Peabody	Essex	MA	New England/ Mid-Atlantic
Interchanges in Major Urban Areas - Bloomington, MN	Interchange	Bloomington, MN	Hennepin	MN	Great Lakes/ Plains

*Appendix : List of Case Studies*

<b>Project Name</b>	<b>Project Type</b>	<b>City or County</b>	<b>County(ies)</b>	<b>Location</b>	<b>BEA Region</b>
Big I Albuquerque	Interchange	Albuquerque	Bernalillo	NM	Southwest
Dallas High Five Interchange	Interchange	Dallas, TX	Dallas	TX	Southwest
I-435 & Nall/Roe Ave. Interchange	Interchange	Overland Park	Johnson	KS	Great Lakes/ Plains
Central Freeway, San Francisco	Interchange	San Francisco	San Francisco	CA	Rocky Mtn./ Far West
I-20 Interchange	Interchange	Jackson	Hinds	MS	Southeast
I-35 and US 290, Texas	Interchange	Austin	Travis	TX	Southwest
Veteran's Parkway Georgia	Interchange	Savannah	Chatham	GA	Southeast
Auburn Intermodal Rail Center	Intermodal Rail	Auburn	Androscoggin	ME	New England/ Mid-Atlantic
Devens Intermodal Rail Terminal	Intermodal Rail	Ayer	Middlesex	MA	New England/ Mid-Atlantic
Global III Intermodal Rail Terminal - Rochelle, IL	Intermodal Rail	Rochelle	Ogle & Lee	IL	Great Lakes/ Plains
Fairburn CSX Industry Yard, Fairburn, GA	Intermodal Rail	Fairburn	Fulton	GA	Southeast
Huntsville Alabama	Intermodal Rail	Huntsville	Madison	AL	Southeast
Tchoupitoulas Corridor	Intermodal Rail	New Orleans	Orleans parish	LA	Southeast
Logistics Park – Alliance TX	Intermodal Rail	Fort Worth	Denton, Tarrant	TX	Southwest
Bayport TX	Intermodal Rail	Seabrook	Harris	TX	Southwest
WorldPort at DIA	Intermodal Rail	Denver	Denver	CO	Rocky Mtn./ Far West
Elwood, IL – CenterPoint Intermodal Rail Center & BNSF Logistics Park	Intermodal Rail	Elwood	Will	IL	Great Lakes/ Plains
Interstate 68	Major Hwy		Garret, Allegany	MD	New England/ Mid-Atlantic

*Appendix : List of Case Studies*

<b>Project Name</b>	<b>Project Type</b>	<b>City or County</b>	<b>County(ies)</b>	<b>Location</b>	<b>BEA Region</b>
Interstate 29	Major Hwy		See footnote 1	IA	Great Lakes/ Plains
Interstate 43	Major Hwy	From Milwaukee to Green Bay	See footnote 2	WI	Great Lakes/ Plains
SR 29	Major Hwy	Chippewa Falls to Green Bay	See footnote 3	WI	Great Lakes/ Plains
Interstate 81 (PA)	Major Hwy	Connects Harrisburg to Wilkes-Barre/Scranton	See footnote 4	PA	New England/ Mid-Atlantic
Interstate 81 (VA)	Major Hwy	Bristol, Roanoke, Harrisonburg, and Winchester.	See footnote 5	VA	Southeast
Interstate 16	Major Hwy	Savannah to Macon	See footnote 6	GA	Southeast
Interstate 26	Major Hwy	Connects Spartanburg to Charleston	See footnote 7	SC	Southeast
Interstate 27	Major Hwy	Amarillo to Lubbock	See footnote 8	TX	Southwest
Corridor B	Major Hwy		See footnote 9	TN	Southeast
I-515 Henderson	Major Hwy	Henderson	Burleson	NV	Southwest
Central Artery Tunnel	Major Hwy	Boston	Suffolk	MA	New England/ Mid-Atlantic
Casey Highway in Pennsylvania (US Route 6)	Major Hwy	Scranton	Lackawanna	PA	New England/ Mid-Atlantic
Interstate 105/Interstate 110 Interchange	Major Hwy	Los Angeles	Los Angeles	CA	Rocky Mtn./ Far West
Anderson Regional Transportation Center, Woburn, MA	Intermodal Pass.	Woburn	Middlesex	MA	New England/ Mid-Atlantic
Sunset Transit Center, Portland, OR	Intermodal Pass.	Beaverton	Washington	OR	Rocky Mtn./ Far West
Bellevue Transit Center, Bellevue, WA	Intermodal Pass.	Bellevue	King	WA	Rocky Mtn./ Far West
Tri-Rail Boca Raton Intermodal Rail Transit Center	Intermodal Pass.	Boca Raton	Palm Beach	FL	Southeast

