NEW ISSUE
BOOK-ENTRY-ONLY

RATINGS: S&P: "A"
Moody's: "A2"
(*See* "RATINGS" herein)

In the opinion of Kutak Rock LLP, Bond Counsel, under existing laws, regulations, rulings and judicial decisions and assuming the accuracy of certain representations and continuing compliance with certain covenants, interest on the Series 2020A Bonds is excludable from gross income for federal income tax purposes and is not a specific preference item for purposes of the federal alternative minimum tax. Bond Counsel is also of the opinion that, under existing State of Colorado statutes, the Series 2020A Bonds and the income therefrom are exempt from State of Colorado taxation, except inheritance, estate, and transfer taxes. For a more detailed description of such opinions of Bond Counsel, see "TAX MATTERS" herein.

E470℠

$167,370,000
E-470 PUBLIC HIGHWAY AUTHORITY
Senior Revenue Bonds
Series 2020A

Dated: Date of Delivery **Due: September 1, as shown on inside front cover**

The E-470 Public Highway Authority Senior Revenue Bonds, Series 2020A (the "**Series 2020A Bonds**") are being issued in fully registered form in denominations of $5,000 and integral multiples thereof. When issued, the Series 2020A Bonds will be registered in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York ("**DTC**"). DTC initially will act as securities depository for the Series 2020A Bonds. Payments of principal of and premium, if any, and interest on the Series 2020A Bonds will be made by U.S. Bank National Association, Denver, Colorado, as Paying Agent, to DTC which in turn is obligated to remit such principal, premium, if any, and interest to DTC participants for subsequent disbursement to the beneficial owners of the Series 2020A Bonds. Interest on the Series 2020A Bonds is payable on March 1 and September 1, commencing on March 1, 2021.

The Series 2020A Bonds are being issued pursuant to an Amended and Restated Master Bond Resolution adopted by the Board of Directors (the "**Board**") of the E-470 Public Highway Authority (the "**Authority**") on May 14, 2020, and a Series 2020A Supplemental Bond Resolution adopted by the Board on May 14, 2020 (collectively, the "**Resolutions**"). The Series 2020A Bonds are secured on a parity with all other Senior Bonds, as further described herein.

Proceeds of the Series 2020A Bonds, together with other legally available moneys, will be used to (i) refund all of the Authority's Senior Revenue Bonds, Series 2004B (Callable Capital Appreciation Bonds), to be outstanding as of September 1, 2020 with an aggregate accreted value of $170,350,202.85 and the Authority's Senior Revenue Bonds, Series 2010C (Current Interest Bonds), currently outstanding in the aggregate principal amount of $81,655,000 (collectively, the "**Refunded Bonds**"); and (ii) pay costs of issuance relating to the Series 2020A Bonds.

The Series 2020A Bonds are special, limited obligations of the Authority, payable solely from the Trust Estate in accordance with the Resolutions. The Series 2020A Bonds shall not constitute or be construed to be a debt or multiple fiscal year direct or indirect debt or other financial obligation, or a pledge of the taxing powers, faith, or credit of the State of Colorado or any political subdivision of the State of Colorado (other than the Authority to the extent provided in the Resolutions). The Authority has no taxing powers.

The Series 2020A Bonds are subject to redemption, at the option of the Board, at par prior to maturity, as described herein.

MATURITY SCHEDULE

(See Inside Front Cover)

This cover page contains certain information for general reference only. It is not intended to be a summary of the security or terms of this transaction. Investors are advised to read the entire Official Statement, including "INVESTMENT CONSIDERATIONS," to obtain information essential to the making of an informed investment decision. Capitalized terms used and not defined on this cover page have the respective meanings assigned to them elsewhere in this Official Statement and in Appendix A — "FORM OF THE RESOLUTIONS."

The Series 2020A Bonds are being offered when, as and if issued by the Authority and received by the Underwriters, subject to the approval of legality by Kutak Rock LLP, Denver, Colorado, as Bond Counsel, and certain other conditions. Certain legal matters with respect to the issuance of the Series 2020A Bonds will be passed upon for the Authority by its special counsel, Hogan Lovells US LLP, Denver, Colorado, and its general counsel, Icenogle Seaver Pogue, P.C., Denver, Colorado, and for the Underwriters by Stradling Yocca Carlson & Rauth P.C., Denver, Colorado. Stifel is serving as Municipal Advisor to the Authority in connection with the issuance of the Series 2020A Bonds. It is expected that the Series 2020A Bonds will be available for delivery to the Underwriters through the facilities of DTC against payment therefor in New York, New York on or about June 18, 2020.

