

# **E-470: MORE THAN A HIGHWAY**

*The Story of a Global Tolling Industry Pioneer*



Thomas J. Noel



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Unless otherwise credited, all images are from E-470.

Thomas J. Noel







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## Foreword

It is exciting to be part of one of the premier tolling organizations in the world. It has been an honor to now serve as its fifth Executive Director. After arriving at the E-470 Public Highway Authority in 2016—coincidentally the 25th anniversary year since its first opening—I was impressed by the history I heard and how E-470 had been so successful those many years. Unfortunately, I did not find a single source that clearly communicated that rich history, thus my reasoning for commissioning this book.

In the pages that follow, we hope you find the organization's distinguished past, including detailed information about events from the early days of the Authority that provide answers to questions about events, policies and practices we might search for today that helped build the solid foundation E-470 now rests upon. Sometimes we scratch our heads and ask, "Does anyone know how *X* came to be? When did that happen? Why? Under whose supervision?" This book should be helpful in finding the answers to many of those questions.

Over the past more than quarter of a century, many key people who have links to E-470's past have come and gone. What our former associates know about E-470 forms a valuable contribution to our information base. Before we lost touch with key players from the past, it was time we tapped into their knowledge and create an historical account of E-470's founding and its first 25 years of operation.

To research this book, we turned to a Colorado historian, Dr. Tom Noel of the University of Colorado Denver. Aided by a graduate student, Evan West, Tom poured over reams of documents from more than 20 large boxes of archived documents that had been long tucked away in one of our toll plaza buildings. He conducted 25 interviews with past and present E-470 employees, board members and consultants. Then he composed this useful and insightful book.

As you read the book, you will see that not everything contained within it is truly historical. The book contains contemporary information that is helpful now (in early 2018, when this book was published) but, as the saying goes, amounts to "history in the making."

In deciding how to organize the book, Dr. Noel grouped the chapters according to events that unfolded in the era of each of E-470's five Executive Directors. The idea is not to lionize the Executive Directors but to identify the overriding challenges and successes that they and their staffs, as well as board members, encountered during each Executive Director's tenure. Dr. Noel also provided a look back at the state's earliest toll roads as well as shared a bit of background on issues, challenges and accomplishments concerning building or improving Denver metro roadways over the past several decades.

E-470's motto is this: "We improve your journey." It's my hope that this book will help you get more from your personal journey through E-470's past and into its future.

Tim Stewart  
Executive Director, E-470 Public Highway Authority



# Timeline

**1956** President Dwight Eisenhower signs Interstate Highway Act.

**1958** I-25 in Denver is completed.

**1968** I-70 in Denver is completed.

**1969** Federal Highway Administration increases local number of miles for the nation's interstates including a 26-mile beginning for an I-470 beltway in southwest Metro Denver.

**1981** Centennial Airport Influence Area Transportation Study is launched, resulting in the recommended extension of C-470 east and north to Interstate 70.

**February 26, 1985** E-470 Authority is formed through Memorandum of Understanding between Adams, Arapahoe, and Douglas counties.

**August 28, 1986** Proceeds of \$722 million in bonds are deposited in a pledged escrow account to build E-470.

**August 27, 1987** Governor Roy Romer signs the Public Highway Authority Act.

**January 13, 1988** Adams, Arapahoe, and Douglas counties enter into a contract establishing the E-470 Public Highway Authority, a successor to the original E-470 Authority.

**March 2, 1988** City of Aurora joins the Authority.

**November 8, 1988** E-470 motor vehicle registration \$10 annual fee is approved by voters 58 percent to 42 percent in Adams, Arapahoe and Douglas counties.

**February 28, 1989** Union Bank of Switzerland letter of credit enables escrow break for one series of bonds and beginning of active construction of Segment I.

**July 14, 1989** Town of Parker joins the Authority.

**1989** The Federal Highway Administration, from whom E-470 turned down a large grant because of all the federal restrictions and delays, gave E-470 its 1989 "Innovative Highway Finance Award."

**August 30, 1990** City of Thornton joins the Authority.

**1990** C-470 opens.

**April 11, 1991** Platte River Constructors, a joint venture including Morrison-Knudsen, is presented a "Notice of Intent to Award" for the design-build contract on Segments II and III.

**May 3, 1991** City of Brighton joins the Authority.

**June 1, 1991** Segment I opens to traffic at 3:30 p.m. No tolls are charged in introductory period until July 15.

**June 27, 1991** The Public Highway Authority signs Program Management Agreement with Morrison-Knudsen to act as the Authority's agent for financing the remainder of the project.

**May, 1992** One millionth toll payer drives E-470.

**January 26, 1993** Public Hearings on realignment of Segments II and III are concluded.

**June 1, 1993** Governor Roy Romer signs House Bill (HB) 1316 into law. The bill enables the E-470 Public Highway Authority to expand their boundaries to 2-1/2 miles in either direction of the highway centerline.

**June 4, 1993** Colorado Department of Transportation votes unanimously to lend \$20 million to E-470 to assist with Segments II and III construction financing, provided a matching amount in loans is produced by member governments and others.

**June 14, 1993** Arapahoe County Commissioners file suit, charging E-470's financing plan violates TABOR Amendment provisions and that HB 1316 is unconstitutional.

**June 30, 1993** E-470 board votes to adopt new alignment of Segments II and III.

**July 22, 1993** Arapahoe County District Court rules on the suit by Arapahoe County to stop E-470, finding in favor of E-470.

**March 24, 1994** The Colorado Court of Appeals upholds the District Court's findings that HB 1316 is constitutional. It further finds that, for purposes of the TABOR Amendment, E-470 is defined as an enterprise and is therefore not subject to TABOR restrictions.

**March 31, 1994** The Board gives approval to an intergovernmental loan agreement with Douglas and Adams counties, Parker, Thornton, Aurora, and Brighton. The funds are contingent upon the Authority approving a Plan of Finance and will be used as matching funds for a Colorado Department of Transportation loan.

**July 1994** Five-millionth toll-paying customer.

**October 11, 1994** Colorado Supreme Court agrees to hear portions of the Arapahoe County appeal. The Supreme Court refuses to hear the portions regarding the challenge to the constitutionality of HB 1316 and the appellant's assertion of contract interference with the rights of Arapahoe County.

**January 12, 1995** The City of Commerce City joins the Authority as a full voting member.

**May 15, 1995** The Colorado Supreme Court issues its decision that the Authority's financing plan for the first three E-470 segments is not subject to Amendment 1's voter approval requirements.

**June 8, 1995** New Plan of Finance approved. E-470 Board is presented a proposal by Morrison-Knudsen to add Fluor Daniel, Inc. to the design-build team for Segment II.

**August 31, 1995** Financing is completed for Segments II and III, with Segment obligations re-financed. E-470 gives Platte River Constructors the official "Notice to Proceed" on Segments II and III, an additional 29 miles of highway.

**January 1, 1996** *Institutional Investor Magazine* names E-470's investment grade financing as a "Deal of the Year" for 1995.

**March 1, 1996** *Governing Magazine* awards E-470 its "Deal of the Year" designation.

**March 16, 1996** The 10-millionth toll-paying customer passes through E-470's plazas.

**March 18, 1996** Governor Roy Romer signs into law Senate Bill 173, removing the taxing authority from E-470, thus establishing E-470 as an "enterprise" under state statute and therefore not subject to limitations imposed by the TABOR Amendment.

**October 21, 1996** The International Bridge, Tunnel, and Turnpike Association presents E-470 with a "Toll Innovation" award for the innovative financing of Segments II and III.

**July 24, 1997** Weld County, City and County of Broomfield and Greeley join the Authority as affiliate members.

**August 27, 1997** Refinancing closes on Segment II and III funds, saving the Authority \$77 million and providing \$31 million in expanded available funding for Segment IV.

**October 9, 1997** The E-470 directors authorize \$6,350,000 in funds for preliminary work on Segment IV.

**May 14, 1998** Arvada joins the Authority as an affiliate member.

**July 1, 1998** Areas AI North (120th Avenue to 56th Avenue) and AI South (Smoky Hill Road to Parker Road) open to the public.

**October 1, 1998** Tolling begins on Segments II and III after a three-month free period.

**February 1, 1999** E-470 moves into new Administrative Headquarters Facility at E-470 and E. 6th Parkway.

**May 2, 1999** Smoky Hill Road to 56th Avenue opens.

**December 1999** MKK, an engineering and construction company formed by a joint venture between Washington Group International (formerly Morrison-Knudsen Corporation) and Kiewit Western Company, is awarded the contract for Design-Build of Segment IV.

**May 22, 2001** Vehicle registration fee bonds refinanced.

**June 1, 2001** E-470 Public Highway Authority launches nonprofit Transportation Safety Foundation to promote traffic safety.

**August 8, 2002** E-470 opens first 4.5 miles of Segment IV, from 120th Avenue to U.S. 85.



**January 3, 2003** E-470 opens U.S. 85 to the I-25 north interchange in Thornton, completing Segment IV and the entire 47-mile semi-circular beltway.

**April 2004** E-470 repays approximately \$33 million in loans to its eight member jurisdictions and the State of Colorado, years earlier than anticipated.

**2006** The International Bridge, Tunnel and Turnpike Association gives its "President's Award" to E-470 for innovation in improving customer service and staff productivity.

**March 21, 2006** Colorado Department of Transportation approves E-470's construction of an I-70 flyover ramp.

**June 4, 2007** Cable median barrier installed on 10.25 miles, between South Parker Road and E. Jewell Avenue and ultimately on the entire highway.

**January 1, 2009** License Plate Toll billing method begins. Scheduled toll increase takes effect. Express Toll customers on E-470 pay a lower toll rate than cash and License Plate Toll customers.

**July 4, 2009** Cash toll collection ends on E-470. E-470 becomes an all-electronic, non-stop toll highway.

**November 2010** Board of Directors votes to implement annual toll increases in smaller increments, beginning January 1, 2011.

**2010** Installation of median cable barrier is completed on all 47 miles of E-470.

**June 9, 2011** Speed limit increases from 70 to 75 mph.

**2011** Transition from hard-case transponders to sticker tags begins.

**Summer 2012** Reconstruction completed on 5-mile oldest segment of E-470.

**November 2012** E-470 redesigns the E-470, ExpressToll and License Plate Toll logos.



**March 2012** Solar power system completed with 22 arrays (groups of photovoltaic solar panels that convert sunlight into electricity). Electricity generated serves a 17-mile stretch of E-470, including the Administrative Headquarters Facility.

**September 2013** E-470 wins the International Bridge, Tunnel and Turnpike Association's President's award for its installation of solar power along the toll road.

**March 2014** Number of vehicles equipped with ExpressToll transponders reaches one million mark.

**September 2014** City of Lone Tree joins the Authority as an affiliate non-voting member.

**November 24, 2014** E-470 opens new Quebec Street interchange in Thornton.

**May 2015** E-470 begins fulfilling requests for new "switchable HOV Transponders" for use on Colorado Department of Transportation's (CDOT) U.S. 36 and I-25 Express Lanes.

**July 22, 2015** ExpressToll toll collection begins on CDOT's new Phase 1 U.S. 36 Express Lanes from Federal Boulevard to 88th Street in Louisville/Superior.

**December 12, 2015** ExpressToll toll collection begins on CDOT's Mountain Express Lane on I-70 between Empire Junction and Veterans Memorial Twin Tunnels (13 miles).

**May 31, 2017** E-470 opens up free to I-25 travelers after tanker truck explosion creates monster traffic jam on I-25.

**June 8, 2017** E-470 opens up electric vehicle charging station at its Administrative Headquarters Facility.

**December 2017** Construction completed on a third lane in each direction of an eight-mile stretch of E-470, between Parker Road and Quincy Avenue.

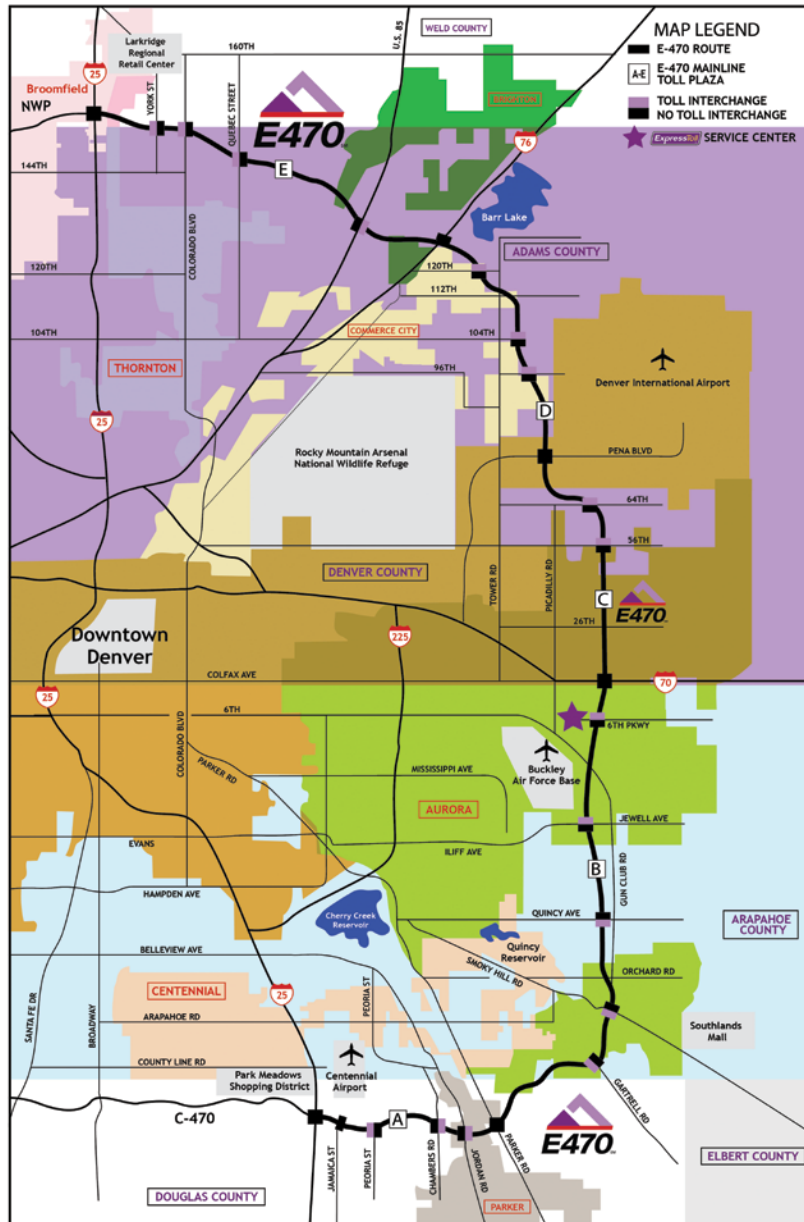




**What is E-470?**



# Chapter 1



E-470 is a 47-mile semi-circular toll beltway around metropolitan Denver's eastern outskirts. It is renowned for:

- Being one of the nation's first three toll roads to offer open road, nonstop tolling at highway speeds.
- Pioneering the use of license plate photo images to generate toll bills mailed to the registered owner of the vehicle.
- Relying on no federal or state funding.
- Early involvement of the private sector in a novel public-private partnership to build a highway, an approach that became a national model.
- Using a design-build system with a single contractor who also helped handle financing, thus speeding the construction process and saving money.
- Getting suburban counties and communities to work together to build a highway without using taxpayer dollars.

The E-470 Public Highway Authority (the Authority) that planned, built, maintains, and operates the toll road is a political subdivision of the State of Colorado. The Board of Directors consists of eight representatives selected by the voting member jurisdictions: Adams, Arapahoe, and Douglas Counties and the municipalities of Aurora, Brighton, Commerce City, Parker, and Thornton. Affiliate, non-voting members are the cities of Arvada, Greeley, Lone Tree, City and County of Broomfield, and Weld County. The Colorado Department of Transportation (CDOT), Denver Regional Council of Governments (DRCOG) and the Regional Transportation District (RTD) make up the non-voting members of the Authority's Board of Directors.

The E-470 Public Highway Authority is the legal successor to the original E-470 Authority formed in 1985 by a Memorandum of Understanding among the three counties involved—Adams, Arapahoe and Douglas. The Public Highway Authority Act was enacted



Governor Roy Romer joined the opening day celebration for Segment I on June 1, 1991.



August 13, 1987 and the E-470 Public Highway Authority was established on January 13, 1988 through a contract entered into by Adams, Arapahoe, and Douglas counties. The Public Highway Authority Act gave E-470 the power to do everything necessary to plan, design, finance, construct, and operate E-470.

## A Tollway On The East Side Of Metro Denver

E-470 is a 75-mph toll highway that runs along the eastern perimeter of the Denver metropolitan area. It provides an alternate north-south route to Interstate 25 (I-25) on the north and south sides of the metro area for travelers wishing to bypass clogged city roads. It is also a major conduit to Denver International Airport (DIA).

On the south end, the toll road starts at the State Highway C-470 and I-25 interchange in Douglas County. From there, E-470 runs east through the Town of Parker and north through Aurora, passing east of Buckley Air Force Base before intersecting with I-70. The highway continues north, passing west of DIA and curving west to connect with I-76 in Brighton and Commerce City. E-470 ends at an interchange with I-25 and the Northwest Parkway, just south of 160th Avenue in Thornton.



Like gigantic golf balls, the radar domes at Buckley Air Force Base dominate the landscape along the west side of E-470 between East 6th Parkway and East Colfax Avenue.

Credit: Tom Noel Collection.

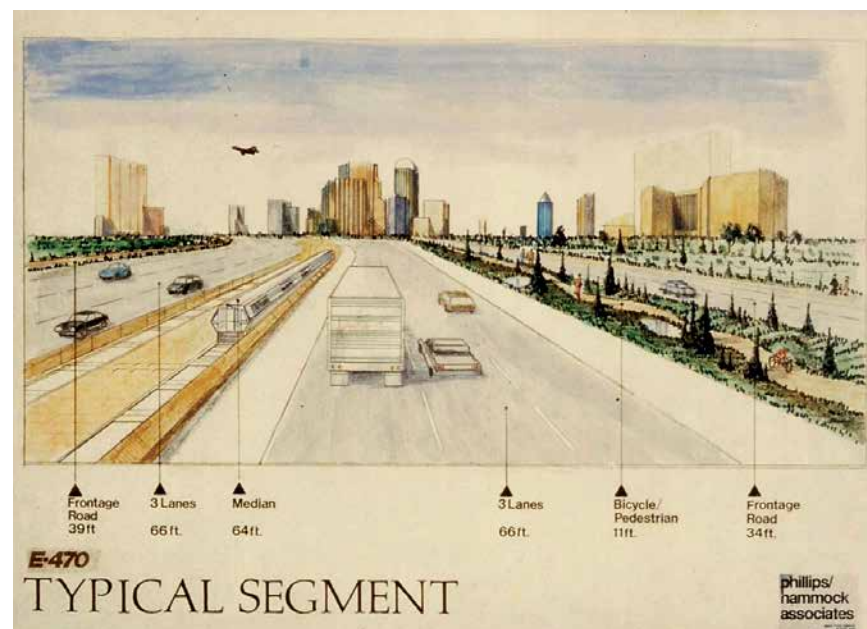


Credit: Pentress Architects

Denver International Airport and E-470 are twin magnets luring metro Denver growth eastward.

## Planned For Future Expansion

E-470, 47 miles long, is predominantly a four-lane highway, although 13 miles consist of six lanes. Engineers designed the entire route as capable of being expanded to eight lanes. The 300-foot right-of-way (plus, for most of its length and on both sides of the mainline right-of-way, 75-foot wide multi-use easements) includes medians and shoulders capable of accommodating future mass transit and multi-use bicycle/pedestrian paths.



This early E-470 concept drawing showed mass transit and bicycle lanes.

## Who Pays For It?

E-470's financing pioneered an approach to dealing with chronically underfunded highway construction. No federal or state funds were used. On August 10, 1988, the Authority board unanimously adopted a resolution endorsing a plan of finance that included, among other funding sources, the use of (a) a \$10 per vehicle motor vehicle registration fee (VRF) to be collected within the Authority's voting boundaries; (b) development fees (highway expansion fees) to be imposed within the Authority's geographical boundaries; and (c) highway tolls on E-470 as sections of it were placed in service. Using these funding sources, the Authority estimated completion of the beltway by 2001, a prediction that proved to be two years too soon thanks to the weakening of the global capital markets and a two-year legal battle between the Authority and Arapahoe County. (See Chapter 4 for a full description of the legal battle regarding E-470's necessary modification of its alignment.)

The first financing came in August of 1986 when Arapahoe County, on behalf of the Authority (which was not legally empowered to issue debt), issued

more than \$722 million in bonds, aggregating \$63,260,000 in principal amount. At that time, this was the largest municipal bond issue in the history of Colorado. Lehman Brothers and George K. Baum and Company underwrote the bonds, which were immediately escrowed, held in trust awaiting a revenue stream to pay for them.

To pay for the Authority's small staff and team of legal, fiscal, and engineering

### Tollways have virtue of letting users pay for miles they travel

**H**IGHWAY planners are singing the praises of tolls these days. They'd like to use tolls (along with a modest license fee) to finance E-470 and W-470. Some even favor putting a toll on the entire metro beltway to create a "cash cow" for other transportation projects.

Only time will tell if their predictions of highway usage are correct. Yet even if they're not and tolls fail to generate the huge, hoped-for surplus, they should produce nearly enough income to construct the actual beltway.

In other words, even in this day and age of horrendous labor and construction costs, a major new highway can practically support itself. Now contrast this performance with that of rapid transit.

Rapid transit rarely covers its operating expenses, let alone its construction costs as well. Each rider requires a huge public subsidy, invariably more than he or she spends on a ticket.

Those subsidies don't argue against rapid transit in every instance. They merely suggest we should look closely at any rapid-transit proposal and choose a technology that's most cost-effective. Too many advocates of transit seem wedded to the most costly, glitzy technology available — and hang the expense.

Fortunately, at least one member of Gov. Roy Romer's transportation roundtable, which has been meeting to establish future priorities and funding mechanisms, seems acutely aware of the perils of technology overkill. State Sen. Al Meiklejohn, R-Arizona, has cautioned his colleagues more than once about the likely cost of commuter trains.

