

# **REGIONAL DEVELOPMENT IMPACTS OF TRADE CORRIDORS: RECENT EXPERIENCES FROM THE UNITED STATES**

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### **Introduction**

Thoughtful observers of recent trends in global trade, transportation, and logistics have been warning of a looming crisis in North America concerning the lack of transportation infrastructure to meet current needs, let alone those of the future. Sharp increases in the volume of trans-Pacific trade are threatening the capacity of the west coast ports as well as inland highway and rail networks. Projections by the US Department of Transportation [US DOT] indicate that a “tsunami” of trade flows will inundate the west coast over the next thirty years, and that current and planned transportation capacity in the Western US especially is woefully inadequate to handle the expected volumes. Add to this the continued growth in automobile and other passenger traffic within and between the growing cities of the West, further straining existing capacity, and the outlines of the current and future transportation infrastructure crisis become even clearer.

Transportation infrastructure is vital to economic development, quality of life, and national security. As the circulation system of our society, it represents the veins and arteries through which goods, people, and information flow. Our contemporary globalized economy would simply not be possible without an efficient transportation system. As one important manifestation of globalization, international trade has grown from 13% of US GDP in 1990 to 24% in 2000, with projections of 30% by 2010. Concomitantly, the volume of freight transported grew by over 30% between 1990 and 2000, and is expected to double over the next 20 years. Much of this freight is being shipped in containers on very large ships from Asia, unloaded at West Coast ports including Los Angeles/Long Beach, Oakland, Portland, Tacoma, Seattle, and Vancouver, and then transferred to rail cars and trucks for distribution to inland load centers and eventually to wholesale and retail outlets throughout North America. The ports, rail lines, highways, local connectors, and other transportation infrastructure that makes trade possible are sagging from the weight of this increased volume, and need significant investment to withstand the flood of expected freight to hit our shores.

In recognition of the importance of trade to national and regional development, governments at the federal, state, and local levels in the US have been developing plans, programs, and projects to begin addressing the transportation infrastructure challenges of increased trade volumes. The US federal government established the National Corridor Planning and Development [NCPD] Program and the Coordinated Border Infrastructure [CBI] Program to provide funding for planning, project development, construction and operation of projects that serve high priority corridors throughout the United States and border regions near Mexico and Canada (USDOT, Federal Highway Administration 2007). Individual US states, metropolitan planning organizations, and even some private sector groups are engaged in these and other initiatives designed to address transportation capacity issues caused in part by increasing freight volumes.

This paper examines the general topic of the regional economic and environmental impacts of transportation corridors on nearby communities, with a specific focus on projects and plans in Colorado and the western US. Numerous theoretical and empirical studies have established the significant impact of transportation in facilitating economic development. Many small, rural, and/or economically distressed places have especially come to view transportation projects as vital to increasing regional employment and long-term economic growth. Similarly, many studies have addressed the environmental and social implications of transport projects, usually in the context of more highly urbanized communities. Many of the trade corridor plans and projects in the US have emphasized their economic development benefits at different geographic scales while being cognizant of minimizing negative environmental and social externalities upon local communities.

After a review of the theoretical and empirical literature dealing with the economic development and environmental impacts of transportation projects, this paper discusses some of the trade corridors that have been developed as part of the USDOT NCPD program. The paper then focuses on specific efforts in Colorado and the western US to develop trade corridors that traverse more sparsely-settled, rural areas to avoid already highly-congested routes. These include the following examples:

- ? The "Ports-to-Plains" NCPD corridor that starts in Nuevo Laredo, Mexico and goes north through western Texas, the Oklahoma panhandle, northeast New Mexico, and eastern Colorado, ending at Denver,
- ? The Front Range Railroad Infrastructure Rationalization Project which is a Colorado Department of Transportation plan to relocate railroad lines away from the more congested Front Range urban corridor (Ft Collins-Denver-Colorado Springs-Pueblo) farther out onto the eastern Colorado plains, and
- ? The Prairie Falcon Parkway Express plan (nicknamed by opponents the "Super Slab") led by a private-sector group to build a toll road and rail line from north of Ft Collins to south of Pueblo about 20-30 miles east of Interstate-25 that would bypass central Denver and central Colorado Springs.

Each of these examples is profiled to analyze proposed impacts, both positive and negative, on those communities through which the projects would traverse.

## **Literature Review of Economic, Social, and Environmental Impacts**

### *Theoretical Overview*

Development is the key objective of the modern world. It is a complex phenomenon encompassing natural, economic, social, cultural and political conditions. According to the various theories of development a wide range of inter-related factors are responsible for the accomplishment of this phenomenon: all levels of a transportation system being one of the most important among them in today's fast moving world. (Peet and Hartwick 1999).

Transportation systems affect all aspects of development either directly or indirectly. The economic, social and natural/ environmental conditions are most widely affected by the expansion of transportation networks. The market economy changes and prospers as a better transport network increases the mobility of passengers/laborers, freight, and information. Commodities become more accessible to a larger section of the population. In other words it can be said that the entrepreneurs get the chance to spread out their business in a larger sized market. Virtually every economic boom in modern human history can be associated with a technological innovation in the transport sector. For instance from the 16<sup>th</sup> to the 18<sup>th</sup> centuries, the development of seaports and sailing ships supported international trade and expansion of colonial power throughout the world. In the late 18<sup>th</sup> and 19<sup>th</sup> centuries the success of the Industrial Revolution largely depended on the expansion of the waterways and railways. And finally the elaborate roadway and airway system of the 20<sup>th</sup> century has paved the way towards massive globalization of the world economy (Rodrigue, Slack, and Comtois 2006). Thus, the relation between transportation and economic progress is a positive one. With elaboration of the transport network, the cost of transportation is reduced. This in turn improves productivity by enabling more commodities to be produced per dollar spent on inputs (Forkenbrock and Weisbrod 2001).

Transportation systems have profound positive as well as negative impacts on the social life of the surrounding communities. The positive impacts include reduction of time and cost of travel to work places, shopping complexes, and entertainment centers. Negative impacts mainly include displacement of residents and businesses, mobility gaps, congestion, and occurrence of accidents. The residents and businesses lying in the way of construction of a transport network are forced to relocate to other sites. But this move leads to a chain of social, economical, as well as psychological disruption. The ineffectiveness of some communities to increase their mobility due to lack of income or facilities puts them in a disadvantageous position in relation to others mainly in terms of availability of economic opportunities. Congestion and accidents occurring due to overuse of transportation networks also have serious consequences for human life and health, insurance, and damage to property. These negative effects usually decline with increasing distance from the line of transportation (Rodrigue, Slack, and Comtois 2006; Stutz 1976).

Transportation networks cause enormous amounts of environmental damage in a multitude of ways. In the United States, the vehicles use a huge amount of fossil fuel every year and so they are responsible for all types of damage taking place such as increases in air pollutants and oil spills. Chemical gases and particles which are released by cars and trucks eventually fall out of the air onto street surfaces or other land areas and finally, during rain or storm events, they are washed into the rivers and lakes causing water pollution. Transportation also gives rise to huge amounts of noise pollution. With expansion of transportation networks, more green spaces are being converted into built-up areas and this in turn leads to loss of diversity and fragmentation of ecosystems. Large plots of fertile farmland are lost forever under large strips of concrete (Clean Water Action Council 2007). Transport structures do not usually have much aesthetic value and so their visual impact has an adverse effect on the quality of the physical environment.