J.P. Morgan **Morgan Stanley**

Jeffries

Official Statement dated June 10, 2020

$167,370,000
E-470 PUBLIC HIGHWAY AUTHORITY
Senior Revenue Bonds
Series 2020A

(CUSIP six digit issuer No. 26822L†)

Maturity (September 1)	Principal Amount	Interest Rate	Yield	Initial Offering Price	CUSIP†
2023	$ 1,500,000	5.00%	0.58%	114.004	MK7
2024	4,245,000	5.00	0.70	117.777	ML5
2025	2,685,000	5.00	0.84	121.132	MM3
2026	27,210,000	5.00	0.99	124.065	MN1
2027	16,280,000	5.00	1.13	126.696	MP6
2028	17,095,000	5.00	1.24	129.237	MQ4
2034	17,950,000	5.00	1.66	131.226 C	MR2
2035	11,080,000	5.00	1.68	131.007 C	MS0
2036	19,325,000	5.00	1.70	130.788 C	MT8
2040	50,000,000	5.00	1.72	113.241 CC	MU5

C Priced to first optional redemption date of September 1, 2030 at par.

CC Priced to first optional redemption date of September 1, 2024 at par.

 Neither the Authority nor the Underwriters take any responsibility for the accuracy of CUSIP numbers, which are included solely for the convenience of Owners of the Series 2020A Bonds. The CUSIP numbers for the Series 2020A Bonds may be changed after the issuance of the Series 2020A Bonds as the result of various subsequent actions, including, without limitation, a refunding of all or a portion thereof or the procurement of secondary market portfolio insurance or other similar enhancement by investors that is applicable to all or a portion of the Series 2020A Bonds.

USE OF INFORMATION IN THIS OFFICIAL STATEMENT

This Official Statement, which includes the cover page, the inside front cover and the appendices, does not constitute an offer to sell or the solicitation of an offer to buy any of the Series 2020A Bonds in any jurisdiction in which it is unlawful to make such offer, solicitation, or sale. No dealer, salesperson, or other person has been authorized to give any information or to make any representations other than those contained in this Official Statement in connection with the offering of the Series 2020A Bonds, and if given or made, such information or representations must not be relied upon as having been authorized by the Authority.