His alternative? Busways, which can carry roughly as many people but without the gigantic initial investment of trains. Moreover, busways can in a pinch be converted for use by other vehicles.

Busways don't pay for themselves either, of course, but that's not the point. Virtually no mass transit does. But when choosing one system over the other, it simply makes sense to select the technology that treats both commuters and taxpayers with respect.

Weighing in on the 1988 E-470 campaign, the *Rocky Mountain News* endorsed tollways as a way for highways to pay for themselves.



These yard signs helped E-470 sell its case for a motor vehicle registration fee to support highway construction.

consultants, the Authority's interim financing was derived from arbitrage—reinvestment of the \$722 million in escrowed bond funds.

On November 8, 1988, a three-county election was held to approve a \$10 VRF to support start-up and ongoing funding for E-470. A majority of voters (58 percent to 42 percent) approved the VRF. Collection of the \$10 fee began in 1989 as an integral piece of the financing along with tolling. Initial 1989 projections called for tolls paying about 85 to 92 percent of the cost of E-470, private developers paying about 7 percent through highway expansion fees and the remainder paid from the \$10 VRF.

**E-470 REGISTRATION FEE**

Precincts	Regt.		Total		Yes		No	
	%	Total	%	Total	%	Total	%	Total
Adams	188	83.6	185	18,544	44.2	24,548	55.8	39,100
Arapahoe	284	100.0	294	27,527	61.2	16,816	38.8	36,111
Douglas	39	100.0	39	12,465	63.7	7,119	36.3	5,746
<b>Totals</b>	<b>461</b>	<b>94.4</b>	<b>498</b>	<b>123,571</b>	<b>58.3</b>	<b>48,183</b>	<b>41.7</b>	<b>65,388</b>

**Arapahoe, Douglas approve fee for E-470**

By Terry Kiewer  
Denver Post Staff Writer

Arapahoe and Douglas counties Tuesday voted heavily in favor of a \$10 annual vehicle registration fee to help finance the E-470 beltway project, easily overwhelming a negative vote on the measure in Adams County.

The approval will clear the way for the E-470 Authority to move to final design for the 30-mile suburban tollway, planned to start construction next spring. The fee will raise about \$60 million in initial financing for the project.

The tollway will be built in phases, with early construction planned in the vicinity of the Denver Tech Center and the new airport in Adams County.

The tollway will be finished from Interstate 25 and 157th Avenue on the north, to I-25 and C-470 on the south, by no later than 2000 — sooner, if additional state money can be found. Drivers can expect to pay an average of seven cents per mile in tolls to use the road.

The vehicle-registration fee will be abolished when tolls become sufficient to cover revenue bond payments for the project. During their campaign, beltway proponents stressed the improvements in drive times to the airport if E-470 were built.

They also said the beltway was urgently needed to ease traffic congestion from commercial and residential development, already occurring in the eastern metro area — development that, according to E-470 projections, will only accelerate in coming decades.

Opponents feared construction of E-470 and W-470, a companion beltway that goes to a vote in February, would hamper chances for regional rapid transit by undermining trends toward higher-density development in downtown Denver.

They contended that beltway construction would trigger new suburban sprawl. That growth, coupled with the additional driving the beltways would encourage, would worsen air quality, they argued.

One question that will linger after the election is what might become of the E-470 Authority in light of the Colorado Transportation Roundtable's work.

Roundtable members have argued that the E-470 and W-470 projects should become responsibilities of a new metro transportation super board called the Metropolitan Transportation Commission.

## A Public-Private Sector Partnership

From the very beginning, E-470 has relied on involvement by the private sector. Land owners and speculators frequently profit from the development of highways in or adjacent to their land holdings. In E-470's earliest planning stages, E-470 established a transparent dialogue with leading developers to discuss issues and opportunities. The private sector was called upon to provide advice and expertise through the E-470 Executive Advisory Committee, chaired by a well-respected developer, Cal Fulenwider III. That committee, formed in 1987 and in operation for about two years, was comprised of a half-dozen major land developers who came to the table to discuss land acquisition options. Developers donated about \$175 million in right-of-way to E-470.

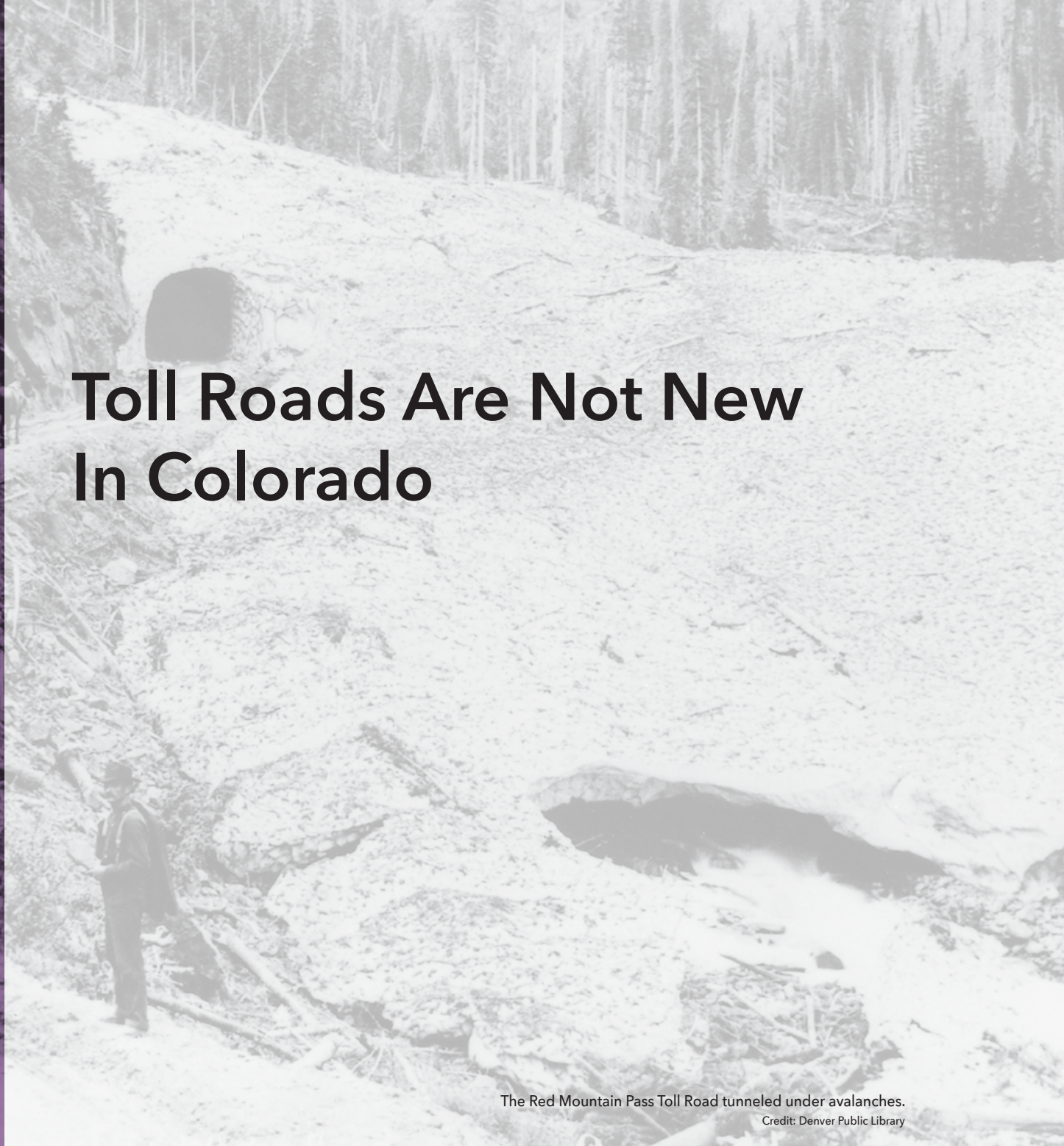
## A Promise Of Excellence

As of 1990, a year before the first segment of E-470 opened, the E-470 Mission Statement began ambitiously: "Our task is to build E-470 as the finest, highest quality toll road project in the history of the world. When we do that, we prove that local government working in concert with the private sector and using private sector methods, including emphasizing timely completion of the project, along with intergovernmental cooperation, is the goal of the future."





# Toll Roads Are Not New In Colorado



The Red Mountain Pass Toll Road tunneled under avalanches.  
Credit: Denver Public Library



# Chapter 2

# RATES OF TOLL,

On the Gasquet Wagon Road, as  
fixed by the Board of Supervisors  
of Del Norte Co., May 7, 1900.

	RATE
PAYE FANONUEA	
MAN AND HORSE	.25
PACK ANIMATA LADZENED	.25
" " CHALANDEN	.25
CATTLE, SHEEP, GOATS AND HOGS per head	10-14
VEHICLE AND 1 HORSE	85.00
" 3 HORSES	3.60
" 5 "	3.10 14
" 6 "	3.35
" 7 "	3.50
TRAIL WAGON	1.00
Haystack Rider	.25

Fred Frantz & J. E. Endert.  
Owners of Gasquet Toll Road.

This antique rates of toll indicates early efforts to regulate toll roads as shown in this posting by the Town of Del Norte in Colorado's San Luis Valley.



The Bradford House, the hub of the Bradford Toll Road from Denver to Breckenridge, is preserved as a State Historic Register site ruin on the Ken Caryl Ranch in Jefferson County.



A wooden swing gate was installed at the log bridge over Bear Creek. Tolls were collected at this location on the Ouray Silverton Toll Road (Otto Mears Toll Road).

Tolls have always played a major role in making financially possible the construction and operation of roadways and bridges in Colorado. The E-470 toll road is simply the latest, state-of-the art culmination of a long tradition originating in Colorado during the 1858–59 gold rush.

On December 7, 1859, the legislature of the Provisional Territory of Jefferson, the extra-legal predecessor of Colorado Territory, issued the first four charters to wagon road toll companies. All four started in Denver with three headed up Mt. Vernon Canyon and one to South Park and one to Breckenridge and the Blue River Diggings.

## Toll Roads Galore

Between 1861 and 1868, the Territory of Colorado issued 43 toll road charters. Some were never built, others were built without charters. Charters, as issued by the Territorial Legislature, contained a list of the people forming the company, a description of the route, and the location of toll gates to be constructed. Probably 100 or more toll roads operated between 1858 and the 1880s in Colorado. Most served the mountain mining towns. Toll roads became a standard way to handle road construction and maintenance before any governmental agency took on such responsibilities. Tolls varied widely with the length of the road, cost of construction and inclinations of the owner and/or operator. Territorial legislation suggested rates of:

Each vehicle with one span of horses, mules or cattle .....	\$1.00
Each additional pair of draft animals attached .....	25 cents
Each horse or mule with rider .....	25 cents
Horses, mules, cattle, or asses driven loose, per head.....	10 cents
Sheep, hogs or goats, per head .....	5 cents
Travel for attendance at funerals .....	free

Mountain toll roads proved to be expensive to build and to maintain. Richens Lacy “Uncle Dick” Wootton, who built and operated the Raton Pass road, reported, “There were hillsides to cut out, rocks to blast and remove, and bridges to be built by the score.” Wootton’s 27-mile toll road was one of the longer lived and more successful.

## Highway Robbery

Otto Mears, Colorado's most prominent and prolific toll road builder, constructed 383 miles of toll roads by 1890. After his wagon load of wheat tumbled over on Poncha Pass, there Mears built his first toll road. Between 1881 and 1883, Mears built the famous Red Mountain Pass Road connecting Ouray and Silverton (now U.S. 550 and famous as the Million Dollar Highway).

Cities and counties began shouldering more and more responsibility for roads. The State of Colorado did not take a serious interest in roads until 1909, when the General Assembly created the Colorado Highway Commission. Governor John F. Shafroth appointed a three-man commission that met in the State Capitol to map and plan the state's highway system.

## Famous Toll Roads

While most toll roads had disappeared by 1916, one opened that year—the Pikes Peak Highway. Spencer Penrose, who also built Colorado Springs' grand Broadmoor Hotel, constructed the highway up the 14,110-foot high Pikes Peak in 1916.

The next toll road constructed in Colorado was the Denver- Boulder Turnpike, as U.S. 36 was commonly called. This four-lane expressway attracted widespread support. Boulder business leaders embraced it as “the magic carpet ride to progress.” Few foresaw how fast traffic volume would accelerate. The turnpike soon paid for itself, enabling the state highway department to close the toll booth in 1967, 13 years ahead of schedule.

Otto Mears rose to fame as the “pathfinder of the San Juans”, the mountainous southwest corner of Colorado which he laced with toll roads.



Credit: Denver Public Library



Credit: 1874 photo by William Henry Jackson, Denver Public Library

Otto Mears built the Red Mountain Pass Toll Road over this tight squeeze at Bear Creek Falls.



Shep, the beloved Denver-Boulder Turnpike mascot, greeted customers at the Broomfield exit.

Credit: Colorado Department of Transportation



Credit: History Colorado

This tollway had become a “freeway”—free of tolls. The success of the Denver-Boulder Turnpike put that idea back into the heads of transportation planners. Tolling would reemerge, as it had during the territorial period, as a solution to Colorado's chronic shortage of highway funding. Tolls, then and now, struck many as the fairest way to finance otherwise taxpayer-funded highway construction. E-470 paved the way for today's proliferation of a new era of tolled roadways.

## Creating And Selling The Vision

The need for a beltway around Denver was discussed as early as 1958 by the organization now known as the Denver Regional Council of Governments (DRCOG). Such interstate highways on the outskirts of expanding metropolitan areas had been built in Boston, Houston, Minneapolis, Washington D.C. and other large metropolises.

In the 1960s, the Colorado Department of Highways perceived a need for a beltway around the Denver metro area and sent a proposal to the Federal Highway Administration. The plan called for the usual federal government contribution of 90 percent of the funds, with the state providing 10 percent. I-470 was added to the Federal Highway Act of 1968 as part of the planned Interstate Highway System.

Constructors of the proposed I-470 (now C-470), the first stage of Denver's beltway, planned to lay pavement between I-70 in Golden and I-25 in what would become the Douglas County city of Lone Tree. Engineering and environmental impact studies began. The Colorado Department of Health opposed the interstate beltway on the grounds that it would violate the Federal Clean Air Act. Other studies suggested that alternate uses for the land would be more environmentally friendly.

The Denver-Boulder Turnpike opened in 1952 as Colorado's first modern toll road.



## Governor Lamm's Roadblock

The feedback from the Colorado Department of Health halted all efforts to plan and build the beltway by order of the Governor, Richard D. Lamm. The governor had risen to prominence as a leader of the opposition to the 1976 Winter Olympics in Denver and was no fan of I-470. As one of the state's leading environmentalists, he denounced the quadrant through the southwest suburbs as an invitation to pollution and sprawl.

The governor vowed "to drive a silver spike" through C-470 and asked the U.S. Department of Transportation to give Colorado the interstate money for alternative transportation. Lamm redirected monies to other needed highway projects and planning for a rail transit system.

After Lamm left office in 1987, I-470 was relabeled C-470, reflecting state rather than federal ownership. C-470 was completed in 1990. Governor Lamm, in a 2017 interview, called his opposition to I-470 one of his worst mistakes—a delay

that led to greater construction costs.

Lamm's successor as governor, Roy Romer, proved to be friendlier to the beltway plan. On a snowy June 1, 1991 at the opening ceremony of the E-470 toll road, Romer declared that "The E-470 Public Highway Authority is an example of the effectiveness of public and private joint enterprises. Colorado needs a strong and well-maintained transportation system to serve the growing needs of our people and businesses...I was pleased to sign the Public Highway Authority Law."



Credit: Courtesy of Richard D. Lamm

Richard D. Lamm, the Colorado governor renowned for questioning growth, led environmentalist opposition to C-470.



This early rendering shows the relationship of E-470 to an also conceptual drawing of the future airport.



## E-470 Authority Becomes E-470 Public Highway Authority

Back in 1981, Arapahoe County, Douglas County, Greenwood Village, and private developers began the Centennial Airport Influence Area Transportation Study. The study, published in 1982, recommended the extension of C-470 east and north to I-70. A series of public meetings starting in 1983 provided for citizen input. In the absence of any funds or prospects for funding from the state and federal governments, Adams, Arapahoe, and Douglas counties joined together to form the E-470 Authority (the predecessor of the E-470 Public Highway Authority) through an intergovernmental Memorandum of Understanding on February 26, 1985.

A year later the City of Aurora joined the E-470 Authority. The board's leaders included an Adams County commissioner, Steven Cramer, and co-chairs of the Executive Advisory Committee, headed by one person from the private sector and another from the public sector—visionary developer George Wallace and Arapahoe County Commissioner Thomas Eggert, respectively.

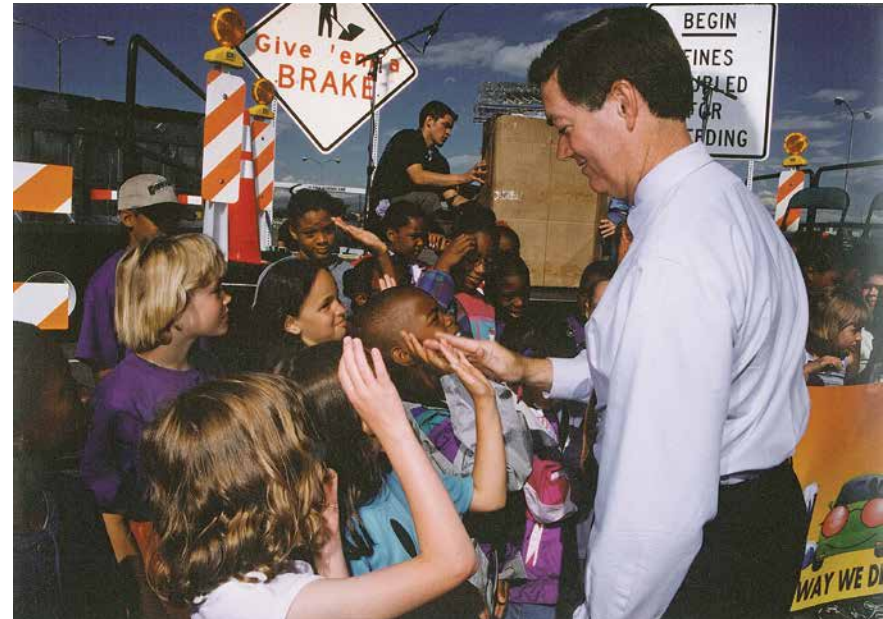
Cramer, a Denver-born real estate man and the first chairperson of the original E-470 Authority, foresaw the important linkage between the proposed highway and the controversial location of the anticipated new Denver airport.

Cramer played a major role in persuading Adams County voters to approve Denver's annexation of Adams County land to build Denver International Airport (DIA). "I was the S.O.B. who negotiated with Denver," he confessed in a 2017 interview. "I learned then to work with different interests. I tried to get people to sit down and talk and listen. We tried to get everyone focused on the big picture and how DIA and E-470 would help all of our communities."

The idea of the new highway had many strong supporters like Cramer. One of the best known of the movers and shakers on the first E-470 Executive Advisory Committee was George Wallace, the dynamo behind development of the Denver Tech Center (DTC). Wallace's farsighted planning and strong personality created the DTC and made it a rival of downtown Denver in terms of office space. Wallace observed in the 1987 E-470 Authority Annual Report: "Developers who, along with the general public, stand to benefit from such projects, are increasingly assuming additional responsibility for making these projects happen, rather than standing on the sidelines, awaiting progress. E-470...is a good example of developers joining forces with the public sector to implement important public improvements. Good transportation is the key to good business. We need E-470 to make Denver's highway system work efficiently."



John Arnold, George Wallace, Governor Roy Romer, and Steve Cramer, left to right, reviewed an early conceptual drawing for E-470.



Governor Bill Owens, an ardent supporter, told kids at this E-470 construction site that Colorado was building toll roads to help them avoid future traffic jams.

Credit: Courtesy of Bill Owens

In that same annual report, Eggert extolled the virtue of what is commonly referred to as public-private partnerships. He called the approach “public control/private participation. Everyone wins with this concept: taxpayers, local governments, developers and other businesses who contribute to the economy’s strength.” He prophesied, “In the coming years, we will find that E-470 will be more than just a highway. It will be a model for the entire nation.”

Colorado Governor Bill Owens, who followed Roy Romer as governor from 1999 to 2007, is a Centennial resident who long championed E-470. As a member of the Colorado House of Representatives, he co-sponsored the Public Highway Authority Act in 1987. Owens also campaigned for the new highway. “E-470 is a bootstraps approach where local governments came together with citizens, identified the need and the financing mechanism, and went out and got it done.”

Owens first became interested in E-470 while serving as chair of the Aurora Planning Commission from 1980 to 1981, when “it became apparent to me that Denver needed a beltway like most other big metro areas already had.” Owens further pushed that idea as a member of the Colorado House of Representatives (1983–1989) and as a state senator from 1989–1975. Owens also served as State Treasurer from 1995–1999, followed by two terms as governor. Owens advanced the concept, as he put it, in a 2017 interview, that “We should leave the mountains alone and build to the east on the prairie. Land, construction and infrastructure are all cheaper and easier to build on the relatively flat east side of town.”

Governor Owens is proud of E-470 and gives credit to the first executive director, John Arnold, whom he calls “The Father of E-470.” He remembers that Arnold helped present the legislature with data, graphs, slides, charts and other materials to help Owens squeak the E-470 Public Highway Authority bill through the legislature by a one vote margin.

As governor, Owens championed subsequent toll lanes on other Colorado highways. Toll roads, Owens points out, “are the roads of the future.”

Aurora Mayor Paul E. Tauer, Sr. became an influential early champion of the highway. Tauer served as Mayor of Aurora from 1987 to 2003 and also chaired the E-470 Board from 1988–99. “From the very beginning I’ve been involved with E-470,” he noted in 2017. “We had to do it a segment at a time as funding would allow. We kept moving ahead, kept finding solutions.

Paul E. Tauer, Sr. as mayor of Aurora and E-470 Board Chair, championed the road as a benefit for Aurora which he predicted will one day be the most populous city in Colorado.