### *Empirical Studies of Economic Impacts*

There exists a very strong relation between transportation and economic activities which is evident from the fact that all important business transactions take place along the main lines of transport. Delivery of goods and services, worker access to jobs and household access to consumer markets all depend on transport facilities. Transportation facilities form the backbone of any developmental process. Hence attempts have been undertaken to measure the effect of major transportation projects on the economic development of an area. It is usually measured in terms of change in output, gross regional product, personal income, and employment. Some other factors like property values, taxes, investment and productivity also give an insight into the intensity of economic development but at a smaller scale. Many analytical methods have been used by several private and public agencies to understand the impact of transportation at local, regional and national levels. The results of the analysis are later used for constructing important policies and framing future projects.

The Economic Development Research Group (2000) completed a US National Cooperative Highway Research Program (NCHRP) synthesis report where in a detailed analysis of the economic impacts of some important transportation projects was provided. The following explanation provides insight into some of those projects.

Surveys and interviews help to provide qualitative as well as quantitative information about the impact of a proposed transportation project on the economy of a community. This method was adopted during the relocation of US Highway 10 north of downtown Durand, Wisconsin. The study projected that most of the business in the area is highway dependent and so will suffer from a fall in sales due to a shift of US Highway 10. But the loss will soon be compensated by the increase in local traffic that will have enough space through the existing route of the highway.

Regional economic models were used to analyze the effect of building a bridge over the Mississippi River and the Zachary Taylor Parkway in central and northern Louisiana. According to the report during the construction period, there will be 9,121 job-years in the corridor and 9,598 job-years in the rest of the state. An income of about \$176 million will be created in the corridor during the construction time. It is expected that on completion of the project by 2035 around 2,926 jobs will be generated in the corridor and 194 in the rest of the state. The income level will also increase by \$120 million in the corridor and \$78 million in the rest of the state over a period of 30 years.

The Massachusetts Aeronautics Commission conducted a study to document the economic role played by the state's 42 public use airports, outside the Boston area, at the local and state level. The study showed that the airports directly support 5,174 jobs in their communities and an additional 3,878 jobs in the surrounding areas. The airports also generate \$245 million of annual wages for workers in the state. They provide important recreation, education and public safety services to the local community.

The transit services of Danbury, Connecticut have huge economic impacts on the local communities and it was measured by a study commissioned by the Housatonic Area Regional Transit District (HART). On the basis of data collection and surveys, it was found that HART's operation generates about \$3.3 million of local wage income. Its services give rise to user cost savings of \$5.5 million. But since there is a local public cost of \$3.3 million for running the services and a public subsidy of \$4.2 million, the net benefit is only \$1.3 million to the local economy.

The Appalachian Development Highway System was established to bring about regional economic development in an isolated and economically depressed region of the US. Later, the income growth rate of the counties with the highway system built in them was compared to the other counties having similar economic and demographic profiles. It was found that the counties with the Appalachian Highway system grew 32% faster than the other counties in the region.

Transportation projects have affected the economic development of local communities throughout the world. For instance, in Australia, the Berrima and Mittagong bypasses had a very different impact on the economic condition of the two small cities. The bypasses were built as part of the project upgrading the Hume Highway from Sydney to Melbourne. As a consequence, Berrima experienced a decline in local traffic congestion which increased the popularity of the city among the tourists and shoppers. There occurred a net increase of 7% in gross sales, 2% in employment, 8% in property values and 5% in income tax revenue. Mittagong's economy, on the contrary, suffered from short-term losses of 6% in gross sales, 3% in employment, 1% in property values and 4% in income tax revenues. However, local business operators perceived these changes as short-term effects of traffic rerouting, and anticipated net increases in these values in the long-term.

Transportation networks cast their impact on non-metropolitan counties and areas as well. Chandra and Thompson (2000) highlighted the effect of new highway construction on adjacent counties and non-metropolitan areas. It was found that the earnings of the manufacturing industries located in the adjacent counties increased considerably by about 2% to 10%. The industries that experienced a boom in their economic output mainly produced nationally traded goods. The effect of highway construction was positive on the retail and service sector only if the county was situated beside the highway or had the highway passing through it. In the other counties, highway investment reduced earnings in the farming, retail and service sector. Loss of earning in farming was the highest, about 10% to 30% and in retail trade and service sector it was 3% to 6%. Thus the net effect of transportation on regional economic activity in this example was mixed.

The Federal Highway Administration (FHWA) hired Jack Faucett Associates and the Economic Development Research Group (2005) to conduct research on the economic effects of selected rural interstates at the county level. The study was conducted through 2003 and 2004 for nine interstate or near interstate corridors where data were easily available. The county level data of population, employment, income, and other variables

were compared against the time period before, during, and after completion of the interstate.

The results of this research, again, clearly depicted that the rural interstates have positive as well as negative impacts on the adjoining counties. Bryan County, Georgia in the I-16 corridor, observed a 420% increase in jobs and a 290% increase in population against 130% in jobs and a 90% increase in population for the State of Georgia between 1969 and 2002. At the same time in Emanuel, Treutlen, Wilkinson, and Twiggs counties in the I-16 corridor, economic growth has taken place more slowly. In these counties the advantages of the interstate (employer access to labor, labor mobility, and supplier access to market) have been overshadowed by poor economic conditions (the relative decline of the US industrial economy, especially certain segments, such as tobacco and textiles). In fact, there is some speculation that in some portions of these counties, I-16 actually suppressed economic activity by: 1) facilitating retail activity outside the area that would otherwise remain in the county; 2) diverting through traffic from non-interstate highways; or, 3) acting as a physical barrier to commerce. I-16 is not the only corridor where such disparity exists within the different counties in terms of economic growth and development. Similar examples can be found in other corridor studies as well.

Stories of positive development along the interstate corridors, however, are more common than the negative ones. For instance Hale County, Texas, situated in the I-27 corridor experienced a 30% increase in employment between 1969 and 2002 due to reasonable success of three industrial parks near I-27 attracting agricultural-related industrial employers. Brown and Ozaukee counties in Wisconsin had 25% and 34% increases respectively in manufacturing employment between 1990 and 2000 after I-43 was built. Though some doubt the role of I-43 in the improvement of the manufacturing industry, the advocates of the process seriously believe in it. The Virginia I-81 corridor instigated an 18% increase in manufacturing employment between 1971 and 2000. The development occurred mainly in the southern part of the corridor where a large chemical industry was closed in 1970. Woodbury County, Iowa went through massive transformation after the I-29 corridor was constructed. This county was once a major meatpacking center and destination of livestock shipped from the northern Great Plains. But due to consolidation of agriculture and closure of livestock yards and meatpacking units, the county suffered from economic recession during the 1970s. By 1983, the region encompassing Sioux City began to attract some business by virtue of its presence beside I-29 and partly due to improvements in other highways. Since then employment has increased substantially (about 25%) and the increase in housing prices (about 85%) exceeded the average for both Iowa and the United States (about 80% and 50% respectively).