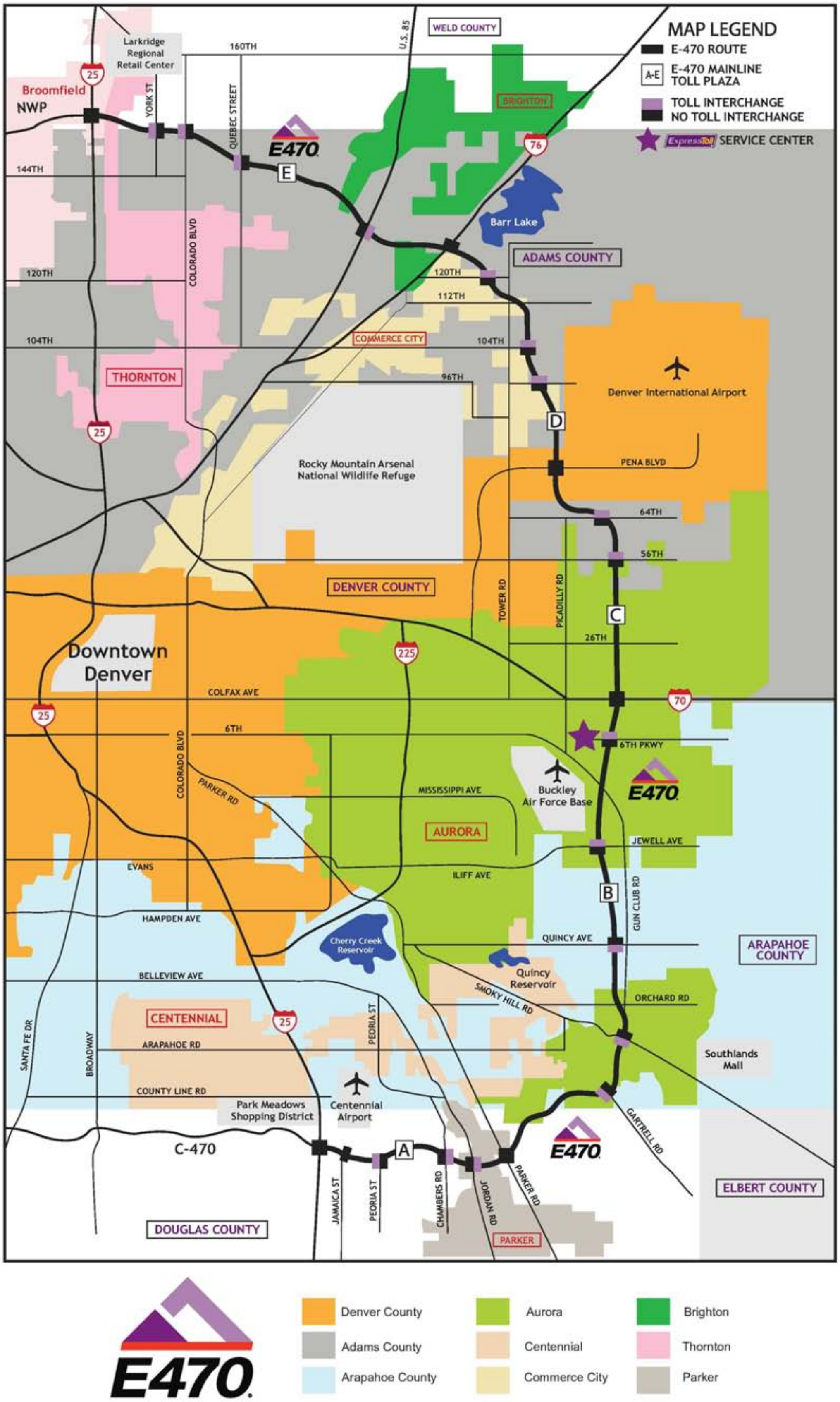
The information set forth in this Official Statement has been obtained from the Authority from the sources referenced throughout this Official Statement and from other sources believed to be reliable. No representation or warranty is made, however, as to the accuracy or completeness of information received from parties other than the Authority. This Official Statement contains, in part, estimates and matters of opinion which are not intended as statements of fact, and no representation or warranty is made as to the correctness of such estimates and opinions, or that they will be realized.

References to website addresses presented herein are for informational purposes only and may be in the form of a hyperlink solely for the reader's convenience. Unless specified otherwise, such websites and the information or links contained therein are not incorporated into, and are not part of, this final official statement for purposes of, and as that term is defined in, SEC Rule 15c2-12.

The Underwriters have provided the following sentence for inclusion in this Official Statement: The Underwriters have reviewed the information in this Official Statement in accordance with, and as part of, their responsibilities to investors under federal securities laws as applied to the facts and circumstances of the transaction, but the Underwriters do not guarantee the accuracy or completeness of such information.

THE PRICES AT WHICH THE SERIES 2020A BONDS ARE OFFERED TO THE PUBLIC BY THE UNDERWRITERS (AND THE YIELDS RESULTING THEREFROM) MAY VARY FROM THE INITIAL PUBLIC OFFERING PRICES OR YIELDS APPEARING ON THE INSIDE FRONT COVER HEREOF. IN ADDITION, THE UNDERWRITERS MAY ALLOW CONCESSIONS OR DISCOUNTS FROM SUCH INITIAL PUBLIC OFFERING PRICES TO DEALERS AND OTHERS. IN ORDER TO FACILITATE DISTRIBUTION OF THE SERIES 2020A BONDS, THE UNDERWRITERS MAY ENGAGE IN TRANSACTIONS INTENDED TO STABILIZE THE PRICE OF THE SERIES 2020A BONDS AT A LEVEL ABOVE THAT WHICH MIGHT OTHERWISE PREVAIL IN THE OPEN MARKET. SUCH STABILIZING, IF COMMENCED, MAY BE DISCONTINUED AT ANY TIME.