Credit: Courtesy of Paul Tauer

Horrendous as it is now, imagine I-25 without our E-470 alternative. E-470 is a dream that we are now living.” When Tauer retired from the E-470 board, fellow board member and Arapahoe County Commissioner Lynn Myers recalled “We gave Paul a crown in honor of how regally he had represented Aurora, the biggest community along our highway.”



Paul Tauer received a crown from his fellow board members during his final E-470 Board Meeting.

## Public-Private Partnering

Developers gave an estimated \$175 million worth of right-of-way to make E-470 possible. Cal Fulenwider, president of L.C. Fulenwider, Inc., was among those collaborators. Cal’s grandfather, Lloyd Caleb Fulenwider, founded the firm in 1904 which still holds Colorado Real Estate License #1.

“E-470 came to me to put together an executive committee of major landowners. We both wanted a pioneering productive public-private partnership with give and take. We donated probably four to five miles of land. In exchange, we were given a voice on where the interchanges would be built.”

Fulenwider has been involved with many major developments in the E-470 corridor, including the 3,000-acre master planned community of Reunion in Commerce City and the Peña Station, a mixed use transit oriented development at the front door of DIA. Such innovative projects have become a hallmark of the E-470 corridor.



Veteran developer Cal Fulenwider believes E-470 was smart to partner with landowners to build the highway that has become the main target of development in southeast metro Denver.

Credit: Courtesy of Cal Fulenwider



A large-scale construction site, likely a dam or earthmoving project. In the foreground, a large crane is positioned on the left, and a white crane is on the right. Several vehicles, including trucks and cars, are scattered across the site. The background shows a vast, flat landscape under a clear sky. The image is split into a purple left half and a white right half, with a red bar at the bottom.

# John E. Arnold's Era 1986-1991



# Chapter 3

When three counties came together in 1985 to form the E-470 Authority, they had no state or federal funds—just a vision—to extend the roadway from C-470 east and north to I-70 and beyond.

The E-470 Authority took the first step in achieving that goal by hiring a visionary and “true believer” to assemble a team to design the proposed road and determine a way to finance it. Equally important, the job entailed vigorously selling the public on the need for the road.

That job fell to E-470’s first executive director, John E. Arnold, who transformed the E-470 dream into reality. Arnold, a former Fort Collins, Colorado city manager, came to E-470 in 1985 as a consultant and was later hired as the fulltime executive director in 1986. The more people knew about E-470, the more likely they were to vote for it.



John Arnold, E-470’s first executive director, spoke warmly at the highway’s June 1, 1991 grand opening despite a freak snow storm.

## Selling The Vision

To promote E-470 and especially the 1988 election to charge a \$10 annual vehicle registration fee (VRF) in E-470’s three counties, Arnold reported in a 2017 interview that “I must have given 600 talks on E-470. Everywhere I promoted E-470, using Victor Hugo’s quote: ‘Nothing is as powerful as an idea whose time has come.’”

Arnold was a fiery speaker and letter writer who rarely failed to respond to critics. “He wrote many letters to editors complaining about misreporting,” recalls E-470’s longtime public relations consultant, Dan Christopherson. “Our public relations mission was to be a truth squad, to get out the facts and dispel misconceptions. In just six years we opened the first five-mile Segment I. By not using federal or state money, we could build a lot faster and cheaper.”

## Huge Bond Issue Brings Credibility and Interest Earnings

Arnold paid his small staff of five and cast of consultants and contractors through interest on the bonds escrowed at Denver’s United Bank. Arnold’s team of outside professionals included its general engineers (a joint venture of three engineering firms called the Engineer 470 Partnership), general counsel, special counsels, accountants, investment bankers, and public relations firm.

Fortunately, the E-470 Authority was able to gain interim financing to help fund the design, engineering and financial blueprints for the new highway. This was derived from interest earnings generated from reinvestment of the \$722 million in escrowed bonds in higher-yielding government securities. In 1986, those earnings totaled more than \$600,000.

E-470 found an ally in Arapahoe County Commissioner and E-470 Authority board member Betty Anne Dittmore. She noted that “the public sector, the private sector, our consultants, and staff worked together to complete the largest bond sale ever in Colorado.”



Bond documents from 1995

## The Public Highway Authority Act

The engineering, financial and legal blueprints were underway by 1986. Now what E-470 needed was the legal authority to build and operate a toll road.

There was considerable public debate about E-470 potentially worsening the metro area’s “brown cloud” smog and concern, from a regional planning perspective, of creating a beltway encircling the entire metroplex. In the end, the legislature and Governor Roy Romer approved the Public Highway Authority Act of 1987. In January 1988, the E-470 Authority became the E-470 Public Highway Authority. Thanks to the Public Highway Authority Act, E-470 was finally

equipped with the powers it needed to build, operate and fund the tollway.

This legislation set the framework under which an E-470 financing plan could be developed. Under the act, as later modified by amendments, a Public Highway Authority was given the following powers that did not require voter approval. Among those powers were the following:

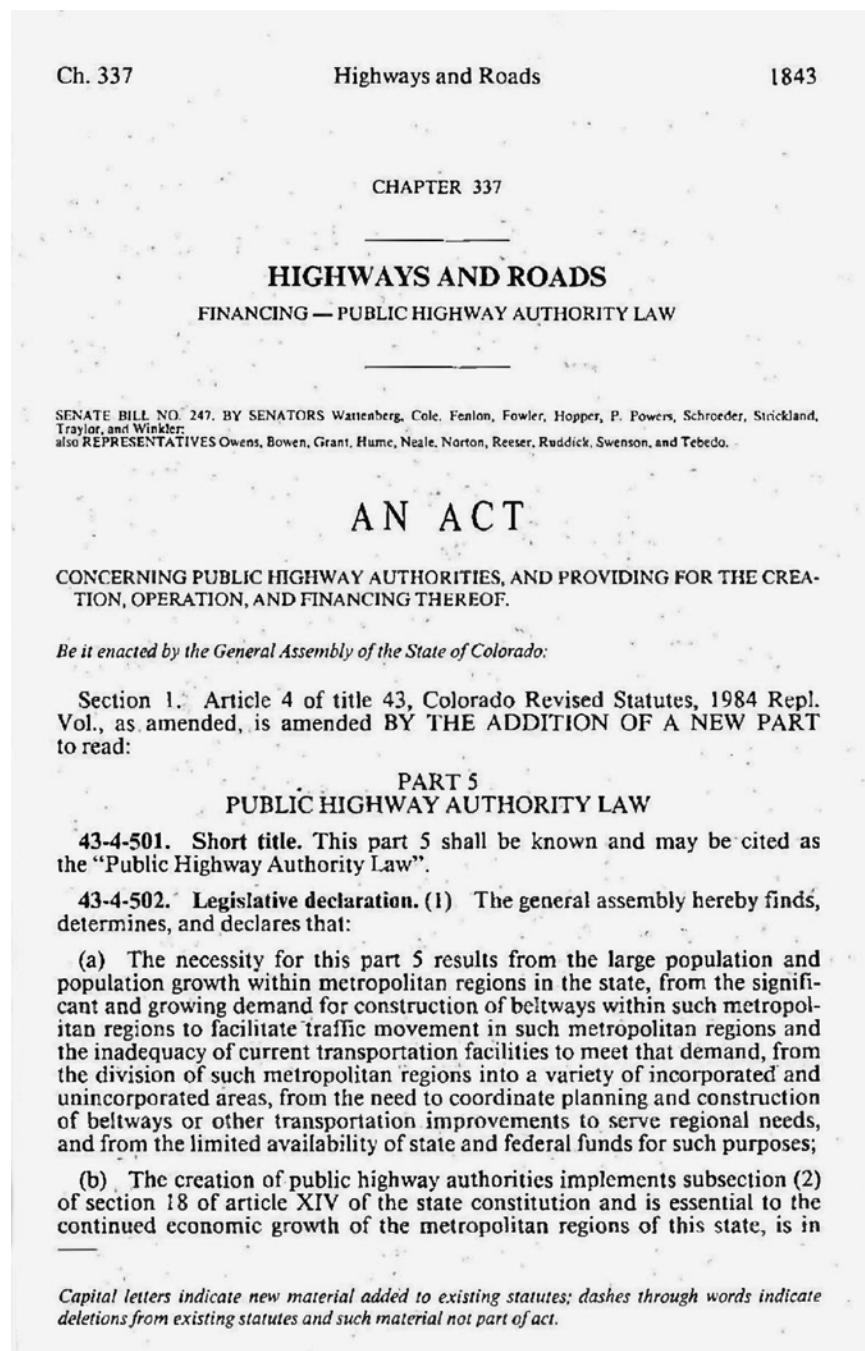
- To construct, finance, operate or maintain beltways and other transportation improvements.
- To take private property by condemnation.
- To establish and collect tolls on any highway provided by the Authority.
- To establish and collect highway expansion fees from persons developing property within the boundaries of the Authority (generally 1 and 1/2 miles on either side of the highway centerline).
- To issue bonds and pledge its revenues to the payment of bonds.
- To succeed to the obligations of other governmental entities.

With voter approval, a public highway authority could impose vehicle registration fees and create special districts (although never exercised by E-470). Also with voter approval, an authority could impose taxes and fees within any part of the member governments' jurisdiction. Those fees and taxes requiring an election are a sales or use tax, an employment privilege tax, a business occupation tax, and a motor vehicle registration fee.

E-470 did not use all of these powers. The successful 1988 vehicle registration fee election was the only E-470 measure that was voted on by the electors. No taxes were ever imposed, and the ability to impose taxes was removed by subsequent legislation.

## Putting It To The Voters

The guiding principle for E-470 was that those benefitting from the toll road should pay for it. On August 10, 1988, the board of directors of the Authority unanimously adopted a resolution endorsing a plan of finance that included (a) a \$10 per vehicle registration fee to be collected within E-470's voting boundaries (parts of Adams, Arapahoe and Douglas counties); (b) development fees (highway expansion fees) to be imposed within the Authority's geographical boundaries; and (c) highway tolls on E-470 as sections of it opened. Without a "yes" vote for the VRF, E-470 was going nowhere.



The 1987 Public Highway Authority Act.



## The 1988 Campaign

An election date was set for November 8, 1988. The effort to win voter approval in the three counties was conducted on two levels: (a) a public information campaign that was dutiful in its straightforward presentation of the facts about E-470 and (b) an advertising campaign funded and run by an independent political group, the BELT Committee (Build E-470 for Less Traffic), with campaign fundraising headed by John Frew.

As a governmental agency, the Authority's public information team was properly limited to presenting the facts about E-470 in a transparent manner, letting those facts speak for themselves, without hype. Brochures covering specific topics, such as financing, environment, economic impacts, and projected time-savings for commuters were distributed in dozens of public places. A speaker's

bureau was set up and Executive Director John Arnold and other staff members spoke to dozens of groups ranging from service clubs to economic development agencies. Town hall meetings were held. On weekends, E-470 staff members manned E-470 information booths in shopping malls.

Meanwhile, the BELT Committee was formed to be the advertising megaphone for the proposed toll road. Guided by polling, the BELT Committee learned that public opposition to the toll road dropped and support rose when the public realized, that by relieving the traffic load on other crowded roadways, E-470 would make driving in the metro areas easier. That powerful message was communicated via newspaper, direct mail, radio and TV advertising.

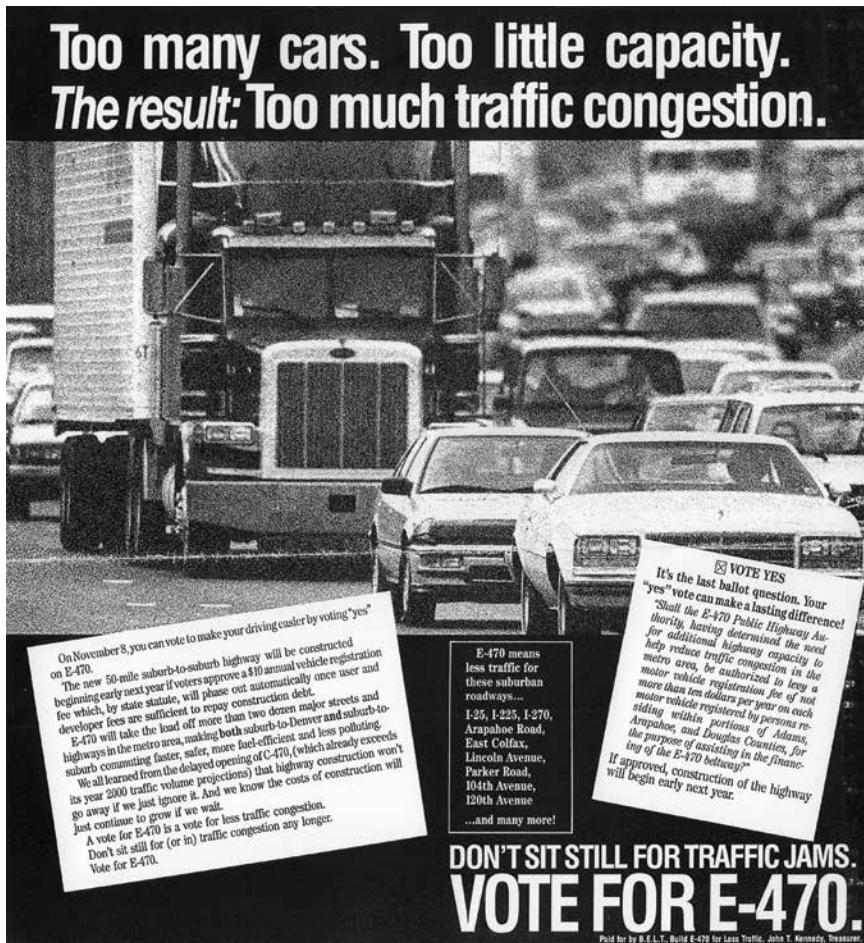
## Boon Or Boondoggle?

Opposition emerged with some calling E-470 "the road to nowhere" and a boondoggle for developers. Patricia "Patty" Calhoun, in her *Westword* column, November 2, 1988 joined the naysayers: "There's no reason to do this project piece-meal—unless you feel sorry for the developers who can't unload their land without nearby roads. Vote No."

The strongest and best organized opposition came from environmental groups. Greg Hobbs, vice chair of the Denver Metro Air Quality Council (and later, from 1996–2015, a justice of the Colorado Supreme Court), was forceful in opposing E-470 as a generator of development and smog. John Arnold counter-argued that E-470 would cut pollution by reducing congestion and stalled roads.

Regarding the wisdom of creating a beltway, E-470 cited projections by the Denver Regional Council of Governments (DRCOG) showing that, by 2010, 61 percent of all trips in the metro area would be from suburb to suburb, not suburb to Denver. In a guest column that Arnold wrote for a chamber of commerce group, he said, "This means the old 'hub and spoke' part of the metropolitan wheel of transportation will be obsolete, and that the 'rim' of the wheel needs to be added to make the system work. That rim is the beltway."

In a speech in Adams County, where opposition was strongest, Arnold emphasized the economic benefits to the county with respect to the new Denver



**Too many cars. Too little capacity.  
The result: Too much traffic congestion.**

On November 8, you can vote to make your driving easier by voting "yes" on E-470.

The new 50-mile suburb-to-suburb highway will be constructed beginning early next year if voters approve a \$10 annual vehicle registration fee which, by state statute, will phase out automatically once user and developer fees are sufficient to repay construction debt.

E-470 will take the load off more than two dozen major streets and highways in the metro area, making both suburb-to-Denver and suburb-to-suburb commuting faster, safer, more fuel-efficient and less polluting. We all learned from the delayed opening of C-470, (which already exceeds its year 2000 traffic volume projections) that highway construction won't go away if we just ignore it. And we know the costs of construction will just continue to grow if we wait.

A vote for E-470 is a vote for less traffic congestion.

Don't sit still for (or in) traffic congestion any longer.

Vote for E-470.

**It's the last ballot question. Your "yes" vote can make a lasting difference!**

Shall the E-470 Public Highway Authority, having determined the need to help reduce traffic congestion in the metro area, be authorized to levy a motor vehicle registration fee of not more than ten dollars per year on each siding within portions of Adams, Arapahoe, and Douglas Counties, for the purpose of assisting in the financing of the E-470 beltway?

If approved, construction of the highway will begin early next year.

**E-470 means less traffic for these suburban roadways...**

I-25, I-225, I-270, Arapahoe Road, East Colfax, Lincoln Avenue, Parker Road, 104th Avenue, 120th Avenue

...and many more!

**DON'T SIT STILL FOR TRAFFIC JAMS.  
VOTE FOR E-470.**

Paid for by B.E.L.T., Build E-470 for Less Traffic. John T. Kennedy, Treasurer.

### Suburban voters OK \$10 road fee to fund E470

By MICHELLE SCHNEIDER  
Rocky Mountain News Staff Writer

Voters in Arapahoe and Douglas counties came out strongly in support of the \$10 fee, but Adams County residents defeated it handsily.

With 388 of 480 precincts reporting in the three counties, the tally was 58,224 — or 63% — in favor of the tax and 18,173 — or 37% — opposed.

But in Adams County, voters rejected the tax 57% to 43%. With 32 of 89 precincts in, the vote was 12,687 for and 16,713 against.

Arnold speculated that some Adams County residents may still feel resentful about Denver annexing 45 square miles of county land for its proposed airport. E-470 will provide a link to the airport for suburban residents.

Arnold said yesterday's yes vote will allow the E-470 Authority to authorize bids for the first pieces of the beltway at its board meeting Friday.

"We'd like to have groundbreaking on a segment of the road by December," he said.

The first stretch of the 50-mile tollway — from Parker Road south to I-25 — is scheduled to open by 1991.

The road will loop east through Douglas, Arapahoe and Adams counties. It will connect with Interstate 25 both north and south of Denver and provide access to Denver's proposed airport.

The \$10 registration fee will raise about \$4.7 million a year for construction of E-470 — only about 5% of the cost of the highway.

Tolls — at a rate of 7.5¢ a mile — are supposed to pay 95% of the cost of the highway. Developers will pitch in an additional 2%.

Yesterday's vote was viewed as a barometer of public support for the 50-mile beltway.

Arnold said he is negotiating with at least two private-sector groups who may be interested in helping finance E-470 through project loans.

Supporters say it will cut congestion and travel time on metro-area roads and provide quick access to the new airport.



International Airport (DIA). “Without E-470 in place to access DIA, Adams County will lose out to Denver in attracting new business and spending.”

Both *The Denver Post* and the *Rocky Mountain News* editorialized in favor of the highway. Governor Roy Romer staunchly promoted E-470, which he called “an example of the effectiveness of such public and private joint enterprises.”

The November 1988 three-county election resulted in the E-470 measure being approved by a 58 to 42 percent margin (126,116 to 91,305). Although Adams County voters had rejected the measure, favorable votes in Arapahoe and Douglas counties carried the day. In celebration, a groundbreaking ceremony was staged the following month. The successful election was the key to financing the first segment of a billion-dollar dream.

## Fees Begin, Tolls Follow

In 1989, the Authority began to impose and collect highway expansion fees from developers. The following year, collections were approximately \$14,000. As for toll revenues, the toll for the first 5.3-mile segment was 50 cents if passing through the mainline toll plaza or 25 cents for all other ramp-only trips. In order

to test the tolling system and to introduce the public to the new toll road and its ExpressToll feature, the tollway was open for free from June 1 through July 15 of 1991. Toll revenue totaled \$226,000 in 1991 and the Authority received approximately \$4.7 million in revenues from vehicle registration fees.

E-470 gained further financial security with a 1989 letter of credit from the Union Bank of Switzerland (UBS) that secured payment of the bonds. That letter of credit enabled construction to begin in February of that year, less than three months after the successful election. The UBS arrangement permitted E-470 to break escrow on \$68.7 million in bonds, enough to complete construction on the first segment of E-470.

A subsequent proposal from UBS for letter of credit financing the balance of the project was withdrawn in 1990 due to the Persian Gulf crisis, international economic crises and the nearly total collapse of the savings and loan industry. What had appeared to be a smooth path to segment-by-segment completion of the entire tollway was endangered. Without the financial backing of UBS or a similar financier, E-470 faced a dire future.



Roy Romer, fourth from left, Betty Anne Dittmore, the only woman, and other leaders did shovel duty at the December 14, 1988 groundbreaking for E-470's Segment I.

## Acquiring The Land

The first step for E-470 involved acquiring 47 miles of right-of-way. Skeptics warned that speculators, litigation and unforeseen obstacles would escalate the right-of-way land purchase price to \$500 million or more. Thanks to John Arnold's wise choice of a right-of-way director, the price came in closer to \$50 million. That director, Michael Callis, was a veteran real estate agent and appraiser. "We followed all federal guidelines and were very upfront about land acquisition," Callis recalled in 2017:

We sent a letter telling property owners about E-470 and asking for permission to do two appraisals. We followed up with a phone call and then visited in person. From the beginning, we explained the purchase was for E-470, and gave landowners two estimates and offered to pay for a third estimate from their choice of a qualified appraiser. E-470 needed a 300-foot right-of-way for all 47 miles. We also acquired a 75-foot multiple use easement in addition to the 300 feet for bike paths, interchanges, signage and any other highway uses.

Callis commented that the entire length of E-470 has a wide median that could accommodate future rail. There was little difficulty in acquiring property as most of the land was in dry land wheat farming or ranching. The larger landowners worked with E-470 on right-of-way acquisition. About 25 percent of the right-of-way in Segment I was acquired through donations. This continued into other sections of the highway, such as Cal Fulenwider's donations between 56th and 112th Avenues. Callis mentioned that "in very few cases did we have to resort to condemnation."

Sometimes the right-of-way crew got lucky. One couple kept holding out until they called Callis one day to say, "We're getting divorced and need to sell out quick. Come on over."

E-470's most unusual acquisition involved a mule.



Jude the Mule obligingly provided right-of-way for E-470 and was rewarded with a new shelter.

## Jude The Mule

Margaret and Arthur Hoke had an eighty-acre farm just across E-470 from where the Administrative Headquarters Facility is located at E. 6th Parkway. They built a shelter there for their mule, Jude. The shelter was a modest building made from an old railroad boxcar but Jude fancied it. Jude was an old mule, the only survivor of the livestock the Hokes once raised on their farm. After Arthur died, Margaret moved into Aurora but visited Jude every day with his favorite delicacy—a cupcake. Callis befriended Margaret and her mule. Jude, he discovered, was also called Cupcake because of his fondness for those treats.