So, highway economic development has taken place in a mixed fashion with considerable dependency on the degree of accessibility and connectivity provided by the Interstate Highways. Other factors of economic development play an important role in the improvement of the non-metropolitan places located beside or near the highways. It must be pointed out that the highways do not automatically increase employment opportunities as advocated by some scholars, neither do they always provoke sprawling and lower

income jobs. They only act as a catalyst towards economic growth and development helping counties with partially successful employment expansion programs to have more success.

The phenomenal growth of some Asian Newly Industrialized Countries has increased trans-Pacific trade to a great extent in recent years. There has been a tremendous upsurge in freight mobility, management of which has become a pivotal factor behind survival in today's competitive international market. Freight transportation includes movement of goods by truck, train, ship, and airplane or all of these modes combined. With increases in freight transportation, a smooth connection between the different modes of transportation became important and along with it the various intermodal transportation projects. In the United States, several multimodal/intermodal transportation plans, funding programs and projects were launched in the past decade. Some of the best plans were the Florida Intermodal Planning Process, Miami-Dade County Planning Process, Oregon Corridor Planning Process, Pennsylvania Policy Plan, Washington State Freight Planning Process, Washington State Regional Planning Process, and Wisconsin Statewide Multimodal and Intermodal Plan. Among the funding programs mentioned were the Florida Intermodal Development Program, Tennessee Transportation Equity Fund, and Wisconsin Transportation Economic Assistance Program. Most of these plans, funding programs, and projects had a profound influence on the economies of their surrounding regions as evidenced by evaluations of any of the above mentioned programs.

As an example, the Wisconsin Transportation Economic Assistance Program was launched in 1987 to provide communities with financial grants so that they can pay for construction of road, rail, harbor and airport facilities which were important to attract new business to Wisconsin or expand current ones (WisDOT 1999). The program went on through August 1998 and generated 38,000 direct and indirect jobs (See Table 1). The program distributed \$39 million through grants awarded to 135 communities. Some 161 businesses benefited from the grants. According to a recent job audit, actual job creation and retention is 104% of those promised. The average state cost to date has been \$2,225 per direct job created. This program was deemed to be a great success. Its main objective—to cut through the normal transportation scheduling process and provide necessary transportation funds to help accommodate business development and creation of good paying jobs—was accomplished to a large extent.

**Table 1: Sample TEA Projects, 1987 to February 1997**

Grant No.	Project Name	Project Description	Business Description	TEA Grant Amount (\$)	Total Jobs Created
6	Oshkosh, Winnebago County/ Experimental Aircraft Association	Improve access roads to airport and convention grounds	Convention and museum operator	162,500	259
14	Bloomer/Bloomer Plastics/A.J. Industries, Inc.	Construct 4,000 ft. access road and 905 ft. rail spur	Plastics and building products	301,068	100, plus 20 retained



18	Mellen/North County Lumber/Superior Kilns	Construct access road, 1,465 ft. rail spur, and railroad bridge in industrial park	Lumber mills and kilns	245,449	95
25	Stratford/A&B Process System Corp.	Build access & connecting roads to new industrial park	Manufacturer of fabricated stainless steel products for food industry	135,000	68
29	Milwaukee/Grace Cocoa	Construct 2,550 ft. rail spur	Chocolate maker, mostly in bulk	132,450	75, plus 1,119 retained
49	Readsburg/Land's End, Inc.	Construct access road & improve intersection of new access & CTH 'H'	Telecommunication center for U.S. & foreign catalog sales of clothing	85,000	673
72	Wisconsin Rapids/Northland Cranberries, Inc.	Extend 990 ft. access road plus 1,310 ft. of storm sewer	Largest cranberry grower in the world	109,500	122
79	Berlin/ U.S. Leather, Inc.	Construct & reconstruct 3,230 ft. of Quarry Street linking two stubs; wetland mitigation	Finisher of leather for footwear, accessories, sporting goods & apparel	180,000	68, plus 31 retained

Source: WisDOT, Division of Transportation Investment Management, *Transportation Economic Assistance Projects* (Madison, Wisconsin, February 1999).

### *Bypass Phobia*

During the construction of Denver International Airport, University of Colorado history professor Tom Noel offered this tongue-in-cheek observation about why Denver was building such a big airport (Dempsey, Goetz, and Szyliowicz 1997):

Why is Denver, one of this planet's smaller major cities, building one of the world's largest airports? . . . Denver suffers from "by-pass phobia." As one of the most isolated major cities, the Mile High City has always been afraid the world would pass by without noticing the little city in the middle of nowhere (Noel 1994).

This "condition" has been perceived to be true not only of Denver, but other large cities and especially many small towns, as they have struggled to achieve some measure of economic relevance in the face of relentlessly competitive market forces. In the case of Denver, when the Union Pacific Railroad announced in 1867 that they would be building their transcontinental rail line through Cheyenne, Wyoming instead of Denver, the early town leaders banded together and formed the Denver & Pacific Railway and Telegraph Company to build a spur line to connect to the Union Pacific at Cheyenne.

Bypassed by the transcontinental railroad which ran through Cheyenne, Denver's leading citizens feared the city of 4000 would go the way of the ghost towns. Ignoring doubters, in a week's time they had raised the monumental sum of \$300,000. The Denver Pacific Railroad was born. Denver was on the map (Greenwald 1995).

This critical decision has been the most frequently-cited reason for why Denver was able to survive its early years, and then go on to become the largest city in the Rocky Mountain region.

Denver and other cities and towns across the West experienced varying degrees of success in being connected to rail, road, highway, and air transportation networks. Other places, however, have not been as fortunate, and as a result, they have had a more difficult time in establishing their economic relevance and justification for existence. Many towns were simply not able to make these connections, and withered away. The Great Plains and interior West are dotted with the remnants of numerous ghost towns that were ultimately unsustainable. Transportation was the economic lifeline for many of these plains country towns (Hudson 1985). If they were able to establish and maintain a rail or highway connection, there was a chance for survival. If not, chances were not so good. Just like the railroads of the late 19<sup>th</sup> century, the Interstate Highway System in the late 1950s and 1960s became the network to which access was critical. Many small towns bypassed by the Interstate (the "Radiator Springs" syndrome) have struggled to maintain their economic relevance.

### *"Pockets of Pain"*

Not only are places bypassed as a result of decisions regarding infrastructure provision, but government policy and private sector decisions can also affect the fates of many places. One such example is the effect that government decisions to deregulate or liberalize transportation industries have had on providing service to different places. One of the concerns raised about deregulation prior to its enactment was the effect it would have on certain places, particularly smaller towns, in the transportation network. It was hypothesized that under deregulation transportation providers would focus their services on the more lucrative, higher-density markets and would eschew smaller places.