*Appendix : List of Case Studies*

<b>Project Name</b>	<b>Project Type</b>	<b>City or County</b>	<b>County(ies)</b>	<b>Location</b>	<b>BEA Region</b>
Lindberg Station, MARTA (Atlanta)	Intermodal Pass.	Lindberg/Morosgo	Fulton	GA	Southeast
DART	Intermodal Pass.	Dallas	Dallas	TX	Southwest
BART	Intermodal Pass.	Daly City and Colma	San Mateo	CA	Rocky Mtn./ Far West
Arlington Heights METRA	Intermodal Pass.	Village of Arlington Heights	Cook & Lake	IL	Great Lakes/ Plains
Emerson Park MetroLink	Intermodal Pass.	East St. Louis	St. Clair	IL	Great Lakes/ Plains
Corridor D	Widening		See footnote 10	WV	Southeast
I-86 NY Southern Tier	Widening	Allegany, Cattaguarus, Chautauqua and Steuben	See footnote 11	NY	New England/ Mid-Atlantic
I-15 Reconstruction - Salt Lake City	Widening	SLC	Salt Lake	UT	Rocky Mtn./ Far West
I-70 Glenwood Canyon	Widening	Glenwood Springs	Garfield	CO	Rocky Mtn./ Far West
Santan Freeway: part of Maricopa RTP, AZ	Widening	Mesa, Gilbert, and Chandler	Maricopa	AZ	Southwest
Corridor J, Appalachia	Widening		See footnote 12	KY	Southeast
Corridor Q, Appalachia	Widening		See footnote 13	VA	Southeast
US 75 North Central Expressway, Dallas	Widening	Dallas	Dallas	TX	Southwest
I-394 Minnesota	Widening	Golden Valley	Hennepin	MN	Great Lakes/ Plains

**Footnotes (county details):**

- 1: Fremont, Mills, Pottawattamie, Harrison, Monona, Woodbury
- 2: Brown, Manitowoc, Sheboygan, Ozaukee and Milwaukee
- 3: Chippewa, Clark, Marathon, Shawano, Brown
- 4: Franklin, Cumberland, Dauphin, Lebanon, Schuylkill, Luzerne, Lackawanna, and Susquehanna
- 5: Bristol CITY, Washington, Smyth, Wythe, Pulaski, Montgomery, Botetourt, Roanoke, Rockbridge, Augusta, Staunton, Rockingham, Shenandoah, Warren, Frederick
- 6: Chatham Effingham, Bryan, Twiggs, Bibb, Bulloch, Bleckley, Candler, Laurens, Treutlen, Wilkinson, Emanuel
- 7: Spartanburg, Laurens, Newberry, Richland, Lexington, Calhoun, Orangeburg, Dorchester, Berkeley
- 8: Lubbock, Swisher, Randall, Potter
- 9: Buncombe, NC; Madison, NC; Unicoi, TN; Washington, TN; Sullivan, TN
- 10: Doddridge, Harrison, Wood, Ritchie
- 11: Chautauqua, Cattaraugus, Allegany and Steuben, Chemung
- 12: Laurel, Pulaski, Wayne, Clinton, Cumberland
- 13: Montgomery, Giles, Tazewell, Buchanan, Mercer, WV