Respecting Margaret's deep attachment to Jude, Callis arranged for Jude to stay on the remnant parcel at 6th Parkway until Jude died. E-470 even built a new shelter for Jude. Although the shelter is now gone, the field still contains a small hexagonal shaped silo with a skylight.

## Arnold Was Right

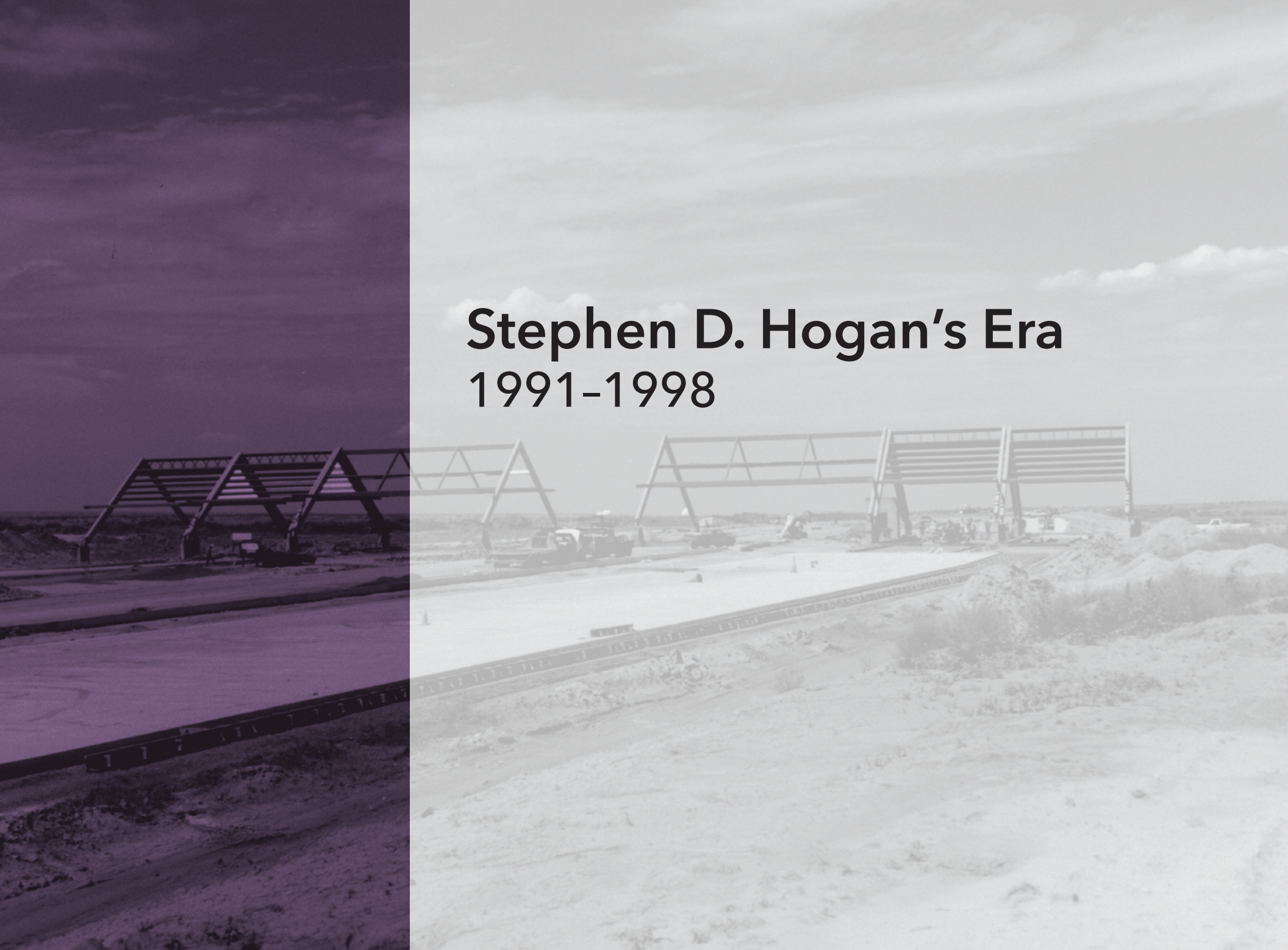
In six years, Arnold and his team, with the support and guidance from the E-470 board of directors, had taken the vision of the original E-470 Authority and turned it into a five-mile miracle. At the June 1, 1991 Segment I opening ceremony, he reiterated his favorite phrase: E-470 truly was "an idea whose time has come."



"Opening the Road to the Future"  
1990-91 Annual Report



# Stephen D. Hogan's Era 1991-1998



# Chapter 4

E-470's first Executive Director, John Arnold, announced his resignation on April 11, 1991, effective June 1, 1991—the day the first segment of the tollway opened. It was a day filled with speeches by elected officials and other VIPs exuding optimism for the ultimate completion of the toll road. The road's proponents proclaimed that the completed E-470 would improve suburb-to-suburb commuting mobility and provide a route directly to the new Denver International Airport, scheduled to open in 1993.

One of those speakers that day was Arnold's successor, Stephen D. Hogan. His remarks from the podium were upbeat. However, in the back of his mind there must have been some deep concerns.

E-470's financing plan to complete the roadway had recently imploded. The war in the Persian Gulf and the collapse of the savings and loan industry had conspired to rattle the international financial markets to the detriment of E-470.

What Hogan confronted was an enormous task. He and his staff and board of directors would somehow have to devise a solution to the funding conundrum. Failing that, those who had derided E-470 as “the road to nowhere” might well be proven right. What he could not know on the day the ribbon was cut on Segment I was that he would have to guide E-470 through a two-year roadblock—a legal dispute concerning the alignment of the next segments of the toll road.

Hogan brought considerable political experience to his E-470 position. He represented Aurora in the Colorado House of Representatives (1974–76), served six non-consecutive terms on the Aurora City Council (spanning 1979–2009) and would later, in 2011, be elected as Mayor of Aurora, serving in that capacity to the



Stephen D. Hogan guided E-470 over some of its roughest riding.

present. *The Denver Post*, in endorsing Hogan's candidacy for mayor, called him a man “with a reputation for problem-solving and a capable manager.” As Aurora's mayor, he rejoined the E-470 board in 2011.

His ability to bring disparate entities together, to accomplish tall tasks that were not unlike aligning a real-world Rubik's Cube, ultimately helped E-470 succeed in removing the roadblocks for the stalled project.

Hogan brought to his new job an understanding of E-470 and its brief political history. When he was approached about serving as the E-470 Public Highway Authority's (the Authority) interim executive director, he was an Aurora city council member who had represented the city on the E-470 board. He ultimately was awarded the executive director post on a permanent basis, a position he held until 1998. He left E-470 that year to become executive director of the Northwest Parkway and assume new tests of his leadership and problem-solving skills.

## A Novel Financing Solution From Morrison-Knudsen

When, in October 1990, Union Bank of Switzerland withdrew its April 1990 proposal to provide letter of credit financing for the remaining three segments of the tollway, Hogan and his team, including the board, were left looking for solutions.

To the rescue came Platte River Constructors (PIRC), a joint venture led by Morrison-Knudsen (MK), an internationally-respected construction firm. MK proposed not only to design and build Segments II–IV, the firm proposed to take the lead in finding the funds to finance the project.

On June 27, 1991, the E-470 board signed a Program Management Agreement designating PIRC, led by MK, as E-470's project developer, responsible for raising the tax-exempt funds necessary to complete E-470. MK also agreed to provide significant financing and, upon completion of the project, operate and maintain the toll road. Financing for Segment II–IV and refinancing Segment I put the total project cost at \$1 billion.

## Two Financing “Musts”

MK's exploration of financing solutions led to two significant commitments that the Authority would have to make to give potential bond investors the comfort level necessary to obtain financing.



First, the Colorado Department of Transportation was asked to lend \$20 million to E-470 to assist with Segments II and III construction financing, providing a matching amount in loans produced by member governments and others. On June 4, 1993, CDOT voted unanimously to make the \$20 million loan. On March 31, 1994, E-470's board gave approval to an intergovernmental loan agreement with Douglas and Adams counties, Parker, Thornton, Aurora and Brighton, and a financial assistance agreement with Arapahoe County. The funds were contingent upon the Authority closing on an approved Plan of Finance to be used as matching funds for the CDOT loan.

The second “must” called for the Authority to move its alignment about one mile to the west. This would put E-470 much closer to the already established population base, thereby driving more traffic and thus more toll revenues and reducing construction costs. To accomplish this, public hearings were held in January 1993. On June 1, 1993, Governor Roy Romer signed House Bill 1316 (H.B. 1316) into law. This bill enabled public highway authorities to expand their boundaries to two and one-half miles in either direction of the centerline. This law was essential to execute E-470's realignment plan.

One of the most frustrating situations that Hogan would face during his tenure with E-470 was a protracted legal battle.

A major roadblock came on June 14, 1993, less than two weeks after Romer had signed H.B. 1316 into law. Arapahoe County Commissioners (supported by two of the three commissioners) sued E-470, claiming its 1977 financing plan for the \$722 million bond issue violated the 1992 Taxpayer Bill of Rights, also known as the TABOR Amendment to the Colorado state constitution. TABOR required voter approval of any new taxes, spending or long-term debt for all units of



Stephen Hogan's motto for E-470.

Colorado government, unless they qualified as “enterprises”—government-owned businesses not dependent on taxes. The Board of County Commissioners also challenged H.B. 1316, the 1993 legislation allowing E-470 to change its alignment and boundaries.

This legal battle slammed the door on E-470 construction for two years. E-470 ultimately prevailed in court and was freed from a major legal hurdle on March 18, 1996 when Governor Romer signed into law Senate Bill 173 (S.B. 173), removing the taxing authority from E-470, thus establishing E-470 as an “enterprise” under state statute and therefore not subject to limitations imposed by the TABOR Amendment.

(For a more thorough understanding of the legal issues and how they were resolved, and other legal challenges E-470 successfully achieved, read the article at the end of this chapter.)

## On The Road Again

The year 1995 will be remembered as a landmark year for the E-470 Public Highway Authority. The barriers to construction began to crumble. The decision of the Colorado Supreme Court in May, ruling that the Authority's financing plan was not subject to voter approval requirements of the TABOR Amendment, cleared the way for the financing and construction of Segments II and III.

On June 8, 1995, a new Plan of Finance was approved and Fluor Daniel, Inc., the country's largest engineering firm, was added to the PIRC design-build team. On August 31, 1995, PIRC was given the official “Notice to Proceed” on simultaneously constructing both Segments II and III of the four-segment toll road. Together, the two segments would extend the highway by 29 miles, bringing the total to 34 miles.

Groundbreaking ceremonies for both Segment II and III, targeted for completion in 1999, were held on October 13, 1995 at the northwest corner of Gun Club Road and I-70.

The Authority proceeded full speed ahead in moving those two segments from the design table to the roadbed. PIRC had readied for the task ahead, staffing all primary management positions, mobilizing field offices and establishing a safety orientation facility and safety procedures. By May 1996, road construction was underway. By the end of the year, civil design and construction was well ahead of schedule, with miles of graded roadbed and the beginnings of bridges and interchanges in place near Denver International Airport and at the southern end of the project.

For construction purposes, the work on Segments II and III was divided into four Areas:

- Area 1 – From 120th Avenue south to 56th Avenue.  
(scheduled to be completed by July 1998)
- Area 2 – From Parker Road north to Smoky Hill Road.  
(scheduled to be completed by July 1998)
- Area 3 – From 56th Avenue south to I-70.  
(scheduled to be completed by July 1999)
- Area 4 – From Smoky Hill Road north to I-70.  
(scheduled to be completed by July 1999)

Many construction milestones were achieved in 1996:

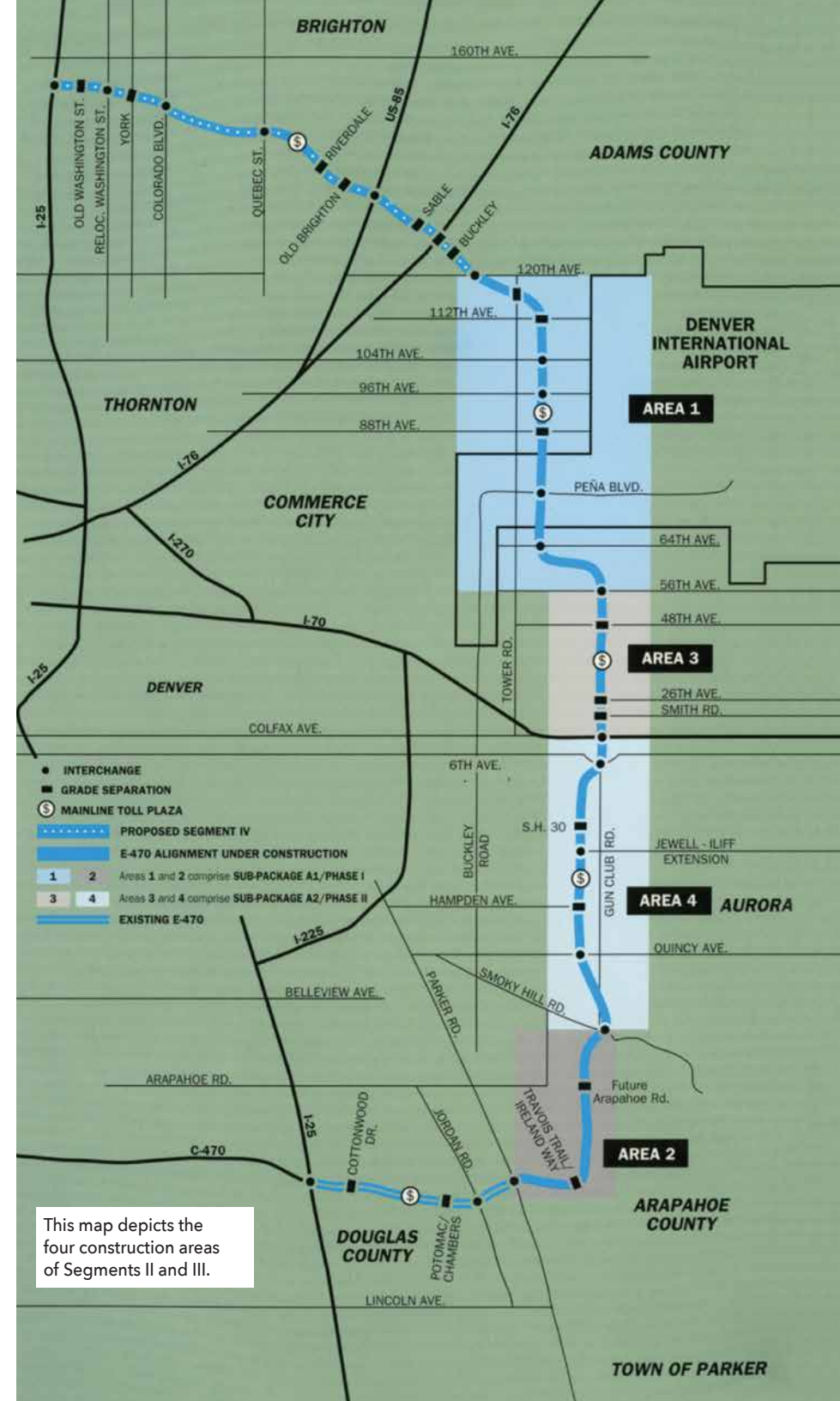
- April 22 – Relocation of utility lines at 120th Avenue and Tower Road.
- May 30 – Road bed grading and shaping commenced at 96th Avenue and Tower Road.
- Second quarter – PIRC issues a “Notice to Proceed” to Ames Construction, the principal grading and drainage subcontractor, for work on Areas 1 and 2.

Other subcontractors that year included Asphalt Paving, Flatiron Structures (several interchanges, including Peña Boulevard), and Lawrence Construction (bridges and interchanges at five locations).

In 1998, his final year heading the Authority, Hogan participated in the groundbreaking ceremony for the Authority’s new 50,000-square-foot Administrative Headquarters Facility. The facility was developed by ORIX GF Aurora Venture, a joint venture of ORIX Real Estate Equities, Inc. and LaSalle Partners, with DPR Construction, Inc. general contractor and Davis Partnership architects.



E-470 Administrative Headquarters Facility



This map depicts the four construction areas of Segments II and III.



For Hogan, thinking back to the 1991 Segment I ribbon cutting ceremony, watching the next 29 miles of the tollway taking shape, and a permanent headquarters building underway, must have given him profound satisfaction and a personal reaffirmation of his skills as a problem-solver and capable manager.

## MK's Illustrious Record

MK's origins date to 1905, when Harry Morrison met Morris Knudsen while constructing the Boise Canal Project in Idaho. Morrison, a young concrete superintendent for the Reclamation Service, was impressed by Knudsen, an older Nebraska farmer and Danish immigrant, who brought a team of horses to the project.

Their first joint venture in 1912 laid a pump plant followed by Three-Mile Falls Dam in Oregon. By 1923, MK revenues topped \$1 million and they incorporated. They went "big time" with the construction of Hoover Dam in the early 1930s.

During World War II, MK built airfields, storage depots, and bases throughout the Pacific and built ships along the U.S. west coast. Post war, MK expanded into a variety of foreign construction fields.

MK won contracts for many domestic and foreign Cold War projects including locks on the St. Lawrence Seaway, the Distant Early Warning Line system, Minuteman missile silos, NASA's Kennedy Space Center, and over 100 major dams.



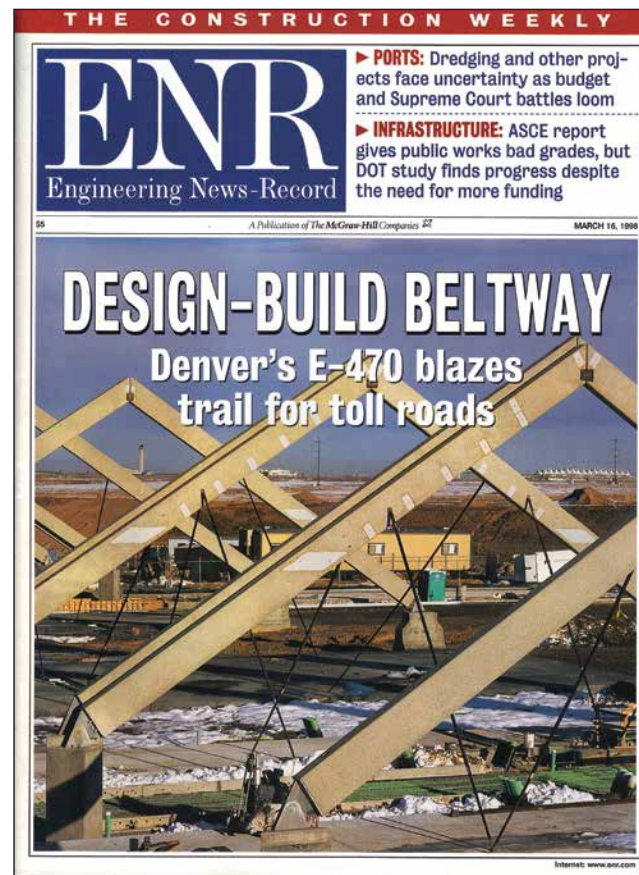
Morrison-Knudsen, an international engineering firm famed for projects such as Hoover Dam in Nevada, helped construct E-470.

Credit: Denver Public Library

## "Deal Of The Year"

In 1995, the existing 1986 bonds were restructured. Platte River Constructors was given notice to proceed. The 1995 bond issue remarketed the Authority's debt into long-term obligations, including approximately \$400 million in current interest bonds, over \$180 million in capital appreciation bonds and over \$50 million in vehicle registration fee pledged bonds. At this time, Arapahoe County delegated all responsibility for the 1986 bonds to the Authority.

The January 1, 1996 edition of *Institutional Investor Magazine* named E-470's investment grade financing the "Deal of the Year" for 1995. *Governing Magazine*, March 1, 1996, agreed, giving E-470 its "1995 Deal of the Year" award. On October 21, 1996, the International Bridge, Tunnel and Turnpike Association (IBTTA) presented E-470 with a "Toll Innovation" award for the innovative financing of Segments II and III.



In a 1988 *Engineering News Record* cover story, E-470's innovative financing and design-build approach were praised as a national model.

## Details Of The “Deal Of The Year”

As outlined in the 1995 E-470 Annual Report, some of the key components of the award-winning plan included:

- Segments II and III were financed as well as refinancing of Segment I.
- Non-recourse: Only pledged revenues were available to pay debt holders. There was no ability to access any tax revenues of the jurisdictions of the Authority.
- Long-term financing from the outset: The bonds that were released from escrow all had a 2026 maturity date, and, with one exception, they possessed the same sinking fund installments originally set out in the 1986 bond documents.
- Tiered debt structure with Vehicle Registration Fee (VRF), Senior Current Interest, Senior Capital Appreciation and Second Tier Subordinate Bonds and loans from state and local governments.
- Capitalized interest for the full construction period plus two years for Senior debt.
- Debt service reserves were funded from bond proceeds for VRF and Senior Bonds.
- VRF Bonds were backed by the pledge of the stream of revenues from the E-470 registration fees. The VRF bonds carried bond insurance and were rated AAA.
- Investment grade rating in Senior Bonds. The ultimate traffic and revenue forecasts plus careful structuring of the debt resulted in projected revenues that were twice the debt service and an investment grade rating which reduced the interest rates and increased the number of possible buyers. The two tiers of Senior Bonds, current and deferred, were supported by toll revenues, highway expansion fees and any excess registration fees not required for VRF bond debt service.
- State and local loan repayments had the next priority on the revenue stream that supported the Senior Bonds.
- The design-build contractor purchased Second Tier Subordinate Bonds in the amount of \$16 million which had the last priority of debt repayment in this financing.
- Included in the total package was a refinancing of the series of bonds released to complete Segment I. This was necessary to free the Authority from the terms and conditions imposed by the letter of credit, including a first lien on the revenues of the Authority.

## Another “Dealmaker Of The Year” Award

The acclaim the 1995 Plan of Finance had won was a hard financing act to follow, but two years later the Authority won more praise for its financing strategies.