Evidence from over twenty years of research on the experiences of deregulation in the United States and elsewhere have confirmed some of these fears. In the case of the US air transportation system, for example, numerous studies by the US Government Accountability Office (GAO—formerly the General Accounting Office) and others have shown that not all places were benefiting from deregulation, and that as many as 30% of air routes were experiencing poorer service and/or higher fares than before deregulation started<sup>1</sup>. Findings such as these led the US Department of Transportation to announce in

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<sup>1</sup> These studies and testimonies have included such topics as: fare and service changes among small, medium, and large communities (US GAO 1990c, 1991a, 1996a); higher fares at concentrated airports (US GAO 1990a, 1991a, 1991b, 1993); barriers to entry limiting competition (US GAO 1989, 1990b, 1991b, 1996c, 1997a, 1997b, 1998a, 1998b, 1999b); effects of mergers and alliances on competition (US GAO

the late 1990s that significant “pockets of pain” exist across the air transport landscape and that it had a responsibility to address the concerns of these communities (Goetz 2002).

The “pockets of pain” scenarios caused by deregulation can be extended to other transportation sectors, such as rail, trucking, maritime, and bus. Under the hegemony of deregulation and liberalization policies, individual communities can find themselves caught in a competitive crossfire, scrambling to maintain service and relevance in the new global economy. Transportation firms, including airlines, railroads, maritime shippers, truckers, and bus companies have benefited from policy changes that provide them with more flexibility to choose which places to serve, and which not to serve, at whatever prices the market will bear. Cities and towns with airports, seaports, and rail/road terminals are in competition with other cities and towns to ensure that the private transportation firms continue to provide good quality and reasonably-priced service to their citizens. Places left out of the market equation, even if they invest in significant infrastructural facilities, can suffer from a by-pass effect similar to the other cases. Infrastructure alone will not guarantee economic success.

This was revealed to a degree in the case of Denver International Airport (DIA) and other airports where hub facilities were built and the airlines eventually decided to leave. For DIA, planners and forecasters from the US Federal Aviation Administration and private consulting firms had projected future passenger enplanements, and thus the rationale to build a huge new airport, based on the likelihood that DIA would continue to be a hub for three major carriers. United, Continental, and the original Frontier Airlines each operated a hub in Denver in the early 1980s. Due to the vagaries of competition in a deregulated industry, the original Frontier Airlines was acquired by People Express in 1986, and then in turn by Frank Lorenzo’s Continental Airlines, which left two hubbing airlines in Denver. In 1994, Continental announced that it would pull out of its Denver hub, thus leaving United as the only hub airline in Denver when DIA opened in 1995. The FAA had based its lofty passenger projections on the likelihood that American Airlines would open a hub in Denver by 1995. When assessing the possibility of hubbing in Denver, American CEO Bob Crandall wryly referred to DIA as a “field of dreams” and denounced the “build it and they will come” approach to airport planning (Dempsey, Goetz, and Szyliowicz 1997).

The DIA case, however, has turned out reasonably well, as a newly reconstituted Frontier Airlines has re-established a hub in Denver, and now low-cost Southwest Airlines has instituted service there. But other cases, such as Kansas City’s investments in ill-fated hub facilities for now defunct TWA and then Eastern Airlines, or Colorado Springs’ investments for long-gone Western Pacific Airlines have not been as fortunate. Investing in transportation infrastructure is usually a good economic development strategy, but it will not necessarily guarantee success.

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1988, 1998c, 1999a, 2000, 2001), and studies of fares and service at specific communities (US GAO 1988, 1997b, 1998a, 1998b, 1999c, 1999d) (see Goetz 2002).

### *Freeway Revolt*

Other elements to consider in planning transportation infrastructure projects are their social and environmental impacts. As the theoretical studies have shown, there are some significant negative social or environmental impacts from transportation that must be considered together with the positive impacts.

During the early phases of construction of the US Interstate Highway System in the late 1950s and early 1960s, the public response to building highways was quite positive, as most people could see the direct benefits of improving travel speeds and accessibility through a national system of limited-access, divided highways. Since much of the early Interstate system was built through more sparsely-populated rural areas, the negative impacts of acquiring land and property and displacing residents were fairly minimal. When the Interstate Highway System went through urban areas starting in the 1960s, however, a public backlash popularized as the “freeway revolt” spread from one city to another wherein many residents faced displacement, homes were demolished, and neighborhoods were split (Goetz 2007). Adding to these concerns were the growing environmental impacts of air and noise pollution on nearby residents who found themselves with major highways as neighbors. Other environmental impacts of the highways included contributions to urban sprawl, consumption of open space, and encroachment into animal habitats on the metropolitan fringe. Finally, there was a growing realization that the new highways were not really solving urban traffic congestion, but were in fact, adding to the problems through the phenomenon of “induced demand.” Simply put, highways that were being built to meet demands twenty years into the future were being filled up within five years because of changes in travel behavior and changes in land use that led to more suburban and exurban development that encouraged more highway driving. By the early 1970s, most observers realized that we could not simply bulldoze our way through urban traffic problems.

The backlash to overly zealous urban highway programs has also manifested itself in response to other transportation projects. Residents living near airports, seaports, rail terminals, and other nodes and corridors of transport activity have expressed dismay at the negative externalities that impact their neighborhoods. Returning back to the example of DIA, a new airport would not have been built in Denver if residents who lived near the old Stapleton airport had not objected to aircraft noise and insisted on a new site for the airport. Many other airports around the world face a constant struggle over noise complaints from nearby residents. Plans to expand port facilities in already developed cities run into obstacles from nearby residents who do not want transport activities to encroach upon their neighborhoods. Expansion plans at the ports of Los Angeles and Long Beach have faced severe criticism from nearby residents who object to increased truck traffic congestion into and out of the port areas, as well as increased air pollution impacts from both the trucks and the ships. There are many examples where freight transport infrastructure projects are opposed by urban residents who object to the negative impacts. These examples tend to be in or near more densely populated areas where there is a greater risk of incompatibility in adjacent land uses.

## National Corridor Planning and Development Program

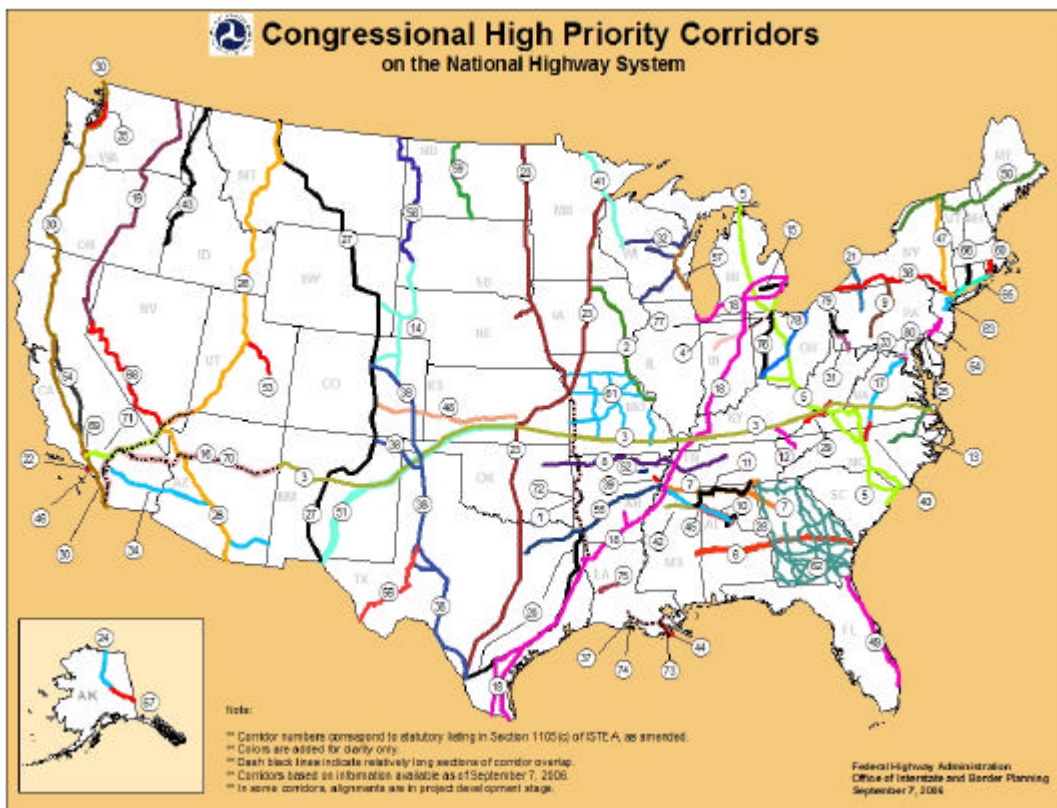
In response to concerns that capacities on certain strategically-located routes were inadequate to handle anticipated future volumes of traffic due largely to increased international trade activity, the US Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 designated and provided funding to improve 21 high priority corridors. In 1997, the USDOT proposed a program that would add new corridors to the ones already-designated as part of a new National Corridor Planning and Development (NCPD) Program, that was subsequently enacted by Congress in the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) of 1998. An affiliated Coordinated Border Infrastructure (CBI) Program was initiated at the same time. The NCPD and CBI programs provided over \$1.1 billion from 1999 to 2003 to state Departments of Transportation (state DOTs) and Metropolitan Planning Organizations (MPOs) for planning and construction of corridor and border projects. Funding was continued in 2004 and 2005 as part of the TEA-21 extension, at \$140 million each year. The program was not reauthorized as part of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) of 2005, but other funds in this legislation can be used for high priority corridors. Some project funding is still continuing from TEA-21 as well as state/local funding (USDOT/FHWA 2007).

Altogether, 80 corridors have been identified as part of the NCPD program (see Figure 1). Because they were first designated as part of ISTEA in 1991, much of the focus of these corridors was on addressing the needs of north-south trade precipitated by the North American Free Trade Agreement between Canada, Mexico, and the US, although some of them are geared toward improving east-west flows. Some of the more notable projects include:

- ? #14—the Heartland Expressway from Denver, Colorado through Nebraska to Rapid City, South Dakota; this corridor connects the Ports-to-Plains corridor (#38) with the Theodore Roosevelt Expressway (#58)
- ? #18--the I-69 corridor (also called the NAFTA corridor) from Sarnia, Ontario, Canada through Michigan, Illinois, Indiana, Kentucky, Tennessee, Mississippi, Arkansas, Louisiana, and Texas all the way to Brownsville, Texas at the border with Mexico
- ? #22--the Alameda Transportation Corridor along Alameda Street from the entrance to the ports of Los Angeles and Long Beach to I-10 in Los Angeles
- ? #34--Alameda Corridor-East and Southwest Passage that goes from East Los Angeles (at the terminus of the Alameda Corridor) to termini at Barstow in San Bernardino County and Coachella in Riverside County, as well as I-10 from San Bernardino to the Arizona state line;
- ? #23—the I-35/I-29 corridor from Laredo, Texas through Oklahoma, Kansas, Missouri, Iowa, Nebraska, South Dakota, Minnesota, and North Dakota, terminating at the Canadian border at I-29
- ? #26--the CANAMEX Corridor from Nogales, Arizona through Nevada, Utah, Idaho, and Montana along I-15 to the Canadian border,

- ? #27—the Camino Real Corridor from El Paso, Texas through New Mexico, Colorado, Wyoming, and Montana to the Canadian border at I-15
- ? #30—the I-5 Corridor from the Otay Mesa Port of Entry on the Mexican border along California State Route 905 through California, Oregon, and Washington
- ? #35--the Everett-Tacoma FAST Corridor in the Seattle, Washington metro area
- ? #38--the Ports-to-Plains Corridor from near Nueva Laredo, Mexico through Texas, Oklahoma, New Mexico, and Colorado, ending at Denver
- ? #46—I-710 between the terminus at Long Beach, California to California State Route 60
- ? #58—the Theodore Roosevelt Expressway from Rapid City, South Dakota to the border with Canada at Raymond, Montana on Montana Highway 16
- ? #59—the Central North American Trade Corridor on US Route 83 in North Dakota through Minot to the Canadian border

**Figure 1: High Priority Corridors Designated in the National Corridor Planning & Development Program**



Source: USDOT/FHWA 2007

Progress in planning and developing these corridors has varied. Some, such as the Alameda Corridor in California have already been completed, while the Alameda

Corridor-East project and the FAST corridor project in Washington are well underway. Others are in various stages of planning and development, and a few have not made much progress at all.

The following sections will profile three freight-oriented projects in various stages of planning in Colorado, including the Ports-to-Plains Corridor, which is part of the NCPD.