In 1997, the Authority further refinanced debt with the purpose of long-term savings, which retired all the 1995 debt, except the VRF bonds. Debt was replaced with lower interest rates on the new 1997 bonds consisting of \$480 million in current interest bonds and \$342 million in capital appreciation bonds. This refinancing provided \$31 million in expanded available funding to accelerate Segment IV construction. Taking note of this shrewd move, the *Denver Business Journal* awarded E-470 its “Dealmaker of the Year” Award for 1997.



Construction of the Peña Boulevard and E-470 interchange provides a fast, safe connection to Denver International Airport.

## 2007 Financial Restructuring

E-470 is always looking for ways to improve its financial efficiency. A 2007 debt restructuring enabled the Authority to chart a more level, predictable route for repaying investors. In that year, E-470 saw a boost in its Moody's bond rating from Baa3 to Baa2. This was the first time in the Authority's history that it received an elevated bond rating. Revenue from tolls and Vehicle Registration Fees (VRF) were enhanced by other streams including, in 2007, \$2 million in toll violation revenues and \$140,000 in cell tower leases.

In 2009, the road refunded its Vehicle Registration Fee bonds to replace a variable-interest rate with a fixed rate. This trimmed nearly half of the debt expense on those bonds.



## Details Of The Tabor Roadblock And Other Legal Landmarks *As Told By Ed Icenogle, E-470's General Counsel From 1990-2014*

One of Icenogle's major legal challenges came when two of the three Arapahoe County Commissioners, Jeannie Jolly and John Nicholl, voted to have the County bring suit against E-470 to halt or delay completion of the highway, as E-470 had moved the planned alignment roughly one mile west of its initial proposed alignment to lower costs and obtain financing. Landowners, who were planning on E-470 to be built farther east so they could develop their land, were distressed by E-470 moving the alignment. They helped convince the two commissioners to have the County sue E-470 to force the alignment to remain where it was originally planned. They based the suit on claiming E-470 defied the TABOR Amendment, that E-470 was not exempt from TABOR requirements and that its funding and debt must be approved by a taxpayer vote, as E-470 could raise taxes and thus did not qualify for the "enterprise" exemption from voter approval allowed by TABOR.

Paulette "Polly" Page saved the day for E-470. A coal miner's daughter from West Virginia, she was an Aurora city councilwoman, from 1987-1995, who strongly supported E-470 and sat on its board. She ran for Arapahoe County Commissioner against incumbent Commissioner Jolly and won. Page and the third County Commissioner, Tom Eggert, who sat on the E-470 board and supported E-470 and its changed alignment, reversed the County's opposition to E-470. "It was Jolly vs. Polly and I was blasted as the 'Developer's Candidate,'" Page recalled in a 2017 interview, "but I won by a 60 to 40 margin. I thought E-470 was most important to Aurora and Arapahoe County. On the day I was sworn in as Commissioner, we dropped the suit against E-470 and fired the county attorney. In retrospect, we were right. Can you imagine I-25 and I-225 traffic today without E-470?" Commissioner Nicholl carried forward the lawsuit in his individual capacity, and the Colorado Supreme Court, in 1995, gave a TABOR-clarifying ruling that a Colorado public entity with the power of taxation, even though unexercised, could not be classified as a government-owned "enterprise," freed of the need for TABOR vote approval. Other challenges to E-470 proceeding with its financing plan were rejected by the Supreme Court. To qualify for an exemption from TABOR as an "enterprise" and to proceed with its financing, E-470 asked the General Assembly to rewrite the powers of public highway authorities,



Ed Icenogle, E-470's longtime General Counsel, steered the highway through legal challenges.

Credit: Courtesy of Ed Icenogle

specifically to rule out any power to tax. The General Assembly did so in 1996, and E-470 went back to the courts for a further determination of its new "enterprise" status under the TABOR Amendment.

The District Court for the 18th Judicial District (Arapahoe County), after reviewing the 1995 Supreme Court decision and the General Assembly's new law, ruled in favor of E-470's TABOR "enterprise" status. The Court clarified that E-470 was an "enterprise," a business owned by the Authority's member counties and municipalities, and exempt from TABOR mandates regarding voter approval of its spending, revenue, and debt. The Court further held that such funding received before the TABOR amendment passed in 1992 would not be subject to voter approval.

The Supreme Court and District Court decisions cleared the way for remarketing the 1995 bond issue as long-term obligations.



Polly Page was the Arapahoe County Commissioner who saved the day for E-470.

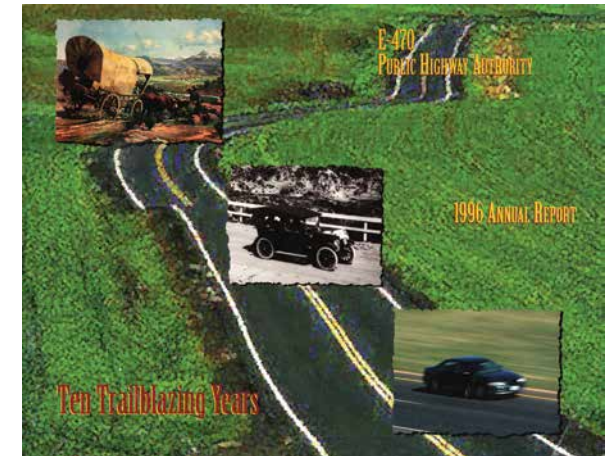
Credit: Courtesy of Polly Page



E-470 interchange with C-470 and I-25 in Douglas County.



E-470 signature red guardrails with Denver International Airport (DIA) in the distance.



1996 Annual Report - Ten Trailblazing Years

## E-470's Legal Beagles

T. Edward “Ed” Icenogle provided legal guidance as E-470’s principal general counsel from 1990 to 2014. Tamara K. Seaver, his longtime law firm colleague who also worked extensively with E-470 over the last two decades, stepped in to Ed’s principal General Counsel role in 2014. Here he provides details on some of the other legal milestones the firm achieved on behalf of E-470:

“Much of E-470’s earliest legal work was acquiring mainline right-of-way of 150 feet on either side of the centerline through the median. For that right-of-way which could not be acquired by purchase at fair market value, E-470 special counsel used eminent domain to condemn the land and then pay fair market value to owners,” Icenogle reported in a 2017 interview. “Some of the right-of-way was obtained by dedication arranged by E-470’s member municipalities as a condition of annexation of land for development and some by donation of nearby land developers. We also needed right-of-way for utilities, signage, and future hike/bike paths and potential transit line expansion, as well as for the road itself. For Segments II, III and IV, E-470 also acquired multi-use easements for an additional 75 feet on either side, giving E-470 control over additional right-of-way for those various uses.”



Tamara Seaver has worked as E-470’s principal General Counsel since 2014.

Credit: Courtesy of Tamara Seaver

Other major legal activity, in addition to the TABOR litigation and acquisition of right-of-way, included the introduction of design-build contracting for Colorado public infrastructure. E-470’s Segments II/III and Segment IV contracts were the first Colorado public works projects under the design-build delivery method, in which the functions of design and construction are concentrated in a single contractor entity.

Said Icenogle, “Because E-470’s repayment of capital costs and its operations were to be funded primarily by toll revenues, the investment bankers who arranged for E-470’s borrowings advised that a project delivery system with a guaranteed completion date and guaranteed completion price was essential. Working initially with an international law firm experienced in design-build in Europe, E-470 procured and administered its three major design-build contracts. E-470’s Segments II, III, and IV were completed on budget and on time, allowing the essential toll revenues to begin as needed.”

As to the all-important TABOR litigation and legislation, which allowed E-470’s major financing to proceed, Icenogle notes that this case established E-470 as one of the largest and first TABOR “enterprises” in Colorado. “Clearing TABOR was an essential and cooperative effort of E-470 staff and consultants, the counties and municipalities which own E-470, and of course, the E-470 Board of Directors,” Icenogle said. No other serious legal problems have plagued E-470 since. Reflecting on his firm’s lengthy career with E-470, Icenogle said, “What most impressed me over the years was how so many elected local officials worked so hard to make E-470 happen. This was tireless work for which the E-470 board of directors did not even get a free toll pass!”





# Edward J. DeLozier's Era 1999-2010

# Chapter 5

With the 1998 departure of Executive Director Steve Hogan, Pamela Bailey Campbell, former director of finance, assumed the vacated post on an interim basis. After a nationwide search, in December 1998 the board chose a successor—Edward J. DeLozier, an attorney and toll highway consultant with 25 years of toll expertise.

DeLozier brought with him experience at every level of the tolling industry. Few, if any, tollway consultants and chief executives had done what DeLozier had done--work as a toll booth attendant. DeLozier started his tolling career as a night shift toll collector on the New Jersey Turnpike while working his way through college and law school. The experience he gained in the toll booth proved to be an invaluable component of his education. He observed on a daily basis what worked and did not work in terms of training and motivating toll employees to treat toll road users not just as drivers but as valued customers.

DeLozier was down to earth and not afraid to take on unpleasant tasks. When E-470 board chair Paul Tauer traveled to DeLozier's home to interview him to succeed Hogan, he remembered: "When I knocked on his door and asked for Ed, his wife told me he was in the backyard picking up dog poop. I knew right away he was our man."

DeLozier worked on toll roads in Virginia and in Florida where he succeeded in privatizing their tolling



Edward J. DeLozier, the third executive director of E-470, started his transportation career as a toll booth attendant in New Jersey.



Ed DeLozier, right, entertained IBTTA conventioners with his skits, this one about whether to privatize toll roads.

systems. DeLozier is best remembered for his commitment to customers, insisting that the staff pamper them. He declared, "A toll road isn't a highway so much as a service getting the customers where they want to go quickly and at a reasonable price." DeLozier also championed a better product. "You're never done building a toll road. You're always doing something to build a better experience." DeLozier is also remembered for the slogan he gave E-470: Safety. Service. Speed. Stewardship.

DeLozier made service his major focus. From his own experiences as a young man working as a toll collector, he appreciated the difference between smiling and snarky customer service.

He believed in developing friendly relationships with customers. He pushed customer appreciation days when E-470 customers were rewarded with coffee, sweet rolls and other perks. On Halloween, toll booth attendants dressed up in costumes and handed out treats. Many customers would choose their specific tollbooth lane just to chat with their favorite toll attendant. To assure toll attendants were customer-friendly, DeLozier arranged for mystery customers to test staff manners and report back to management. DeLozier was admired, liked and respected by the E-470 staff and board of directors for his knowledgeable, even-handed management style and sense of humor.

Internationally known in the tolling industry, he served as first vice-president of the International Bridge, Tunnel and Turnpike Association (IBTTA). He was scheduled to become IBTTA's president in 2011 but a stroke took Ed's life in 2010, to the distress of his colleagues and employees.

As Manager of E-470 Road Management, Ron Newlander, a friend and employee of Ed's, reflected in a 2017 interview: "Ed was the kind of guy who regularly walked the building, visited with and knew every employee by name. He talked to you, not down to you."



The board and employees memorialized Ed DeLozier with a large boulder bearing this plaque on DeLozier Circle in front of the Administrative Headquarters Facility.



## Engineering The Tollway

During DeLozier's tenure, road construction progressed at a rapid pace. Four years before DeLozier joined E-470, the Authority had hired as its chief engineer, Matthew Maynard McDole, who served from 1995 to 2008. He was E-470's third chief engineer. Greg Henk and Richard Bauman were E-470's first and second chief engineers, respectively, having worked on Segment I. McDole had previously served as chief engineer for the Bay Area Rapid Transit system in San Francisco. The five-mile Segment I was already completed when McDole arrived, but he oversaw design and construction on the remaining three segments, completing E-470's full 47-mile route.

McDole recalled in a 2017 interview "Our big challenges were crossing two railroads (the Burlington Northern Santa Fe and Union Pacific) and I-70, I-76 and Peña Boulevard as well as several irrigation canals and numerous smaller roads. The crossing of U.S. 85 was also a challenge which included the construction of a lake in what had been an old gravel pit."

## Construction Marches On

When DeLozier came aboard at E-470 on January 1, 1999, construction of Segments II and III (29.3 miles) was well underway. Platte River Constructors (PIRC), a partnership of Morrison-Knudsen and Fluor Daniel, had completed by July 1, 1998 two out of four designated areas, totaling 15.5 miles. The remaining two areas, totaling 13.8 miles, were completed on May 3, 1999.

Lawrence Constructors, a local contractor, was the design-build prime contractor for the I-70 interchange.

## Stuck In The Mud

Upon arriving at E-470, McDole had to hire engineering and construction management staff. He also had to equip that staff, which had been operating on a relatively lean budget. The first person he hired was Matt Alexander as manager of construction (who succeeded McDole when he retired from E-470) to oversee the contractors' field activities. Upon reporting for duty, Alexander asked if he could be assigned a pickup truck to visit construction sites. McDole advised that E-470 owned no vehicles and employees were compensated for mileage on their personal vehicles. In his first week, Alexander went to a construction site and buried his sports car up to the axles in mud and had to get the contractor's tractor to pull out his vehicle. This motivated E-470 to acquire four-wheel drive pick-up trucks for its field staff.



E-470's distinctive red bridge railings

## Aesthetics That Packed A Punch

Said McDole, "We continued the distinctive red bridge railings and built in aesthetics such as carving the street names of overpasses into the bridge abutments." Such frills led Executive Director Ed DeLozier to talk about eliminating aesthetics to save money. McDole reported that:

"Ed was such a good sport that we took that fight to the International Bridge, Tunnel and Turnpike Association annual conference. They set up a mock boxing ring, and I appeared in a red robe with red trunks and red boxing gloves representing our red bridge railing aesthetics. Ed DeLozier wore a black robe, trunks and gloves, representing austerity. We fought verbally with punchy arguments and counter arguments by tapping each other's gloves. That was a most popular and memorable session."

DeLozier ultimately conceded defeat. Mrs. DeLozier settled the matter on a dark, rainy, foggy night when she and Ed were returning from DIA to their home in Parker. "Thank heavens, Ed," she told him that scary night, "You have those street names carved into the bridge so we have some idea of where we are."

McDole is now Vice-President of Transportation Services for L.S. Gallegos & Associates. "I'm working nowadays on another section of the 470 Beltway, Jefferson Parkway, a proposed toll road between Colorado 128 and Colorado 93. We've all learned from the pacesetting work on E-470 where we pioneered design-build. E-470 has become a national, even an international model."

## Mission Completed!

By May 5, 1999, only one segment remained to complete the E-470 beltway. A Segment IV design-build contract was signed in January 2000 between MKK Constructors (MKK) and the Authority. MKK, a joint venture between Washington Group International, Inc. (formerly Morrison-Knudsen) and Kiewit Western, designed and built the final segment, which was 12.2 miles long.

Segment IV opened on January 3, 2003. This completed the nearly 47-mile-long tollway. The event was celebrated with a ribbon-cutting ceremony based on the theme “We’re not in Kansas anymore,” in reference to kidding that E-470 had originally endured about its location on the eastern periphery of the Denver metro area.



Dorothy (staff member Stacy Tempas) and her dog, Toto, pedaled to the 2003 opening of the final segment. The theme of the event was “We’re not in Kansas anymore”.

## Flyby Or Flyover

The theme for 2006 was “Pulling out all the stops.” The inspiration for this theme came from the completion of a two-mile-long, \$40 million flyby over I-70 and a flyover ramp at the E-470/I-70 interchange.

The flyby opened on August 24, 2006, eliminating E-470’s only traffic signals for E-470 through-drivers. The flyby re-routed E-470 through-traffic, bypassing the existing traffic signals on the highway at the intersections with E. Colfax Avenue, I-70, and 19th Avenue. Funding for the E-470 interchange at I-70 was not available in 1995 when construction began on this portion of the toll road. With the opening of the flyby, E-470 customers could now travel the entire length of the highway without slowing or stopping for traffic signals.

The next step on the E-470/I-70 interchange improvements began to take shape in 2006 with the construction of the \$18 million northbound E-470 to westbound I-70 flyover ramp. With completion of the ramp in 2007, motorists traveling from northbound E-470 to westbound I-70 could take a direct ramp instead of exiting E-470 through-lanes and proceeding through the traffic signals at the existing interchange.



The flyover ramp at the E-470 and I-70 interchange soars for two miles.



## Telling The Story

In 1991, the year the E-470 tollway opened, Executive Director Steve Hogan hired a young woman who he had seen shine as the budget analyst for the City of Aurora, where she also worked in planning and economic development. Jo Ellen Snell worked in three E-470 departments before returning to Toll Operations, where she completed her E-470 career.

Snell found E-470's traffic increased substantially in August of 1993 when Pope John Paul II came to Denver for World Youth Day. For his appearance at Cherry Creek State Park, "hundreds and hundreds of buses and vehicles transported people, mostly youngsters, to and from the site via E-470. It was uplifting to see all the buses with banners in many languages from all over the world on our highway."

As Snell reminisced in a 2017 interview, she and other staff had to call worried wives: "In those pre-cell phone days, we had call boxes all along the highway for our customers to use if they had an emergency or a vehicle problem. Some customers used those phones to stay out of trouble with their wives, calling our communications center to ask us to 'please call my wife and tell her I will be late coming home.'" As more segments of the tollway opened, E-470 held a marketing contest with the employees. One engineer suggested, Snell recalled, "that we put Jude (the mascot mule who lived on a remnant parcel next to the E-470 office) in a trailer, hook up the trailer to a truck, and drive up and down E-470 with a



Jo Snell tackled many different jobs at E-470.

Credit: Courtesy of Jo Snell

banner on the side of the trailer advertising "HAUL ASS ON E-470."

Snell's last post before her 2012 retirement was as Community and Public Relations and Incident Management Manager. She dealt with a variety of media, from newspapers and magazines to television.

Publicizing the switch from cash toll collection to All Electronic Tolling proved to be Snell's biggest challenge. "We spent a whole year getting the word out," Snell remembered, "but come July 4, 2009, when cash toll collection ended, some customers still drove around barricades at the toll plazas trying to pay their cash toll." As E-470 was the one of the first U.S. toll roads to end cash toll collection and convert to All Electronic Tolling, "agencies from all over the world came to study our system."

"Many U.S. presidents have used our toll road. We could see a convoy of helicopters and then U.S. Air Force One land at Buckley Air Force Base for presidential visits."

"It's amazing that Denver is still one of the few major U.S. metropolitan cities that does not have a complete beltway," Snell declared in 2017. "After 21 years at E-470, I still call it my road."

Snell worked closely with Dan Christopherson, E-470's long-term public relations contractor. He majored in journalism at CU-Boulder with minors in philosophy and marketing. He then handled public relations for Vail Resorts before becoming Marketing Director for Beaver Creek.

In 1987, his firm, Christopherson & Co., took on E-470 which then had a five-person staff in a small, borrowed Denver Tech Center office space. "E-470 was just a vision then. It was an idea and an aspiration," Christopherson reflected in a 2017 interview. "But John Arnold, E-470's first executive director, had contagious optimism. He was an intense believer, a cheerleader for E-470 who made the highway happen."

Christopherson and his firm's vice-president, Jon Goldman, were heavily involved in making the E-470 vision happen by publicizing and promoting one of Colorado's most improbable transportation tales. They also fielded relations with a skeptical and sometimes hostile press. Christopherson's most memorable success on behalf of E-470 was its role in building public and legislative support for the creation of the Public Highway Authority Act in 1987, and heading the public information effort that resulted in E-470's successful three-county election in 1988 where voters approved the Vehicle Registration Fee. In 2000, E-470 recognized his contributions by giving him its "Driving Force Award."



Dan Christopherson has served as the public relations contractor for E-470 since 1987.

Credit: Courtesy of Dan Christopherson



Jo Snell handled media for years as the face of E-470. Credit: Courtesy of Jo Snell

## Information Technology

Another of the veterans who keeps E-470 humming is Jennifer Saul Larson, who started out in 1994 as engineering coordinator.

Larson credits DeLozier for grasping the increasingly important role that information technology would play in keeping E-470 at the forefront of tolling. Although IT was then a small player, Jennifer helped it grow. The new department, teaming with E-470's engineering, operations, finance, roadway and marketing experts, was given the freedom to invent, implement and maintain toll technology that better served customers as well as the entire E-470 operation. E-470 soon established a global reputation for its pioneering tolling advances, including, during DeLozier's tenure, All Electronic Tolling (AET).

With an expanded IT department," Larson reported, "we can always do everything in-house. We started out as the road to nowhere but believed in the old slogan, 'Build it and they will come.'"



Jennifer Larson

## Environmental Concerns - A Commitment To Stewardship

DeLozier and his predecessors at E-470 consistently demonstrated a commitment to stewardship of the environment, the land and heritage. Addressing wildlife issues, E-470 rerouted its original planned alignment to avoid nesting eagles, spared prairie dogs, built eight-foot high deer fencing and provided deer underpasses.

E-470's first segment, from its interchange with I-25 and C-470 to Parker Road, completed in 1991, disturbed approximately five acres of wetlands along Cherry Creek in northern Douglas County. Under a permit from the Army Corps of Engineers, the E-470 Public Highway Authority was required to replace the wetlands. Typically, replacement is done at the time of construction. However, E-470 took the unusual step of providing replacement wetlands one year before the original wetlands were disturbed. The \$113,000 project converted a former alfalfa field northwest of the E-470 and Parker Road interchange into a thriving habitat for water fowl, eagles, and other wildlife.

Additionally, between 1997 and 2002, almost 50 acres of wetland mitigation and approximately 10 acres of riparian mitigation were successfully constructed as part of the middle and northern portions of E-470. These locations included Antelope Creek, Third Creek, South Platte River, and Big Dry Creek.



E-470 installed deer fencing to keep wildlife off the highway.



Motorists whizzing by on E-470 can admire the wetlands E-470 created along Cherry Creek.



## Barr Lake State Park

E-470 also addressed worries about how it might impact Barr Lake State Park, a 5,714-acre natural area on the east side of the highway. Carol Leasure, longtime park manager at Barr Lake, reported that E-470 “really listened to our concerns about the effect of the highway on the park and its surroundings. They voluntarily bought a 117-acre site to create a wildlife habitat buffer zone. Then they gave it to Barr Lake State Park.”

E-470 helped finance a three-year U.S. Fish and Wildlife Service (FWS) study of bald eagles at Rocky Mountain Arsenal National Wildlife Area and Barr Lake State Park. E-470 also donated \$15,000 to the FWS so they did not have to buy tracking devices for eagles. To protect a breeding nest for golden eagles in Arapahoe County, E-470 reworked its alignment, winning praise from the FWS for an “exemplary” approach to “a perceived conflict between development and wildlife.”

In 2015, to prevent harm to a baby golden eagle nesting next to an E-470 interchange in Commerce City, E-470 posted warning signs, stationed Roadside Assistance vehicles at the interchange and enlisted volunteers for a 24/7 watch to make sure the eaglet’s first flight did not crash land on the highway. The eaglet survived its first flight, but shortly thereafter succumbed to West Nile virus. A happier fate awaited two eaglets in a nest along the 120th exit ramp. When the branch holding their nest collapsed and fell to the ground, the eaglets could not yet fly. They were rescued and turned over to the Raptor Society which helped the pair recover and then released them back into the wild—far away from any highway. Construction crews also took great care not to disturb burrowing owls along portions of the tollway.

## Environmental Expertise

Virginia “Gina” Leslie McAfee, a Boulder-born environmental planner, handled environmental issues for various engineering firms working on E-470. She began her career working on Colorado’s most environmentally-sensitive highway—I-70 in Glenwood Canyon.

“I went to work for E-470 in 1982,” she remembered in 2017. “The right-of-way team had to research historic ranches, railroad lines, water ditches as



E-470 helped rescue this eaglet after it crashed during its fledgling flight next to the highway.

well as plants and animals. We completed National Register eligibility forms for the historic structures. We moved the alignment a half-mile east for golden eagles nesting high in a ponderosa tree near E-470.” That move is commemorated by the Heritage Eagle Bend residential subdivision and golf course near that bend at E-470 and Gartrell Road. “We found fens—rare and ancient wetlands with deep organic matter—at Barr Lake and moved the alignment to preserve them. We also performed cutting edge replacement of the wetlands along E-470 next to Cherry Creek. There we had to create wetlands by digging down to the water table, a technique that had never been done before. We built deer fences to protect deer and had deer underpasses on about half the bridges. We looked for the endangered Preble’s meadow jumping mouse and black-footed ferrets but never found either.”

## Preservation

E-470 construction unearthed and preserved evidence of the very first settlers in the E-470 corridor. Native American tipis, ancestors of DIA’s glistening white-tented Jeppesen Terminal, once decorated these plains. Traces of those long ago archaic and historic era tribes have been preserved in a display case in the lobby of the Administrative Headquarters Facility—stone tools, arrowheads and a knife blade.

An architecturally and historically significant wooden silo is still standing today across E-470 from the Administrative Headquarters Facility. This tiny, unique structure is hexagonal with a skylight. The Salinas tracks of the Union Pacific Railroad, where E-470 crosses the historic Smoky Hill Trail, were preserved by bridging over them. Interpretive signage was installed to celebrate this pioneer route, a distant ancestor of E-470.



Credit: Courtesy of Gina McAfee

Gina McAfee, E-470’s environmental contractor, helped make the highway construction a model for preserving natural and historical treasures.



Some of the prehistoric Native American artifacts found during construction of E-470 are on display in the Administrative Headquarters Facility.

## The Windler's Centennial Farm

Gina McAfee and Right-of-Way Director D. Michael Callis, took an interest in the Windler Farm, a centennial farm straddling E-470 near E. 56th Avenue and Picadilly Road in Aurora. One of many farms owned by the Windler family for a century or more was honored by History Colorado and the State of Colorado. Henry Windler, Sr., and his wife, Anna Catharina Dreyer, both German immigrants, bought their farm and 80 acres in 1883. Their dairy farming allowed the family to buy more acreage and build a brick and frame house and outbuildings which still stand. Mike Callis and E-470 arranged for a highway pull out and historic marker to celebrate the most significant and visible relic of E-470's agricultural past.

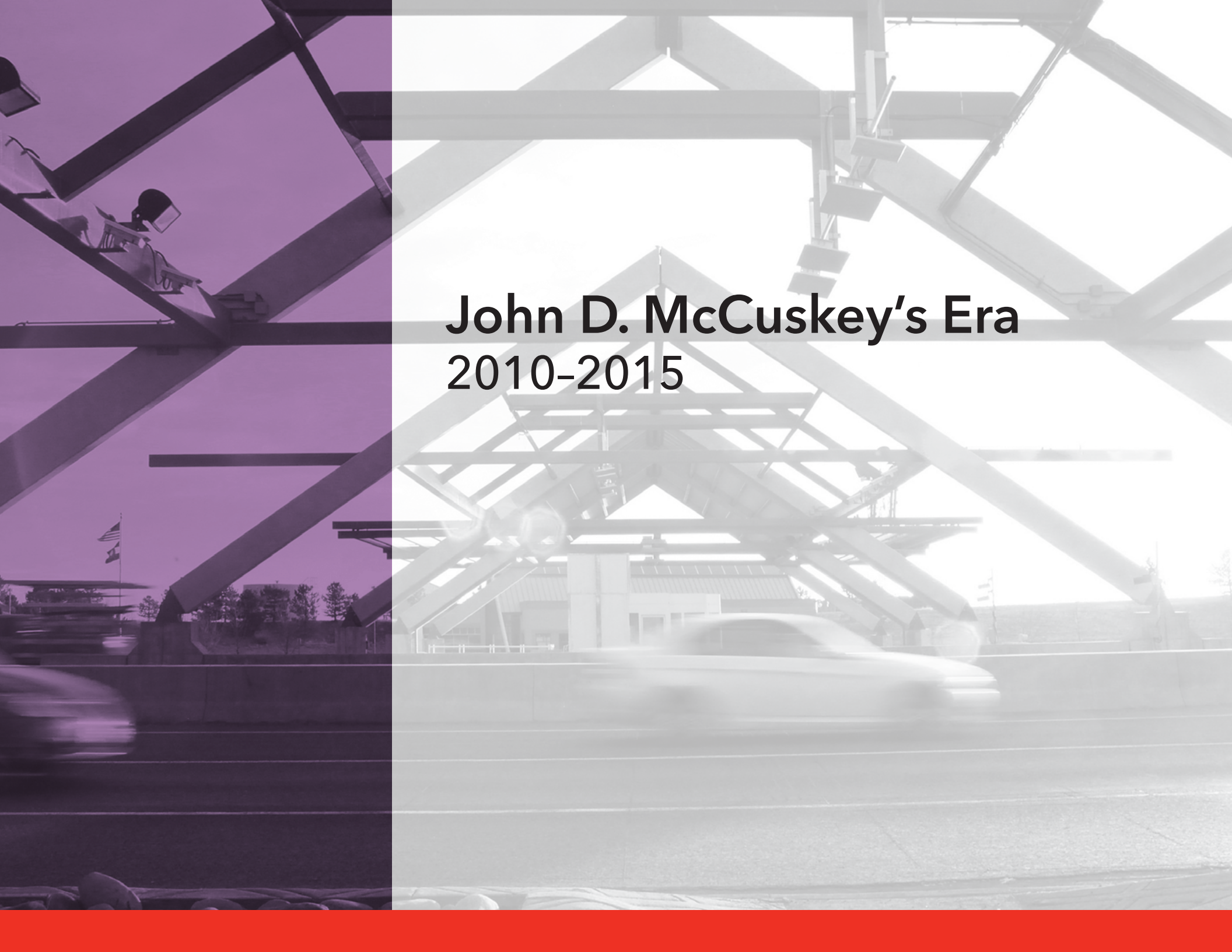


The Windler Centennial Farm is a survivor of homesteads that once occupied the E-470 corridor.

E-470 strove to enhance the environment along its route:

- Winning approval of more than 73 different environmental protection permits from various governmental agencies.
- Adopting 18 voluntary measures approved by the Public Health Administration to reduce air pollution.
- Committing to environmentally-friendly solar energy. Solar panels atop the Administrative Headquarters Facility are one of 22 solar panel installations along a 17-mile stretch of E-470. E-470 is one of the few U.S. toll roads to rely extensively on solar energy. The solar program gained global recognition in the tolling industry. In 2013, E-470 earned two awards from the International Bridge, Tunnel and Turnpike Association (IBTTA): the "Toll Excellence Award" for social responsibility and the aforementioned "President's Award for Excellence."
- The original toll plaza was designed with a raised canopy and slotted roof for better dispersion of exhaust.
- When E-470 ended cash toll collection in July 2009, the toll plaza and all toll booths were closed. Vehicles no longer had to decelerate and then accelerate for paying tolls, thus eliminating much air pollution.
- E-470 uses solid and liquid deicers to help combat snow and ice on the roadway. The environmentally-friendly liquid deicers used are created by combining a high quality winter grade magnesium chloride with a corn-based inhibitor. The solid deicers used are naturally occurring salts that are mined. By using these deicers instead of a salt sand mix, E-470 is reducing the amount of fine particles dispersed into the air that contribute to the brown cloud.
- To reduce water consumption, E-470 employs xeriscaping for drought-resistant roadside vegetation and at its administration building.
- E-470 staff and consultants helped plant thousands of willows and cleaned up rubbish along the South Platte River in Thornton.
- The administration building features an electric car charging station.
- In 1996, E-470 planted 100 trees at Gun Club Road and E-470 to replace trees sacrificed to build that intersection. E-470 also undertook a Black Forest tree preservation effort.





# John D. McCuskey's Era 2010-2015

# Chapter 6

When it came time to select a candidate to serve as E-470's fourth executive director, one candidate's qualifications stood out. In addition to having been E-470's director of finance and deputy executive director, when it came to hands-on experience with operating a toll road, he had "been there, done that."

John McCuskey became E-470's fourth Executive Director upon the sudden passing in April 2010 of Executive Director Ed DeLozier. David Kristick, director of operations, took on the additional role of deputy executive director, and Joe Donahue was promoted to director of finance. All three had at least a decade of experience with E-470, thus easing the transition of leadership.

McCuskey had worked with DeLozier on Florida toll roads. He had developed expertise in toll road privatization in Virginia, southern California, Florida and the Government of Pakistan (on assignment from the World Bank).

DeLozier brought McCuskey to E-470 in 1999 as Director of Finance and, in 2002, McCuskey was promoted to Deputy Executive Director and Director of Finance and Audit.



John McCuskey served as E-470's fourth executive director.

## Road Runner

When McCuskey joined DeLozier's team, he was no stranger to the operations and finances of the E-470 Public Highway Authority (the Authority). From 1992 to 1994, as an employee of Morrison-Knudsen Corporation (MK), he was the program manager for the E-470 toll road, which operated the then 5.3-mile-long toll road under contract to E-470. He had full responsibility for complete contract management of the privatized toll operations. Those operations included manual, automatic and electronic toll collections, road management, staffing, violation enforcement, budgeting and accounting.

Preceding that assignment, he had been an investment banker with George K. Baum & Company, developing transportation and infrastructure financing arrangements. His clients included the Authority.

After joining the Authority, his era at E-470 was marked by globally-recognized tolling innovations and financial milestones greeted favorably by Wall Street. He implemented the Authority's Plan of Finance that led to multiple bond ratings increases. He oversaw numerous bond transactions as part of the successful plan of finance and initiated a multi-year budgeting program and capital planning cycle.

While McCuskey's resume was tilted to financial management, as Executive Director he demonstrated his versatility and ability to motivate and lead the E-470 team through a six-year period of rapid change that included expanding E-470's scope to being more than just a toll road. He changed E-470's culture and, with his staff and his board's support, he took E-470 in new directions.

When Ed DeLozier suffered a fatal stroke in a Texas airport, McCuskey lost a longtime good friend, partner, collaborator and colleague. He would miss DeLozier, and so would most of those who had worked for him. "My priority after Ed died was to meet one-on-one with as many employees as I possibly could and address their concerns about the future of E-470 and if Ed's passing might impact them. My main goal was to give employees peace of mind and, in the process, I came to develop a closer relationship with my staff. And for me it led to strengthening my belief in the importance of 'management by walking around'—getting to know each staff member through frequent interaction with them."

His tenure at E-470 was marked by strong leadership skills. In a 2017 interview, he said, "Not much is going to change unless the Executive Director is behind it, endorses it and lets it proceed or leads it. I wanted to see innovation and technology improvements that worked for E-470 and our customers. Even though I had a finance-oriented background, my role and emphasis were not just about finance. It was about motivating, guiding and building teamwork." To that end, among other things, he encouraged creating employee events, supporting the Good Guys volunteers and working closely with PB/WSP (Parsons Brinckerhoff/WSP) staff.



Toll attendants greeted customers with a smile.



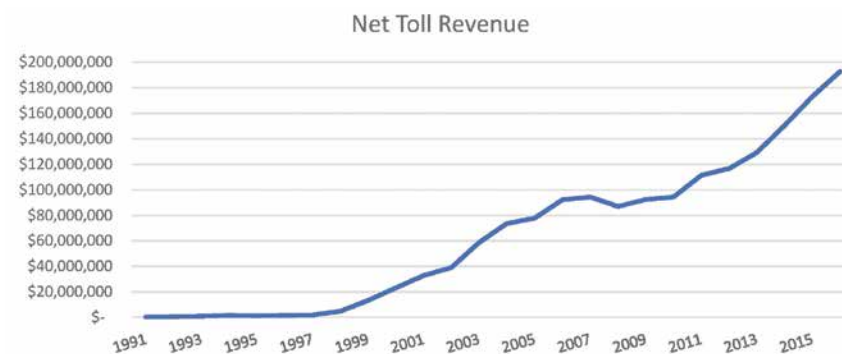
In a relatively short period of time, his leadership brought about many positive changes and a shift in focus that broadened the scope of E-470's mission. Those changes, described in more detail elsewhere in this book, included the following:

- Rapid response to process changes such as All Electronic Tolling (AET) billing, image processing and court adjudication procedures. "I took over as Executive Director before we were a year into full AET. We were pioneering. And with that came a steep learning curve and unanticipated problems, sometimes leading to customer dissatisfaction. I always said if it isn't working right for our customers, we'll fix it. And we did."
- The use and capabilities of social media grew. "We launched that effort in late 2010, about six months after I became Executive Director."
- Rebranding was undertaken, "bringing new logos and visualization."
- Headquarters building makeover. "We needed a facility to match toll collection processes of today."
- Continued industry involvement through IBTTA. "We continued to be an active industry leader, involved at the IBTTA board level."
- Statewide Tolling Services. "I felt it was very important for E-470 to take a leadership role in developing and collaborating on a statewide customer service center for Colorado's citizens and toll road and managed lane customers."
- E-470 road widening Parker to Quincy. "I wanted to be sure that project was teed up with the engineering work and board of directors' endorsement of the work before I left E-470."

Apart from the financial successes and road construction achievements, McCuskey said in a 2017 interview that he was proud of having instilled a new focus for E-470. "For years, internally we always referred to the toll road as 'the project'. When we finally completed the 47-mile route in 2003, I encouraged E-470 staff to stop calling the tollway the 'project'. We needed to switch from a construction-focused mentality to a marketing mentality to pay for our construction projects, our operating costs and the bond debt we had accumulated." He also instructed the Authority's bond lawyers to remove from bond documents the word 'project' and replace it with 'emerging toll road'.

In 2002, for the first time, to meet its obligation to bondholders, the Authority was required by the master bond resolutions to produce net income at least 1.30 times the aggregate senior debt service payment for the year.

The introduction of the 1.30 minimum bond debt service coverage ratio helped spur E-470 to an elevated level of financial performance. The Authority has never failed to meet the 1.30 ratio. In fact, most often E-470 has substantially exceeded the requirement. In 2016, for example, the Authority achieved debt service coverage of 1.91.



E-470's revenues climbed as more highway segments opened.

## Growing Traffic And Toll Revenues

Helping E-470 meet its financial obligations during McCuskey's time at E-470 was a thriving local economy with a growing metro area population that created an expanding market for the speed, safety and reliability E-470 offered. In just the five years from 2012 to 2016, net toll revenue grew from \$116.7 million to a record-setting \$192.8 million.

In that same period, traffic, as measured in toll transactions, grew from 54 million to a record 80 million.



Jason Myers, E-470's Director of Finance

## Three Financial Focal Points

The rise in traffic and net toll revenues helped contribute to the attainment of the following three ongoing financial principles:

1. Continue a stable debt management program with sufficient reserves and liquidity;
2. Avoid issuing additional debt; and
3. Ensure the capability to self-fund capital projects.

Along with E-470's strong revenues and solid debt service coverage, adhering to those three principles under the guidance of McCuskey and three Directors of Finance, the most recent of whom was Jason Myers, helped the Authority win the confidence of Wall Street. E-470 received solid ratings from the three major rating agencies.

In June 2016, six months after McCuskey's retirement from E-470, Moody's Investors Service upgraded the E-470 toll revenue bonds from Baa1 to an A3 rating.



John McCuskey and members of his finance team visited Wall Street analysts in 2015. From left: Jason Myers, Stan Koniz, Jaime Heitman, and McCuskey

The rating outlook was stable.

During 2016, E-470's Fitch rating was BBB and Standard & Poor's rating was BBB+; both were assigned stable outlooks.

E-470's solid performance in 2016 set the stage for good news in 2017 from the bond rating agencies. In February 2017, in conjunction with a 2017 bond transaction, Fitch announced that it had upgraded its rating from BBB to BBB+ with a stable outlook. Shortly thereafter, Standard & Poor's announced that it had increased its rating from BBB+ to A- with a stable outlook. The Moody's rating remained at A3 with a stable outlook.

## Going Solar

E-470's commitment to environmental stewardship took a leap forward when McCuskey's operations team completed in 2012 one of the largest photovoltaic system installation projects of any toll road in the United States. E-470 is now among only a few tolling agencies that rely extensively on solar-generated electricity.



E-470 became Colorado's first solar highway.



Walt Arnason and Dave Kristick accepted the IBTTA President's award for solarizing E-470.

Within the 47-mile E-470 corridor, the system powers a 17-mile stretch served by the Xcel Energy electrical grid. The 22 solar sites host solar-generated electricity panels for road surveillance cameras, road signage, variable message signs and streetlights, toll collection equipment, toll plazas, maintenance facilities and the E-470 Administrative Headquarters Facility. The project has reduced electricity costs and E-470's reliance on nonrenewable energy sources.

E-470's solar-power initiative, spearheaded by Dave Kristick and his colleague, Operations Manager Walt Arnason, won the highest award of the International Bridge, Tunnel and Turnpike Association (IBTTA). The "President's Award for Excellence" was presented to E-470 in 2013 at the association's 81st annual meeting. E-470's solar program previously won the association's annual "Toll Excellence" award for social responsibility earlier in the year.

This is the second time that E-470 has earned the President's Award. E-470 is one of only two organizations to have earned the distinction more than one time. E-470 previously won the award in 2006 for its application of Lean Six Sigma strategies and tools to achieve business efficiencies.

## Customers First

"Service" is another key value for E-470. In 2011, E-470, led by Deputy Executive Director and Director of Operations Dave Kristick, introduced a new, multi-dimensional Customer Driven Management program, the cornerstone of which is seeking E-470's customers' evaluation of its performance after every customer service interaction.



E-470 rolled out new ways to improve and promote two-way communication with customers through Facebook and Twitter. In addition, that year, E-470 introduced a new, greatly improved website. In subsequent years, the website was continuously enhanced to provide more “do it yourself” utility for customers who prefer to do business online.

## Collaboration To Improve Regional Mobility

ExpressToll is the automatic toll collection system used in the Denver metro area on E-470, Northwest Parkway, and all of the Colorado Department of Transportation (CDOT) Express Lanes. Express Lanes are currently in use, as of late 2017, on U.S. 36, I-25 and the I-70 Mountain Express Lane. Express Lanes in 2017 were under construction, extending I-25 Express Lanes north to the I-25/Northwest Parkway interchange, and on C-470 between E-470/I-25 and Wadsworth Boulevard. Those include the “Central 70” roadway reconstruction between Brighton Boulevard and I-270, among others being contemplated by CDOT.

ExpressToll operations have grown in support of CDOT and its ongoing strategy to employ Express Lanes to alleviate traffic congestion and aging infrastructure in the absence of adequate taxpayer funding.

E-470 and the ExpressToll Service Center provide CDOT and its concessionaire, and Northwest Parkway’s concessionaire with toll system software development, toll equipment installation, testing and ongoing back office and customer services for Express Lanes and all toll roads in Colorado. In addition to the downtown Denver central I-25 Express Lanes that have been in operation since 2006, ExpressToll is also the tolling services provider for the new lanes mentioned earlier that opened to the public in phases beginning in 2015, and have been providing ExpressToll services to Northwest Parkway since 2003.

- The U.S. 36 Denver-Boulder Express Lanes: The first phase, from the U.S. 36/I-25 interchange in Denver to Broomfield/Superior, along with the reconfiguration of I-25 central, opened in July 2015. The second and final phase, to Boulder, opened in the spring of 2016.
- The I-70 Mountain Express Lane: The MXEL opened in December 2015 on a 13-mile stretch of eastbound I-70 in the foothills west of Denver.



Express Lane signage on U.S. 36

- I-25 Segment 2 Express Lanes: The six-mile extension of CDOT’s central I-25 Express Lanes from the U.S. 36/I-25 interchange north to 120th Avenue in Westminster opened in 2016. I-25 North Segment 3, extending the Express Lanes from 120th to the interchange of E-470 (in Thornton) with the Northwest Parkway (in Broomfield) was anticipated to be open to customers late 2018/early 2019.

The CDOT program has thrust the ExpressToll Service Center into a much larger role in the State of Colorado, prompting E-470 to reposition ExpressToll as its own standalone brand, no longer synonymous with E-470 but instead the “one-stop toll shop” for electronic tolling throughout the state. E-470 operates more than a road. It operates an integral component of the route to improving statewide mobility through tolling.

Successfully introducing these new tolled installations to the public required clear communication. Although there were over 700,000 ExpressToll accounts open before the new CDOT Express Lanes opened, there was still a large customer segment that was not familiar with tolling. E-470



Customer service representatives work in the ExpressToll Service Center.





ExpressToll switchable-mounted transponders enable U.S. 36 and I-25 Express Lane customers to signify toll charge or free HOV travel.



worked with CDOT's communications team to ensure clear and consistent messaging on how the new tolling facilities work and how to use the Express Lanes efficiently. ExpressToll customers pay the lowest available toll rate on all Colorado toll roads; therefore, it was vital to get that message out to the driving public. Also, customers were educated on a new type of ExpressToll transponder.