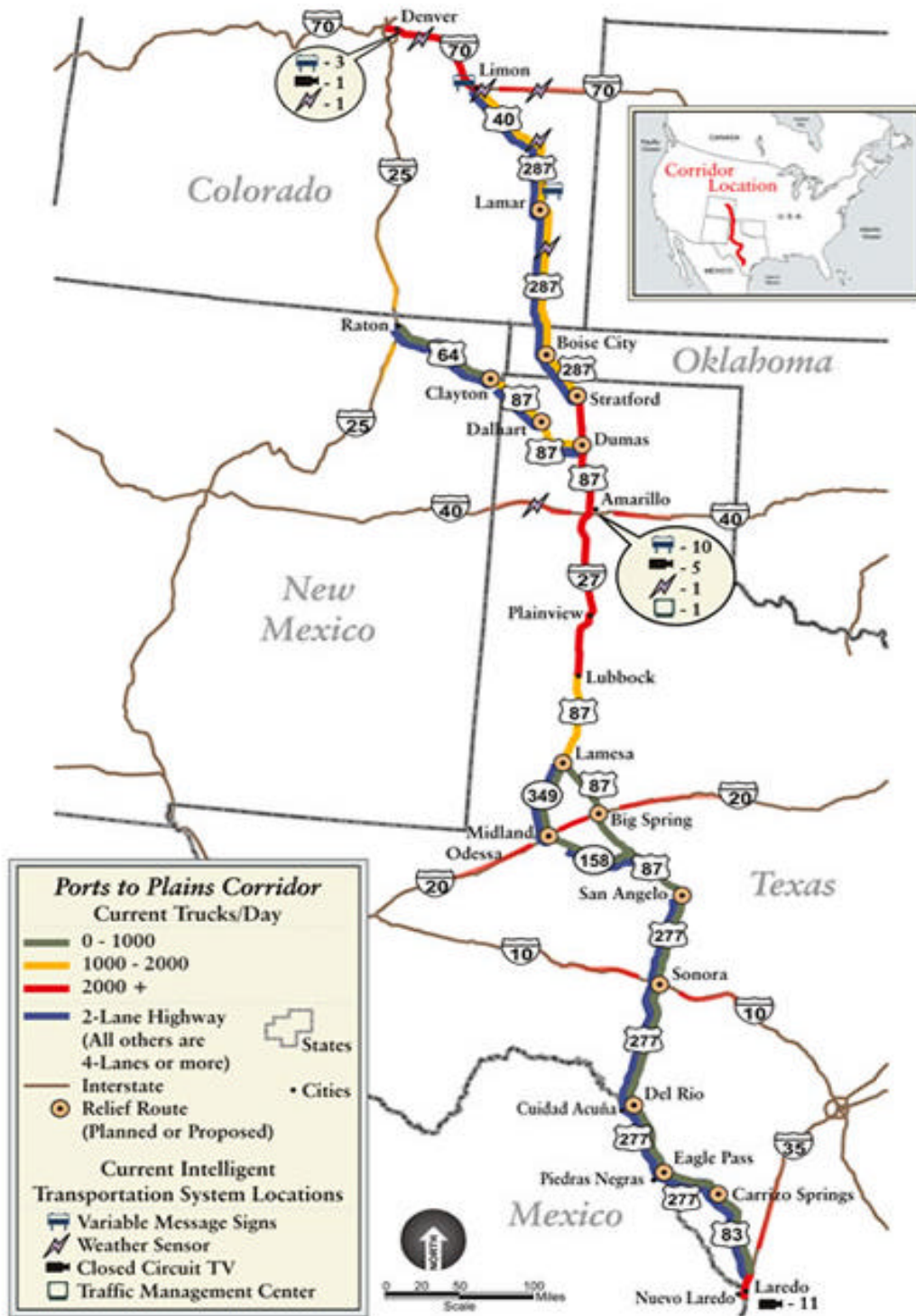
### **Ports-to-Plains Corridor**

Designated as part of the TEA-21 legislation in 1998, the Ports-to-Plains Corridor extends from the Mexican border at Laredo through Texas, Oklahoma, New Mexico, and Colorado, ending at Denver (see Figure 2). The *Ports-to-Plains Feasibility Study* (2001) and the *Lubbock to I-10/Amarillo North Route Study* (1996) led to this specific route designation: the border crossing at Laredo north along I-35 to US Highway 83; US Highway 83 to US 277 at Carrizo Springs; US 277 to San Angelo; US 87 to Lubbock; I-27 to Amarillo; US 287 to Limon, Colorado, and then I-70 west to Denver. Also included were parts of Texas State Highway 158 near Sterling City to Midland; Texas State Highway 349 from Midland to Lamesa; and a stretch of US 87/64 from Dumas, Texas to Raton, New Mexico.

This corridor was designated for the purpose of improving the flow of trade between Laredo, Texas and locations along the corridor, leading to Denver. From Denver, it will connect to the Heartland Express corridor which leads to Rapid City, South Dakota where it will connect with the Theodore Roosevelt Expressway north to the border crossing with Canada at Raymond, Montana/Reaway, Saskatchewan. These three corridors have been grouped together as part of the Great Plains International Trade Corridor (See Figure 3).

The Ports-to-Plains corridor links to the inland Port of Laredo which is one of the largest ports of entry from Mexico, carrying 50% of the value and 36% of the volume of goods carried between the United States and Mexico by rail and truck (*Ports to Plains Corridor Development and Management Plan*, 2004). The corridor is nearly 1400 miles long, consisting of 511 miles of 4- to 6-lane roadway, 755 miles of 2-lane roadway, and 113 miles of roadway in metropolitan areas. The ultimate goal of the corridor plan is to upgrade the entire route to at least a 4-lane divided highway, construct 15 relief routes around larger towns, add amenities needed by commercial vehicle operators; improve or construct connective interchanges; improve or construct overpasses for railroad crossings; replace obsolete or deficient bridges; install corridor-specific signs; and integrate an intelligent transportation system (*Ports to Plains Corridor Development and Management Plan*, 2004).

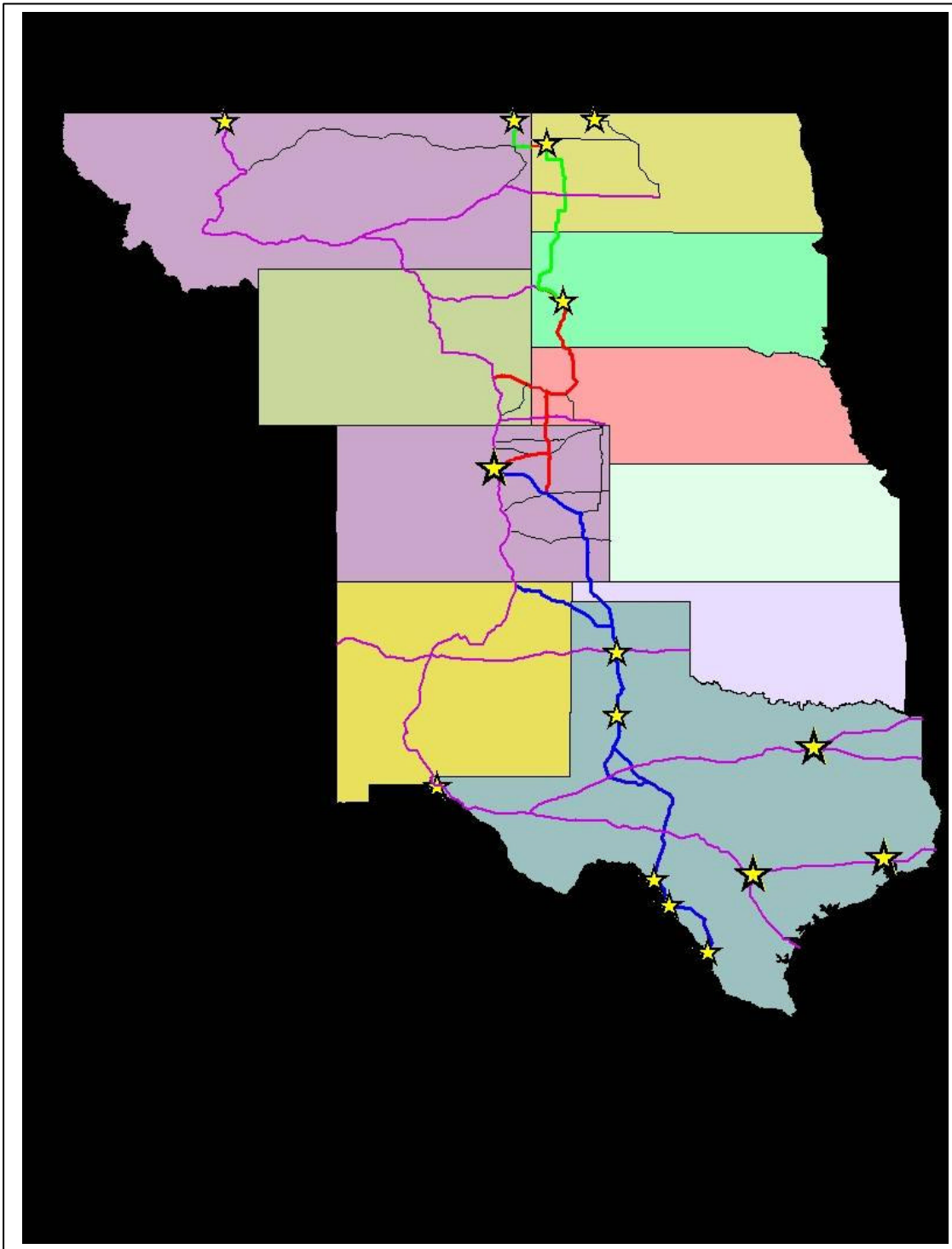
Figure 2: Ports-to-Plains Corridor



Source: Ports-to-Plains Corridor Development and Management Plan, 2004.



**Figure 3: Great Plains International Trade Corridor**



Source: Great Plains International Trade Corridor 2006.

Benefit/cost analysis indicates that the project is expected to cost nearly \$2.9 billion (in 2004 dollars), of which nearly \$2 billion would be in Texas alone. Transportation user benefits, including improved safety, travel time savings, and vehicle operation costs are estimated to be just under \$1 billion summed over the period from 2011 to 2030. But economic development benefits, including employment and earnings in construction, manufacturing and distribution, roadside services, tourism, and fiscal benefits total nearly \$19 billion and will create over 43,000 jobs over the period from 2006 to 2030. Over \$16 billion and 39,000 jobs are projected to be generated by the manufacturing and distribution sector alone. Using the US Office of Management and Budget (OMB) guidelines for calculating net present values on the costs, transportation user benefits, and economic benefits, the estimated benefit/cost ratio is 3.15.

The *Ports to Plains Corridor Development and Management Plan* (2004) also included an assessment of environmental, social, political, and financial risk. Project planners conducted inventories of potential environmental impacts, surveys distributed at public meetings and through a website, interviews with community leaders and residents along the corridor, research into the political setting of the corridor area, and analysis of traditional and potential funding sources.

The entire corridor was subdivided into 41 project sections and 15 relief routes for the purpose of environmental inventories including the identification of major rivers, streams, and reservoirs; wetlands; riparian habitats; floodplains; endangered and threatened protected species; air quality; cultural resources; low-income and minority populations; noise; potential relocations; public lands and community facilities; irrigated farmlands; induced growth and cumulative impacts; and hazardous materials. The purpose of this inventory was simply to identify potential environmental impacts that would need to be addressed more fully in future environmental studies as part of the National Environmental Policy Act (NEPA) process. Of the 41 sections, it was estimated that 4 could be cleared through a Categorical Exclusion (CE), 4 others might also be cleared, 23 will require an Environmental Assessment (EA), and 10 will require at least an EA or perhaps a more comprehensive Environmental Impact Statement (EIS). Of the 15 relief routes, 4 have environmental clearance processes either ongoing or completed, while the other 11 will need at least an EA.

The response from surveys and interviews indicated strong support from virtually all constituencies in favor of the project. The only negative responses came from those who were concerned about some of the relief routes, and from those in other parts of the states farther away from the corridor who were concerned about economic benefit diversion away from their areas.

The greatest potential risk to completing the project within the 25-year time frame is failure to acquire adequate funding. Since federal sources will comprise only a small percentage of total needs, most of the funding will need to be generated through state and local sources, perhaps with tolls or other user costs implemented. Thus far, elements of the Ports-to-Plains Corridor have received relatively small funding amounts from the

NCPD/CBI program, but total federal and state funds committed to actual construction segments is now over \$1 billion.

### **Front Range Railroad Infrastructure Rationalization Project**

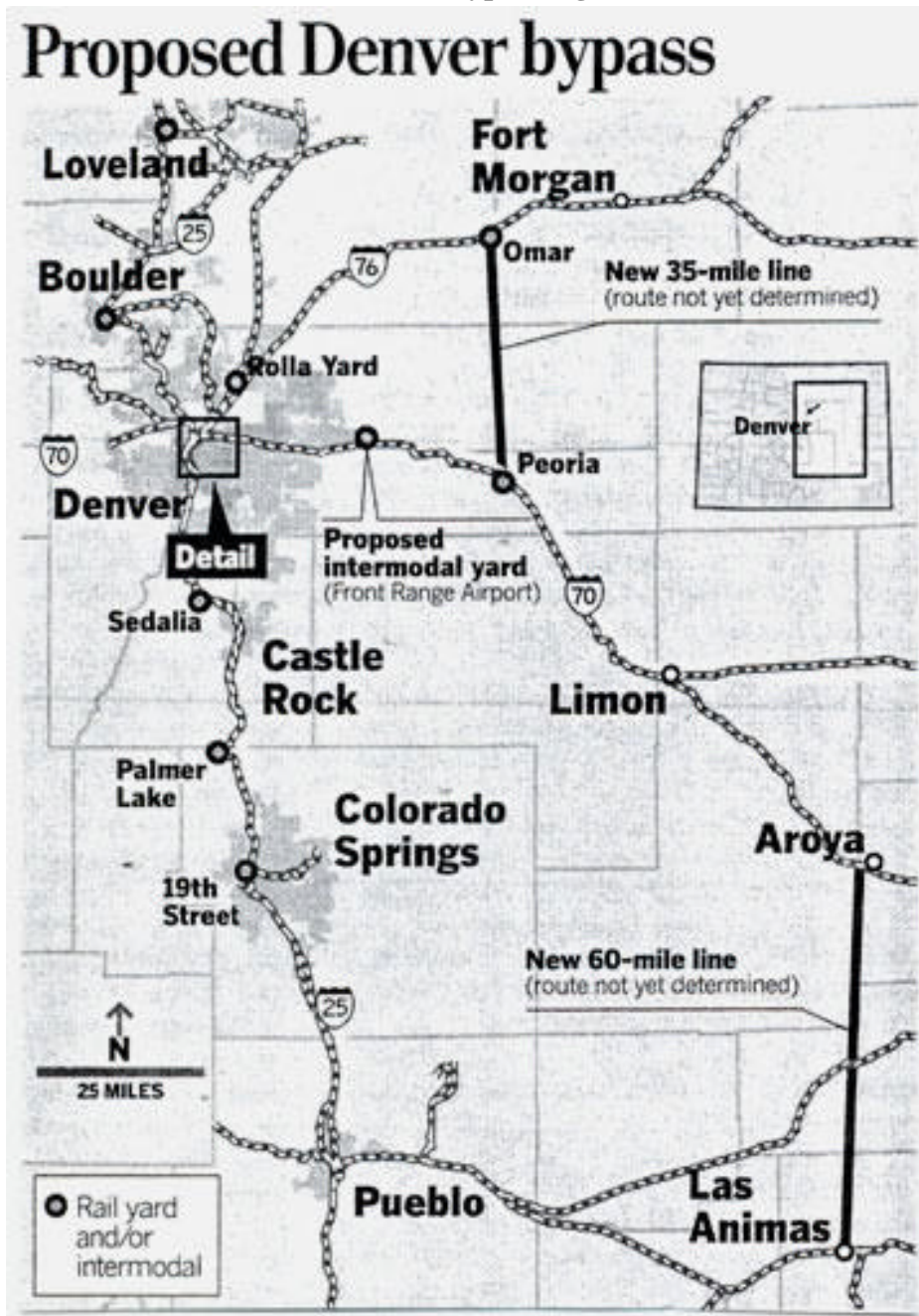
Although not a part of the NCPD, the proposed Front Range Railroad Infrastructure Rationalization Project is a public-private effort spearheaded by the Colorado Department of Transportation (CDOT) to improve north-south freight rail traffic flow by relocating some traffic away from the more urbanized Front Range corridor (Ft Collins-Denver-Colorado Springs) to the more sparsely populated Eastern Plains. In discussion with the Burlington Northern Santa Fe (BNSF) Railroad and the Union Pacific (UP) Railroad, CDOT has proposed constructing two rail segments in eastern Colorado (one between Omar and Peoria and the other between Aroya and Las Animas) that would allow through-service freight traffic to bypass the more congested main line through Denver (See Figure 4). Much of this traffic is composed of unit trains carrying coal from Wyoming to power plants in the south and southeast US that do not need to go through Denver or Colorado Springs. It is estimated that as many as 30 trains per day can be rerouted away from these cities if the bypasses are built and utilized (CDOT 2005).