This hard-plastic "switchable" windshield-mounted transponder enables U.S. 36 and I-25 Express Lanes customers to slide a bar on the device to signify whether they should be charged a toll or treated as an HOV customer and drive for free in the Express Lanes. Through collaboration and coordination between E-470 and CDOT, customers were provided with the information they needed to utilize the Express Lanes when they opened, and the driving public began to increase acceptance of user-financed transportation as one solution to improving mobility in Colorado.



At the E-470 Toll Plaza D, west of Denver International Airport, planes are a common sight.



## Decades Of Pioneering

Gone are memories of having to stop and wait behind a line of vehicles to reach a toll booth, then fumbling around for the correct change. E-470 reinvented the toll road. Since the first ribbon for the tollway was cut in 1991, the E-470 Public Highway Authority has been a national pacesetter for innovating toll road financing, design, construction and operations.

- **ExpressToll:** When E-470 first opened, according to records provided by IBTTA, E-470 was one of the first three toll roads in the country to provide transponder-based, open-road, non-stop toll collection (“ExpressToll”) at highway speeds.
- **All Electronic Tolling:** In mid-2009, cash payments were no longer accepted on E-470 when the tollway officially transitioned to All Electronic Tolling (AET). After the cash lanes closed, the only two payment options on E-470 were either through a prepaid ExpressToll account or License Plate Toll (LPT).

Through the LPT system that E-470 created to support the introduction of AET, drivers without ExpressToll transponders have a photo taken by infrared cameras of their front and rear license plates. The registered owner of the vehicle is identified, receives a bill in the U.S. mail and has the option to pay tolls online, in-person or by mail. E-470 introduced LPT on January 1, 2009, allowing a little over six months for customers to become familiar with the LPT toll payment option prior to E-470’s switch to AET. Later that year, at 12:01 a.m. on Independence Day, cash lanes and automatic coin machines were permanently closed. E-470 was now an AET tollway. There was no turning back.

Because LPT billing is more expensive to process, through 2017 ExpressToll customers paid a 20 percent lower toll rate (10 percent discount from 2009 through 2010) than LPT customers.

Tolls were initially increased every three years before 2010 when the board implemented annual toll increases in smaller amounts. The reduced amount of toll increases had less impact on customers’ commuting expense. This revised approach improved cash flow and debt servicing and generated very little push-back from E-470’s customers.

On November 9, 2017, the E-470 Board of Directors announced a toll adjustment that froze 2017 toll rates for ExpressToll drivers on the 47-mile roadway through 2021, pending annual board approval. Additionally, the toll rate at Toll Plaza C near I-70 was reduced by 25 cents to align the toll pricing with demand in the area and further ease congestion on the neighboring roadways. E-470 Executive Director Tim Stewart said this should incentivize drivers to sign up for an ExpressToll account to benefit from the huge savings. “The LPT

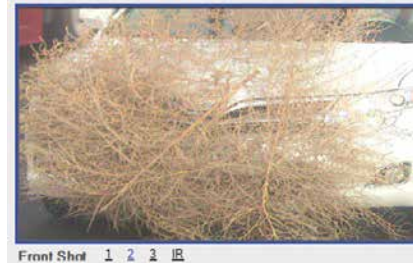


Image processing center employees read license plate images and bill the registered owners.

differential is significant but so are the costs associated with collecting License Plate Tolls. It takes a large amount of resources and manpower to look up each license plate, cross-reference the plate with the state DMV for verification, send out printed bills and continue to collect on those tolls.”

## Reducing Toll Delinquency

Of course, there are always certain individuals looking for a free ride. They go to considerable lengths to hide their license plates and thus elude LPT billing. According to Image Processing Supervisor Priscilla Scadden, one passenger in a convertible was caught on camera climbing out of his seat to hide the rear license plate with his hands. Motorcyclists are also known to reach with their hands to obscure their plates. And there are devices marketed on the internet to baffle license plate photography.



Sometimes scofflaws and sometimes Mother Nature conspire to obscure license plates.

With AET came a profusion of LPT scofflaws, many of them racking up hundreds, and even thousands, of dollars in unpaid tolls and associated late fees and penalties. E-470 in 2010 experimented with an amnesty period when violators could clear their record by paying a greatly reduced rate. This allowed delinquent customers to lower the usual \$70 penalty to \$25 on outstanding bills if the bills were paid before a certain date. McCuskey explained to *The Denver Post*: “The proposed changes are aimed at being more customer-friendly by making the cost of a civil penalty more affordable while, at the same time, boosting toll collections.” The program was a moderate success; however, many delinquent accounts remained unpaid despite the Authority’s magnanimous offer.

Then in 2012, the Authority went through an extensive analysis of the entire License Plate Toll customer experience. The work completed by this internal working group led to a complete re-design of the LPT statements and a modification to the fee structure that reduced impact to customers and an adjustment to the overall billing process. These updates ultimately led to improved customer understanding and acceptance of License Plate Tolling and less complaints to the local media.

Another modification was made with the collection policies and practices as described below:

Originally, hearings on contested bills were held in Adams, Arapahoe or Douglas county courts, which were soon overwhelmed by cases. At their request, E-470 in 2006 opened an Administrative Law Court in the Customer Service Center of the E-470 Administrative Headquarters Facility. There, administrative hearing judges try the cases. Most cases are either settled before going to court or defendants do not appear.

As a last recourse, E-470, through the Division of Motor Vehicles, has the violator’s annual vehicle registration renewal placed on hold until the tolls and fees have been paid (Vehicle Registration Hold program introduced during the summer of 2013).



2011 Annual Report - 20 years of putting the customer first.





# Timothy Earl Stewart's Era 2016-present



# Chapter 7

## Creating The Vision

Timothy Earl Stewart became the fifth Executive Director of E-470 in 2016. Trained in civil engineering technology at Oklahoma State University, he was formerly Executive Director of the Oklahoma Turnpike Authority (OTA).

Stewart started working as a youngster with his father's commercial and residential construction company. At the age of 18, Stewart took over the family business. That work kept him on the road much of the time, prompting his wife to look for a position for Stewart with less traveling. She found an opening with the OTA in their hometown of Chickasha. Stewart applied and began working in field construction, maintenance and repairs. With the OTA, Stewart rose rapidly through the ranks, advancing to Director of Patron Services, Director of Maintenance, Director of Planning and Operations, Deputy Director and Chief Operating Officer, and in 2014, Executive Director of the OTA where he oversaw ten turnpikes and some 605 miles.



Tim Stewart, Executive Director since 2016, hopes to steer E-470 into the future: "I love to roll up my sleeves and get down to planning."

Two years later, Stewart was appointed Executive Director of E-470, where he has made planning a priority and is working with the board and staff to create E-470's first ever master plan to chart the course for the next 25 years. "The first step," Stewart said in a 2017 interview, "is reviewing our unfunded projects to see if we can align financing, engineering and political will. The last is most important. We must have buy-in from our board, politicians and key stakeholders. We also need to focus on repurposing our abandoned toll plazas, perhaps as convenience stores. We should also forecast and budget long term for bridge maintenance and improvements. We will need to add interchanges to address transportation needs and stimulate the economy."

After seeing dedicated truck lanes working well in Germany, Stewart is weighing them as a possibility. He is also looking into future support needed for

electric vehicles and accommodating autonomous (driverless) vehicles. "We are collaborating with the Colorado Department of Transportation to open Express Lanes on C-470 and further extend Express Lanes on I-25 in E-470's north suburban corridor in 2018 or early 2019."

Stewart envisions that E-470 in the coming years should be ahead of the curve, cognizant of coming new developments that will mean additions to the current roadway and technological advances.

"I am happy with this excellent organization," Stewart reflected in 2017. "E-470 is in the black and seeing continued significant growth each year. I hope to stay as long as the board is happy, and I am making a contribution."



Diligent maintenance, such as the bright lines left by this lane striping truck, is a priority of Executive Director Tim Stewart.

## IBTTA

In 2018, E-470 Executive Director Tim Stewart became President of the International Bridge, Tunnel and Turnpike Association (IBTTA). This is the worldwide association representing toll facility owners and operators and the businesses that serve them. Founded in 1932, IBTTA has members in 25 countries on six continents. Through advocacy, leadership and education, members are implementing state-of-the-art, innovative user-based transportation financing solutions to address the critical infrastructure challenges of the 21st century. IBTTA's international headquarters are in Washington, D.C.



Tim Stewart took the podium as the new IBTTA President in 2018.

Credit: IBTTA



## Reconstruction

For Stewart and his predecessors, maintaining highways also means continued repairs and even reconstruction. The first and most heavily-traveled segment of E-470 is a five-mile stretch in Douglas County between the interchange with I-25 and C-470 east to Parker Road. The project was accomplished in two phases.

First, in 2009, a 2.5-mile, six-lane stretch of this segment was completely repaved. The \$8.1 million project provided a smoother and quieter driving surface by employing stone matrix asphalt that also reduces road spray. The old asphalt was recycled and used on the project to reduce cost and increase environmental sustainability. The next 2.5 mile phase was reconstructed in 2012. Meanwhile, E-470 resurfaced a six-mile section in Adams County in 2011 and won a top award from the Colorado Asphalt Paving Association. The recently completed expansion of the eight miles of the highway between Parker Road and Quincy Avenue in E-470's southeastern corridor, from two to three lanes in each direction, and an addition of a pedestrian and bicycle path, is an \$88 million undertaking.

This project was planned, budgeted for and designed well before the level of service dropped below an acceptable rating on this stretch of road. This proactive effort demonstrates the foresight of E-470, particularly the Roadway and Engineering team, when it comes to maintaining and improving its infrastructure. Neil Thomson, E-470's Director of Roadway and Engineering since 2012, said, "Our team works very hard to ensure E-470 remains a well-maintained, congestion-free, safe and reliable road for our customers. Whether it is snow maintenance, routine repairs or safety enhancements, we strive to provide an excellent driving experience for our customers and to improve their journey."

E-470 is under agreement to assist the City of Aurora with the extension of East 6th Parkway to the E-470 tollway with a \$2 million grant and a \$2 million loan.



The heavily-used Segment I from Parker Road to Quincy Avenue had to be widened in 2017 from two to three lanes in each direction.

## Customer Focus

E-470's operations have become the passion of Dave Kristick, deputy executive director and director of operations. He oversees E-470's ExpressToll Customer Service Center contractor, WSP USA, in ensuring a highly efficient, customer-friendly experience. A West Point graduate who ultimately reached the rank of Lieutenant Colonel, he graduated with an engineering degree and later earned an MBA in finance and organizational development from the University of Rhode Island and a Master's of Science in Strategic Studies from the U.S. Naval War College.

At Fort Carson in Colorado Springs, Kristick worked in leadership, information technology, and operations. In June of 1996, Kristick decided to retire from the Army and began looking for other employment opportunities. His wife, Bev, was also retiring from the Army and, because they had two young daughters in school at the time, the Kristicks wanted to remain in Colorado Springs.

Kristick began his E-470 career in 1996 as Manager of Operations, and then became Director of Operations in 1998 and Deputy Executive Director and Director of Operations in 2010.

He oversees communications, toll collection operations and maintenance of the toll collection system equipment, the vehicle service fleet, and manages the contract with Colorado State Patrol and all public safety agencies that provide assistance to the toll highway. He was heavily involved in the transition to cashless operations in 2009 and reorganized E-470's customer services to support that major change.

Kristick hosts visitors from all over the world who come to check out E-470's cashless tolling system. "I may be biased," Kristick noted in 2017, "but I think we have the nation's pacesetting toll system."

IBTTA's Interoperability Committee is chaired by Kristick. "On that committee," he reported in 2017, "we are hoping to standardize transponders for use across state lines. Although standardization was federally mandated in 2012, the lead has been taken at the state level. Texas, Oklahoma and Kansas have set



David Kristick strives to make E-470 a most efficient and enjoyable ride.

up the largest interoperability system thus far. We hope to join them in 2019. That means anyone with a Colorado toll transponder can pay their toll electronically in those states.”

No detail is too small for Kristick to take an interest. When nesting eaglets were too close to the highway and were in danger of crashing on their first trial flights, Kristick saw to it that an eagle brigade was there 24/7 to rescue any baby eagle in distress. When blizzards made travel impossible, Kristick arranged for E-470 to provide cots, blankets and emergency rations ready at the headquarters building.

Kristick has become a personal customer service representative to many over the years and continues to set an example for providing top notch customer service.



## At The Interchange Of Operations And Information Technology

E-470 has transformed over the years from a well-run road to a technically-charged organization that is leading the industry with its technological improvements and advancements. “When autonomous vehicles enter the landscape, E-470 will be positioned to accommodate that challenge, and we plan to play a large role in that transition,” says E-470 Director of Information Technology (IT) Sandy Bish. She joined the Authority in 2015 and was promoted to Director the following year.

Bish boasts a BS from Purdue and an MS from Stanford, and had led recent initiatives accomplished by the IT team that she manages. Through the implementation of a more dynamic and agile approach to IT updates, Bish’s team has completed numerous projects that improve business efficiencies while lowering operating costs. Bish said, “The team could not have had been so successful without an extremely capable staff and exceptional teamwork and collaboration within the organization.”



Sandy Bish, Director of Information Technology

## Communicating With Customers

Jessica Carson, E-470’s Manager of Communications and Tolling Services, has an MBA from CU-Boulder. She reported in a 2017 interview, “I never thought I would work for a toll road, but I love it. I was hired 10 years ago, and during my first week, I went up in a bucket truck to photograph the I-70/E-470 flyover ramp before the ribbon-cutting event. E-470 is a great place to work because they provide you with support, trust and independence.”

Jessica grew the in-house communications team which now shares informative messages to over 1.5 million ExpressToll account holders and millions more License Plate Toll customers. “We use a multitude of communications channels to ensure customers hear a clear and concise message regarding the benefits of E-470 and ExpressToll,” Jessica explained.

“One of our biggest challenges is changing the word ‘toll’ from a negative to a positive term. To do that, we emphasize the choice aspect of toll roads and stress the fact that we are not tax-funded and that customers only pay for what they use. We are known as a trailblazer not only in All Electronic Tolling and customer service but also in communications,” Carson added. “For me, the E in E-470 stands for excellence. I use E-470 every day because it is less congested, safer, and more reliable. At E-470, we all work hard to provide that excellent experience for our customers so that they see the value in choosing us.”



Jessica Carson, Manager of Communications and Tolling Services

## More Than Just A Great Highway

Carson’s enthusiasm is shared throughout the organization. “All of our employees are working hard to make E-470 more than just a great highway,” Executive Director Stewart said. “We strive to make E-470 a key factor in improving regional mobility.”



# More Than A Highway



# Chapter 8

From the E-470 Administrative Headquarters Facility (AHF) at the southwest corner of E-470 and East 6th Parkway, employees look out on raw prairie, populated by prairie dog villages, bull snakes and bald eagles. Deer and antelope still roam.

Looking out on this natural world enveloping the AHF, it is amazing to think of the transformation to come. By building far ahead of development, E-470 shapes the future and relieves the present congestion along I-25 and elsewhere. It is the road to the future.



Prairie dogs are a common sight along E-470.

Credit: Denver Museum of Nature and Science

## Roadside Development

Upon its completion in 2003, E-470 was able to provide speedy access to DIA and to Denver's booming southern, eastern and northern suburbs. The toll road also serves such major recreational opportunities as the Plains Conservation Center, the Aurora Reservoir, and Barr Lake State Park. Also adjacent to the tollway are the Adams County Fairgrounds, Centennial Airport, and the Rocky Mountain Arsenal National Wildlife Area.

These amenities cushion perhaps the most dramatic growth in current Colorado. The boom in the E-470 corridor has spawned numerous annexations and growth in roadside towns, cities and counties. The Denver Regional Council of Governments (DRCOG) in 2015 projected Adams County to be the fastest



Aurora Reservoir is one of many amenities that are easier to reach thanks to E-470.



The MacLean sod house preserved at the Plains Conservation Center in Aurora is reminiscent of the earlier homesteads in the E-470 hinterland.

Credit: Photo by Tom Noel

growing county in Colorado over the next twenty years in both population and employment. Commerce City doubled in land area and used new development to transform itself from the industrial focal point of the metro area to an amenity-filled prime residential area.

Park Meadows, Colorado's largest retail center, opened in 1996 with more than 60 stores near the junction of E-470, C-470 and I-25. The Meridian International Business Center is booming along E-470's southern corridor with such major employers as the 225,000-square-foot Telecommunications, Inc. corporate headquarters. Other giants in E-470's Douglas County corridor include American Family Insurance, CH2M Hill, Dish Network, TeleTech and Western Union.



Dick's Sporting Goods Park has given Commerce City a major league attraction as the home of the Colorado Rapids soccer team.

Credit: VISIT DENVER

## The Vickers Connection

The Vickers family had a successful history of operating Vickers gas stations and building the upscale Castle Pines Country Club and neighborhood on land once attached to the famous Cherokee Castle in Sedalia. That development is now the City of Castle Pines.

Mike Vickers, land owner and developer, said in a 2017 interview, "Years ago our family began buying up land along what would become E-470 and launched the Compark Business Campus Metropolitan District in 1998 in Parker."

Vickers became one of the first developers to partner with E-470. "We donated 60 acres to E-470 and also helped get the neighboring Denver Tech Center, Cordillera, Stonegate and Cottonwood to work with the tollway. In lieu



of receiving payment for land, we were allowed to help negotiate where the interchanges would be built. Of the first five interchanges, Peoria, Chambers and Jordan were all negotiated to expedite development.”

With 700 acres on either side of the E-470 right-of-way between I-25 and Parker Road, Vickers was eager to get things rolling. He created the 500-acre mixed-use Compark on the north side of E-470, mainly west of Chambers Road. Residential areas--about 30 percent of Compark--enjoy easy E-470 access to DIA, Parker Adventist Hospital and Sky Ridge Medical Center. Compark also houses Rocky Vista University, an osteopathic medical college.

One of Compark’s anchors is the 635,000-square-foot American Furniture Warehouse. Vickers reported that Compark, in 2017, is 70 percent occupied with the other 30 percent already sold. “E-470,” he added, “is the safest, most efficient road in Colorado. It makes all this development possible.”

Centennial Airport is one of the nation’s busiest general aviation airports and a light-plane pilot in trouble once used E-470 as a runway. The little two-seat Cessna ran out of gas and landed in the E-470 median. E-470 had to tow it to the Peoria exit and on to Centennial Airport. Snuggled up against Centennial Airport is the 220,000-square-foot United Parcel Service facility. Many other firms find Centennial Airport a major reason to open offices along that stretch of E-470. This realm of giant enterprises also includes the Dove Valley Headquarters of the Denver Broncos, Coloradans’ favorite big business.



This Cessna’s emergency landing on E-470 near Centennial Airport was toll-free.

## Douglas County

The south end of E-470 also harbors Liberty Media, headquarters for a vast international cable network, with a huge operations complex at E-470 and the Peoria Street interchange. Next to Liberty is the palatial stone office complex of Starz and the Lionsgate Company, leading movie makers.

## Town of Parker

A major Parker development near E-470 is Crown Point Center, a \$200 million regional mall along Parker Road just south of E-470. This 311-acre retail hub is home to Parker Adventist Hospital and an assisted living and memory care center, as well as many restaurants, hotels, and retail establishments.

## Aurora

In a 2017 interview, Paul Tauer, former Aurora mayor and E-470 board chair, noted that “More than half of E-470 is in Aurora.” He added that, “E-470 development includes high end as well as attractive, affordable middle level residential developments.” Aurora growth generated by E-470 includes Southlands Mall on a 300-acre site near the junction of E-470 and Smoky Hill Road. Murphy Creek, a golf course community along E-470 just north of Jewell Avenue, is a 1,100-acre, 4,000-unit housing development. Another large residential area sprouted around the Saddle Rock Golf Course. It is one of more than a dozen golf courses edging E-470.

Aurora Mayor Steve Hogan said, “In the coming decades, 250,000 new residents are expected along the E-470 corridor in Aurora alone, which would nearly double our city’s population. Growth eastward to E-470 may soon make Aurora Colorado’s most populous city.”

General Motors constructed a 405,000-square-foot parts distribution center at the E-470 and I-70 interchange, a strategic intersection that also attracted a large ProLogis office development. One of the largest E-470 developments is the \$1.5 billion Gateway Park project on Airport Boulevard and E-470 with its many hotels and motels. Graebel Relocation Services, a large international moving specialist, moved its headquarters into the 22-acre Gateway Park in the early 2000s. The Gaylord family’s Colorado Rockies Resort and Convention Center is scheduled to open in 2018 with 1,500 guest rooms, 114 suites, a water park and 485,000 square feet of meeting and convention space near DIA and E-470.

Colorado’s first Amazon Fulfillment Center, a million-square-foot facility that opened in 2017, is also in the E-470 corridor. Near Peña Boulevard and E-470, the city of Denver plans a vast “Aerotropolis” mixed-use development for “a city within a city.”



The Gaylord Rockies Resort and Convention Center opens in 2018 as Colorado’s largest hotel complex.

Credit: Gaylord Rockies Resort and Convention Center

## Brighton Brightens Up

Adams County, and the city of Brighton, the county seat, on the north end of E-470, experienced the most spectacular growth of all, becoming the fastest growing county in the country in 2015.

A key E-470 supporter from Brighton has been Jan Pawlowski. She joined the board in 1997 as Brighton's representative while serving on Brighton City Council and as mayor pro tem. In a 2017 interview, she reported that she was shocked when, in 2000, Brighton's mayor recommended the city pull out of E-470. She then ran successfully for mayor, serving from 2001 to 2008 as Brighton's first woman mayor. At E-470, she would become instrumental in many new policies including the end of cash toll collection and new construction projects such as flyover ramps at I-70.

"We knew E-470 would bring positive growth to Brighton," Jan reminisced in a 2017 interview. "But we didn't realize our city population would double between 2000 and 2010 to what is now over 40,000 residents. Before E-470, residents had to go elsewhere to find work. Now there are plenty of good jobs and growth due to E-470. My grandson just found a job at our new Prairie Center, a huge retail and residential complex along E-470." Prairie Center and the adjacent Bromley Park contain nine million square feet of office space, an industrial park, retail, commercial, and residential. Strategically located at the junction of E-470 and I-76, Brighton's 600,000-square-foot Adams County Government Center opened south of downtown Brighton.