State departments of transportation are becoming more interested in facilitating rail infrastructure projects due to the realization that highway expansion alone will not be able to accommodate the volume of traffic that future trade and other economic activity will create. Rail systems can move larger volumes of freight with greater economic and environmental efficiency than trucks on highways. For example, one intermodal train can take 280 trucks off the highway, thus saving wear and tear on the highways, conserving fuel, and improving air quality. According to the American Association of State Highway and Transportation Officials (AASHTO 2002), a 1% increase in the rail share of freight tonnage carried by 2020 would shift 600 million tons of freight and 25 billion truck vehicle miles traveled off the highways, save shippers \$239 billion, save highway users \$397 billion, and reduce highway costs by \$17 billion

CDOT initiated a *Public Benefits & Costs Study* (2005) that provided some indication of the benefits and costs associated with the proposed railroad improvement and relocation. The study compared a no-build option with a build option, and concluded that the build option would include the following benefits:

- ? Reduced auto, truck, and emergency vehicle delays at grade crossings
- ? Improved air quality and reduced noise and vibration in built-up metro areas
- ? Statewide economic development, jobs creation, and urban redevelopment opportunities
- ? Reduced train-vehicle accidents

Figure 4: Front Range Railroad Infrastructure Relocation Project proposed rail bypass segments



Source: Rocky Mountain News and Colorado Department of Transportation 2007.

- ? Alternate routing to reduce terrorist and hazardous material risk and system-wide delays
- ? Future passenger rail facilitation

The mid-range scenario costs for the project were estimated to be \$1.17 billion, and would take four years to complete. The mid-range scenario for direct benefits that included benefits from transportation, economic development and land use, safety and security, environment, quality of life, and passenger rail facilitation was estimated at \$2.3 billion, thus yielding a benefit/cost ratio of 2:1. The mid-range scenario for direct and indirect benefits combined was estimated to be \$5.17 billion.

Even though the benefit/cost ratios were favorable, the funding and financing for this project is still very uncertain. The railroads have been less than enthusiastic about proceeding on this project, even though there will be direct benefits to them in improving travel speeds and other efficiencies. All of the major railroads are facing considerable capital infrastructure needs, and they must prioritize among all possible projects to those that will generate the largest improvements in their route systems. Additionally, the state of Colorado, similar to most other states, has been faced with severe transportation funding shortages and must prioritize among a large list of needed projects. Still, there is some optimism that this project may eventually be built, if changes in federal taxing structures encourage more infrastructure investment by the railroads.

### **Prairie Falcon Parkway Express**

One other proposed project in Colorado that involves freight transportation is the controversial Prairie Falcon Parkway Express (PFPE), formerly known as the Front Range Toll Road, and nicknamed “Super Slab” by opponents. This project is being proposed by a private firm, the Prairie Falcon Parkway Express Company, that hopes to construct a four-lane median-divided toll road together with rail and utility lines between north of Fort Collins and south of Pueblo about 20-30 miles east of I-25 (See Figure 5). It is controversial because numerous landowners in the proposed corridor area are opposed to this project, and have organized to try to stop it. The Colorado Department of Transportation has distanced itself from the project by claiming that it “has not taken a position in support of or in opposition of this project and does not anticipate doing so anytime in the near future” (CDOT 2007).



## Summary and Conclusion

This paper has summarized some of the theoretical and empirical literature relating to the regional economic, social, and environmental impacts of transportation corridors and gateways on nearby communities. Some experience with trade corridors in the US was explored through a discussion of the National Corridor Planning and Development Program that has identified 80 trade corridors targeted for federal and state funding for the primary purpose of facilitating freight movement. One of those corridors, the Ports-to-Plains Corridor from Laredo, Texas to Denver, Colorado was profiled along with two other freight-oriented infrastructure projects in Colorado.

We have drawn several conclusions from the literature as well as the case studies presented. One, transportation is a major factor in promoting regional economic development and the expected economic benefits are a prime force supporting the construction of transportation infrastructure projects. That said, it is also recognized that economic benefits do not always accrue to those areas that build transportation projects. Numerous other factors can, and do, influence patterns of economic growth on the landscape, but it is nevertheless better economically to be connected in some way to major transportation networks than to be completely isolated. Second, the social and environmental impacts of transportation are very important in considering the overall success of infrastructure projects. Evidence from the “freeway revolt” period in urban transportation planning history revealed widespread opposition to highways built in urban areas based largely on social and environmental concerns. These examples tend to be in or near more densely populated areas where there is a greater risk of incompatibility in adjacent land uses. Concerns such as these have led to the development of some freight-oriented projects that are being undertaken explicitly for the purpose of bypassing locally congested and impacted urban areas in favor of more sparsely-settled areas that would facilitate traffic movement and provide economic development potential for areas that may be in greater need.

There is thus a trade-off involved between economic development and social/environmental impacts in the establishment of freight corridors. When the corridors are located such that they are sufficiently removed from major population centers, the negative impacts are minimized and the economic development potential is appreciated to a greater extent. When the corridors are located too close to already built-up areas, the potential for public backlash increases, as the social and environmental externalities can outweigh the expected economic development impacts. Given the massive increases in freight traffic expected in North America as a result of projected increases in trade volume, it is necessary to plan and construct improved gateway and corridor infrastructure. But this planning must be mindful of the past, and must balance economic development opportunities with social and environmental concerns.

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