"The E-470 board and staff were very dedicated and a lot of fun," Jan, who chaired the board 2004–2005, recalled in 2017.

## Commerce City

Commerce City earmarked the E-470 corridor for mixed-use development such as the Reunion neighborhood, one of the largest residential developments along the entire E-470 tollway. This model subdivision boasts a 21,000-square-foot recreation center, a water park, a 52-acre park, an eight-acre lake and ten miles of trails.

## Thornton

E-470's northern terminus is in the thriving city of Thornton, site of the 2003 celebration of the completion of E-470's 47-mile route. E-470 helped Thornton directly in 2014 with the November 24 opening of a new \$5 million Quebec Street interchange.



Thornton's Quebec Street interchange opened in 2014.

Thornton Mayor Heidi Williams, then E-470's vice-chair, said, "This is a very positive advance for mobility in Thornton and the surrounding area. It provides the additional transportation capacity we will need to accommodate our future population growth and the growth of our business community."

## E-470's Economic Impact

Economic and Planning Systems in Denver compiled a 2016 report on the economic contributions of the E-470 tollway that found:

- **Property Valuation:** E-470 has had a tremendous economic impact on the entire metro area. Since 1986, E-470 has been the catalyst for more than \$38.4 billion in real estate value along its 47-mile long corridor. The developments in the corridor contribute \$467 million in annual property taxes.
- **Wages, Income, Output and Gross Regional Product:** Total business and household spending in the corridor is \$25 billion per year and the corridor's Gross Regional Product is \$14.2 billion.
- **Travel Time and Safety Benefits:** Without E-470, Denver metro area residents would spend 14.8 million more hours driving per year translating to lost productivity and lower quality of life.
- **E-470 is responsible for avoidance of nearly \$25 million in costs related to accidents, injuries and fatalities per year by moving traffic to a safer, more efficient road type.**



## Safety: E-470's Weather System Helps Fight Snow And Ice

When snow and ice begin to plague traffic in the metro area, thousands of otherwise occasional E-470 drivers join the tollway's regular commuters to escape the perils of winter driving. The reason: well-maintained road surfaces and safer, faster flowing traffic.

The E-470 Public Highway Authority pioneered the use of roadway information systems in 1994 with the installation of its first weather station in the southernmost section of E-470. In 2004, E-470 contracted with the National Center for Atmospheric Research (NCAR) in Boulder to create a new system to monitor and automatically analyze differing weather and road surface conditions and provide treatment recommendations. E-470 also contracted with Vaisala, for software and hardware support as well as roadway weather responses. Northwest Weathernet, a subcontractor to Vaisala, provided E-470 with weather forecasting tailored to specific locations along the highway.

## Fighting Ice With "Hockey Pucks" And More

The task is complex. Weather conditions can vary greatly as E-470 traverses through various elevations along the 47 miles. The roadway information system provides for integrated data supplied from micro-weather stations and pavement-embedded sensors located in eight different sites to monitor weather conditions. The embedded sensors resemble, and are often referred to, as "hockey pucks."

E-470 also has four non-embedded, overhead road sensors with cameras that provide a visual picture of the highway, as well as monitor pavement and air temperature, and humidity. Sensors are located at strategic locations along the highway. The data these stations and sensors provide assists E-470's roadway staff to dictate where and when to deploy maintenance crews and which type of treatments will be required to optimize safe roadway conditions. E-470 employs an outside contractor equipped with more than 20 snowplows to battle adverse weather. Even during winter's most daunting conditions, E-470's customers enjoy a safe and efficient drive.



This embedded so-called hockey puck relays roadway weather data.

## Other Keys To Safety

- E-470 has set new standards for safety and records for accident-free days during construction and still cherishes that reputation.
- To ensure roadside safety, E-470 contracts with the Colorado State Patrol for 24/7 service. E-470's 47-mile corridor has median cable barriers to prevent vehicles from entering opposing lanes of traffic, saving lives and more serious collision damages.
- Eliminating all toll booths ended accidents caused by vehicles that stopped to pay their tolls and accelerate in to fast-flowing traffic. It also ended minor accidents caused by drivers slowing and changing lanes in their approach to the toll booths.
- In 2010, E-470 installed solar-powered lighted lane markers. This durable, dependable technology helps drivers stay in their own lane, especially during darkness or inclement weather.
- Surveillance cameras have been installed throughout the tollway. They boost safety for customers by helping the communications staff dispatch information to the incident management team. This provides faster response to emergencies and changing road conditions.
- Engineering added enhancements to the toll road to help with wrong-way drivers. They installed solar powered flashing stop signs at ramps with the eye level warning: "WRONG WAY. DO NOT ENTER." Large white arrows were also painted on the pavement to alert drivers of wrong-way travel.
- A five-mile stretch of deer fencing was installed in 2013 in an area of Douglas County where 58 percent of recorded deer-vehicle accidents occurred in 2012. Deer-vehicle collisions in the targeted five-mile section during the final four months of 2013 were reduced by 74 percent compared to 2012.

## E-470 Transportation Safety Foundation

After the first fatality on the road in 2001, the E-470 Transportation Safety Foundation (TSF) was established on the tollway's 10th anniversary. As a nonprofit corporation, the foundation provides donations and grants to nonprofit organizations that promote transportation safety. It raises funds designated for programs such as child safety seat training and inspections, seat belt safety, driver's classes, and related education. The foundation raises funds from charity golf tournaments and other fund-raising activities.



The South Metro Safety Foundation received one of E-470's TSF grants in 2017.

## Service

E-470 prides itself on providing superb customer service. James Joseph Harlan, E-470's Customer Service Manager, earlier worked in customer service for Diner's Club. "I came to E-470 because they give you a lot of freedom and opportunity to build up customer service. A portion of our staff worked as toll

attendants. When we ended cash toll collection, we offered the toll attendants an opportunity to apply for other positions at E-470. They had already been trained in providing service with a smile." Customer service representatives are empowered to negotiate violation and toll payments and the reduction of fines.

Harlan is committed to maintaining E-470's superior service. Customers are surveyed regularly. As of 2017, almost 99 percent were very satisfied with E-470's services.

Harlan added, "We recruit and have Spanish-speaking representatives. We have a translation service that can help customers in almost any language. Our service crew is now operated by WSP USA out of Montreal, Canada, the successor to Parsons Brinckerhoff and, before that, Morrison-Knudsen. They give us the freedom to provide the friendliest possible service to our customers."

Ron Newlander, who started working at E-470 in 1998, reports that, "When I came here the toll was 50 cents for the first five miles." Coloradans were not used to tolls and sometimes became irate, giving Ron an earful. "Now," Ron reported in 2017, "customers have become more knowledgeable about paying tolls."

The Communication Center utilizes digital technology and video screens across a large wall displaying the status of the 47 miles. Roadside Assistance crews are dispatched quickly to help change tires, jump-start stalled vehicles, arrange

## WSP/PB - From The Subway To The Tollway Parsons Brinckerhoff, An Enduring Partner

WSP USA Parsons Brinckerhoff is a large international engineering and design firm founded in 1885 in New York City by William Barclay Parsons, who was joined in 1906 by engineer Henry M. Brinckerhoff. One of the firm's first projects was the New York City subway system. Subsequently, they completed many major tunnels, railways, rapid transit systems and highways around the world. In 2014, Parsons Brinckerhoff was acquired by WSP USA, a global professional service consultancy.

Today it's called WSP USA, but back in 1986, when it was part of the Engineer 470 Partnership (along with DeLeuw Cather and Co. and CRS Serrine), it was called Parsons Brinckerhoff, Quade & Douglas.

Over the years, WSP USA has been a partner in E-470's success in several ways. Using the same state guidelines required for six of the highway's state/federal highway interchanges, E-470's entire 47-mile length was evaluated for environmental impacts and mitigation by the Engineer 470 Partnership, which included WSP USA.

This voluntary environmental overview evaluated the effect of building the highway on such environmental components as flood plains, water quality, wetlands, endangered species and other wildlife, air pollution, noise pollution, and historic and archaeological resources. Socioeconomic impacts were evaluated. In addition

to this overview, environmental assessments at each of the six state/federal highway interchanges got underway in 1987, with the partnership greatly assisted by the Colorado Department of Transportation (CDOT) and the Federal Highway Administration.

In 1997, the Authority chose the WSP USA's Alltech, Inc. subsidiary as the contractor for E-470 toll collecting, customer service, and toll violation enforcement. Soon the scope of the assignment for WSP USA grew considerably. WSP USA's Customer Service Center provides ExpressToll tolling services to the Northwest Parkway and for CDOT's Express Lanes throughout metro Denver and in the nearby foothills.

The tolling workload in 2016 included serving over 700,000 active ExpressToll accounts with nearly 1.4 million ExpressToll transponders. The ExpressToll Customer Service Center that year handled nearly 900,000 in-bound service calls and processed more than 59 million license plate image transactions.

In addition to providing tolling services, WSP USA staffs and operates the E-470 Roadside Assistance program, providing roadside assistance to E-470's customers and assisting the Colorado State Patrol with incident management. WSP USA was also retained to coordinate response to accidents with the Colorado State Patrol, provide customer assistance, coordinate snow removal, and handle variable message sign alerts.



towing, car rentals and provide directions. The team offers 24/7 free roadside service.

E-470's Customer Driven Management program reaches out to customers after any contact with the ExpressToll Service Center. Customers are asked for immediate feedback about the service they received, which helps E-470 improve processes and enhance training and development of its Customer Service Representatives. E-470 also conducts an annual customer satisfaction survey via email. The 2016 survey, with over 50 questions, garnered over 57,000 customer responses.



Ron Newlander is the veteran leader of E-470's roadway operations.

## The E-470 Good Guys

E-470 also promotes community service. The "E-470 Good Guys," a volunteer group of employees, use their off-duty time to raise funds and donate countless hours to a variety of volunteer projects including Coats for Colorado, the Denver Children's Hospital, the Denver Rescue Mission, Food Bank of the Rockies, Habitat for Humanity, the March of Dimes March for Babies, the Military Care Package Drive, the Ronald McDonald House, Special Olympics, and other worthwhile projects.



E-470's Good Guys helped with many community non-profits, including the March of Dimes.

## Speed

E-470 customers can travel 47 miles in 47 minutes or less. This highway to the future is advanced in accommodating 75 mph traffic, faster than most of its metro area counterparts. "At-speed" interchange ramps minimize on and off-ramp backups. By constructing the tollway ahead of development, E-470 had plenty of room to build bigger, safer access ramps.

E-470 has literally "pulled out all the stops" for its customers by continuing improvements and accomplishing engineering marvels such as the E-470/I-70 interchange.



E-470 replaced 70 mph signs with 75 mph signs in 2011.

## Other Toll Roads

The success of E-470 inspired proponents of the Northwest Parkway to extend the beltway. The nine-mile Northwest Parkway (NWP) begins as a beltway continuation from E-470 west through Broomfield, to just north of U.S. 36, with



E-470 connects with the Northwest Parkway in a giant step towards completing a metro Denver beltway.

plans to extend south to 120th Avenue. Like E-470, the Northwest Parkway was developed by a new public highway authority (the Northwest Parkway Public Highway Authority). That Authority comprises the City and County of Broomfield and the City of Lafayette and was initially funded entirely with toll revenue bonds. The NWP uses ExpressToll services and its own Go-Pass license plate billing system.

The first segment of the Northwest Parkway opened to the public in November 2003. In 2007, the Northwest Parkway's bonded indebtedness was retired by funds provided by a private sector concessionaire who in return acquired a 99-year lease to operate the Northwest Parkway.

In August 2008, the City of Arvada, the City and County of Broomfield and Jefferson County organized Colorado's third public highway authority, the Jefferson Parkway Public Highway Authority. That authority proposes to fund with tolls and operate the Jefferson Parkway from the future southern terminus of the Northwest Parkway at 120th Avenue to just north of the City of Golden. While Arvada, Broomfield and Jefferson County have embraced the Jefferson Parkway, Golden threatened to sue to stop it from a route that the city called a disaster for its downtown.

Stephen D. Hogan, who left the Executive Directorship of E-470 in 1989 to become the Northwest Parkway's Executive Director, had become a great advocate towards completing the Denver metro beltway. Responding to Golden's threat to sue, he cautioned, "If people are truly interested in good planning, they should cooperate, not threaten to sue."

The city of Golden rejected the concept of a high speed highway to complete the metro area beltway. Golden instead worked with the Colorado Department of Transportation on an environmental impact study and plans to improve State Highway 93 and U.S. Highway 6 within Golden to enhance the metro area circumferential loop. Golden, hemmed in between North and South Table Mountains and the foothills, lacked room for a highway. Golden suggested willingness to accept a 1.5-mile tunnel under its downtown at an estimated (and prohibitive) cost of \$250 million that sank this proposal.

## Legacy

The many other proliferating tolled roadways are perhaps the greatest legacy of E-470. It pioneered financing without the use of state or federal funds, design-build construction, and high-speed nonstop tolling that have made it possible for many to follow in E-470's path.

Starting with very humble beginnings in 1986, with a staff of five and a donated office suite, E-470 has since grown to become a globally-recognized leader in the tolling industry. It is truly, as this book demonstrates, more than a highway.

## CDOT Arrivo E-470 Partnership

E-470's commitment to pursuit of pioneering technologies to improve regional mobility took a headline-making leap on November 14, 2017.

That day, the Colorado Department of Transportation (CDOT), E-470 and Arrivo, a next generation transportation company engineering a hyperloop-inspired infrastructure and vehicle system, jointly announced a public-private partnership to build the first-ever "Arrivo" super-urban network to serve the greater Denver region.

Arrivo will partner with CDOT to build the half-mile test track alongside the E-470 tollway in Adams County west of Denver International Airport. Arrivo will open a research and development center in Commerce City.

E-470 is contracting with Arrivo to allow the company to build its test track on about a half-mile of land near a toll plaza that has been closed since 2009. The test track adjacent to the tollway is where the proposed first leg of the Denver network will be built. Unlike the hyperloop model, Arrivo is focused on regional distances, providing high-speed travel to connect every part of a super-urban region such as Denver in less than 20 minutes. The Arrivo system propels four models of vehicles that serve different passenger and cargo needs through an enclosed, electromagnetic superhighway. The technology uses magnetic levitation to make the vehicles float, and electric power to move them forward.

In the news conference to announce the partnership, Sandy Bish, Information Technology Director at E-470, said "E-470 has transformed over the years from a well-managed, successful road to include a technically-charged organization that is leading the toll industry through its continuous advancement in the area of technology. We look forward to working with Arrivo and CDOT to review the potential development of this innovative technology that could improve mobility in Colorado."



This rendering shows the proposed Arrivo futuristic vehicles scheduled for testing along E-470.

Credit: Colorado Department of Transportation





E-470 Public Highway Authority  
22470 East 6th Parkway  
Aurora, Colorado 80018

# Appendix A

## BOARD OF DIRECTORS

### E-470 AUTHORITY BY JURISDICTION

(1985–January 12, 1988)

#### Adams County

Steven E. Cramer, 1985–1987  
Ronald D. Nichol, 1985–1986  
Leo M. Younger, 1985–1988  
Harold E. Kite, 1987

#### Aurora

Linda Capra, 1985–1987

#### Arapahoe County

Bob Brooks, 1985–1987  
Betty Ann Dittimore, 1985–1987  
Thomas R. Eggert, 1985–1987

#### Douglas County

Sonya B. Blackstock, 1985–1986  
Clark Huff, 1987  
Frank McCurdy, 1985–1987  
Suzy McDanal, 1985–1987

### E-470 PUBLIC HIGHWAY AUTHORITY BY JURISDICTION

(since January 13, 1988)

#### Adams County

Steven E. Cramer, 1988–1989  
Harold E. Kite, 1988–1994  
Guillermo A. DeHerrera, 1995–1996  
Ted Strickland, 1997–2004  
Larry Pace, 2005–2010  
W. R. “Skip” Fischer, 2011–2012  
Chaz Tedesco, 2013–2017

#### Arapahoe County

Bob Brooks, 1988  
Betty Ann Dittimore, 1988  
Thomas R. Eggert, 1988–1996  
Polly Page, 1997–1999  
Lynn Myers, 2000–2006  
Frank Weddig, 2007–2011  
Bill Holen, 2012–2017

#### City of Aurora

Linda Capra, 1988  
Stephen D. Hogan, 1988–1991  
Elsie Lacy, 1991–1992  
Nadine Caldwell, 1993–1994  
Paul E. Tauer, 1995–2003  
Ed Tauer, 2004–2011  
Steve Hogan, 2012–2017

#### Affiliate Directors

City and County of Broomfield, since 1997  
City of Greeley, since 1997  
Weld County, since 1997  
City of Arvada, since 1998  
City of Lone Tree, since 2015

#### City of Brighton

Don Hamstra, 1990–1994  
Terry V. Lucero, 1995–2000  
Jan Pawlowski, 2002–2009  
Dick McLean, 2010–2017

#### City of Commerce City

Roland Cole, 1995–2001  
Sean Ford, 2002  
Reba Drotar, 2003–2008  
Paul Natale, 2008–2009  
Jim Benson, 2010–2015  
Steven Douglas, 2016–2017

#### Douglas County

Clark Huff, 1988  
Frank McCurdy, 1988  
Suzy McDanal, 1988  
James R. Sullivan, 1989–2004  
Mike Maxwell, 2005–2006  
Melanie Worley, 2007–2008

#### Ex-Officio Directors

Since 1992  
  
Colorado Department of Transportation  
Denver Regional Council of Governments  
Regional Air Quality Council  
Regional Transportation District

#### Town of Parker

Ann Waterman, 1989–1991  
Greg B. Lopez, 1992–1995  
Gary Lasater, 1996–2004, 2009–2011  
David Casiano, 2005–2008  
Josh Martin, 2012–2017

#### City of Thornton

Margaret W. Carpenter, 1990–1999  
Noel Busck, 1999–2006  
Erik Hansen, 2007–2009  
Randy Drennen, 2010–2013  
Heidi Williams, 2014–2017



## Appendix B

### **E-470 PUBLIC HIGHWAY AUTHORITY EXECUTIVE DIRECTORS**

John E. Arnold, 1986–1991  
Stephen D. Hogan, 1991–1998  
Edward J. DeLozier, 1999–2010  
John D. McCuskey, 2010–2015  
Timothy E. Stewart, 2016–Present

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Carson, Jessica, E-470 Communications and Tolling Services Manager, interview with Tom Noel, August 17, 2017.

Christopherson, Daniel Alfred, longtime public relations contractor, interview by Tom Noel, August 17, 2017.

Cramer, Steven Edward, first Chair of E-470 Board, interview with Tom Noel, Aug. 2, 2017.

Decker, George, E-470 Operations Electrician, interview with Tom Noel and Evan West, July 13, 2017.

Eggert, Thomas Russell, E-470 Board Member, interview with Tom Noel, August 9, 2017.

Egnor, Jeff, E-470 Road Management Supervisor, interview and tour of E-470 by Tom Noel.

Fontane, Richard Alan, Investment banker/broker, interview with Tom Noel, July 25, 2017.

Frew, John, Chair of E-470's BELT Committee, interview with Tom Noel July 13, 2017.

Fulenwider, Calvin, developer, interview with Tom Noel, July 18, 2017.

Harlan, James Joseph, E-470 Customer Service Manager, interview with Dan Christopherson and Tom Noel, August 8, 2017.

Henk, Gregory Gerald, Chief Engineer, interview with Dan Christopherson and Tom Noel, August 17, 2017.

Hogan, Stephen D., E-470 Board Member, interview with Tom Noel, July 17, 2017.

Icenogle, T. Edward, E-470 principal general counsel, interview with Tom Noel, July 22, 2017.

Kristick, Dave, E-470 Deputy Executive Director, Director of Operations, interview with Dan Christopherson, Tom Noel and Evan West, July 13, 2017.

Lamm, Richard D., Governor of Colorado, interview with Tom Noel, June 19, 2017.

Larson, Jennifer Saul, E-470 Business Analyst, interview with Dan Christopherson and Tom Noel, August 8, 2017.

McAfee, Virginia Leslie "Gina", E-470 Environmental Contractor, interview with Tom Noel, August 8, 2017.

McCuskey, John D., E-470 Executive Director, interview with Dan Christopherson and Tom Noel, July 21, 2017.

McDole, Matthew Maynard, E-470 chief engineer, interview with Tom Noel, July 27, 2017.

Myers, Lynn, E-470 Board member, interview with Tom Noel, July 26, 2017.

Newlander, Ron, E-470 Manager of Road Management, interview and tour of E-470 by Tom Noel, June 27, 2017.

Owens, William Forrester "Bill," Governor of Colorado, 1999–2007, interview by Tom Noel, August 2, 2017.

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Pawlowski, Jan, E-470 Board member, interview with Tom Noel, July 19, 2017.

Romer, Roy Rudolph, Governor of Colorado, interview with Tom Noel, July 29, 2017.

Scadden, Priscilla, E-470 Image Processing Manager, interview with Tom Noel and Evan West, July 13, 2017.

Snell, Jo Ellen, E-470 Manager of Community and Public Relations and Incident Management, interview with Tom Noel, August 14, 2017.



Stewart, Timothy Earl, E-470 Executive Director, interview with Dan Christopherson and Tom Noel, August 8, 2017.

Tauer, Paul E., Sr., E-470 Board Member, interview with Tom Noel, July 21, 2017.

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## ABOUT THE AUTHOR

Thomas Jacob Noel is a Professor of History and Director of Public History, Preservation and Colorado Studies at the University of Colorado Denver. Tom is the author or co-author of 51 books and many articles. He was a longtime Sunday columnist for *The Denver Post* and the *Rocky Mountain News* and appears regularly as "Dr. Colorado" on Channel 9's "Colorado & Company."

Tom completed his B.A. at the University of Denver and his M.A. and Ph.D. at CU-Boulder where his mother and grandmother also did their graduate work. Please check Tom's website: [dr-colorado.com](http://dr-colorado.com) for a full resume and updated list of his books, classes, tours and talks.

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