IN MAKING ANY INVESTMENT DECISION, INVESTORS MUST RELY ON THEIR OWN EXAMINATION OF INFORMATION SET FORTH IN THIS OFFICIAL STATEMENT WITH RESPECT TO THE AUTHORITY AND THE E-470 TOLL ROAD, THE REVENUES AND THE TERMS OF THE OFFERING, INCLUDING THE MERITS AND RISKS INVOLVED. THE SERIES 2020A BONDS HAVE NOT BEEN RECOMMENDED BY ANY FEDERAL OR STATE SECURITIES COMMISSION OR REGULATORY AUTHORITY. FURTHERMORE, THE FOREGOING AUTHORITIES HAVE NOT CONFIRMED THE ACCURACY OR DETERMINED THE ADEQUACY OF THIS OFFICIAL STATEMENT. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.


MAP LEGEND
E-470 ROUTE
A-E
E-470 MAINLINE TOLL PLAZA
TOLL INTERCHANGE
NO TOLL INTERCHANGE
ExpressToll SERVICE CENTER
WELD COUNTY
U.S. 85
Larkridge Regional Retail Center
160TH
Broomfield
NWP
25
YORK ST
QUEBEC STREET
BRIGHTON
E470
76
E
144TH
Barr Lake
COLORADO BLVD
ADAMS COUNTY
120TH
112TH
104TH
COMMERCE CITY
THORNTON
96TH
Denver International Airport
D
Rocky Mountain Arsenal National Wildlife Refuge
PENA BLVD
64TH
56TH
DENVER COUNTY
TOWER RD
PICADILLY RD
C
26TH
Downtown Denver
225
COLFAX AVE
70
6TH
6TH PKWY
PARKER RD
MISSISSIPPI AVE
Buckley Air Force Base
AURORA
JEWELL AVE
EVANS
ILIFF AVE
B
GUN CLUB RD
HAMPDEN AVE
Cherry Creek Reservoir
QUINCY AVE
ARAPAHOE COUNTY
Quincy Reservoir
BELLEVIEW AVE
SMOKY HILL RD
ORCHARD RD
CENTENNIAL
PEORIA ST
SANTA FE DR
BROADWAY
ARAPAHOE RD
Southlands Mall
COUNTY LINE RD
Park Meadows Shopping District
Centennial Airport
GARTRELL RD
C-470
A
JAMAICA ST
CHAMBERS RD
JORDAN RD
PARKER RD
ELBERT COUNTY
DOUGLAS COUNTY
PARKER
Denver County
Adams County
Arapahoe County
Aurora
Centennial
Commerce City
Brighton
Thornton
Parker

E-470 PUBLIC HIGHWAY AUTHORITY
22470 East Stephen D. Hogan Parkway
Aurora, Colorado 80018

BOARD OF DIRECTORS

Director	Title/Member Government	Director Since
Chaz Tedesco, Chairperson	County Commissioner, Adams County	2013
Roger Partridge, Vice Chair	County Commissioner, Douglas County	2013
John Diak, Secretary	Council Member, Town of Parker	2018
Francoise Bergan, Treasurer	Council Member, City of Aurora	2018
Bill Holen, Director	County Commissioner, Arapahoe County	2012
Craig Hurst, Director	Council Member, City of Commerce City	2020
Matt Johnston, Director	Mayor Pro Tem, City of Brighton	2020
Jessica Sandgren, Director	Mayor Pro Tem, City of Thornton	2020

Ex-Officio Directors (Non-Voting)	Representing
George Teal	Denver Regional Council of Governments
Doug Tisdale	Regional Transportation District
Kelly Brown	Colorado Department of Transportation/HPTE

Affiliate Member Directors (Non-Voting)	Representing
David Jones	Council Member, City of Arvada
Steve Moreno	County Commissioner, Weld County
John Gates	Mayor, City of Greeley
Laurie Anderson	Council Member, City and County of Broomfield
Jackie Millet	Mayor, City of Lone Tree

DEPARTMENT HEADS

Tim Stewart, Executive Director
Jessica Carson, Director of Operations
Jason Myers, Director of Finance
Neil Thomson, Director of Engineering and Roadway Maintenance
Ken Smith, Director of Information Technology

General Counsel to Board of Directors
Icenogle Seaver Pogue, P.C.
Denver, Colorado

Bond Counsel
Kutak Rock LLP
Denver, Colorado

Special Counsel
Hogan Lovells US LLP
Denver, Colorado

Municipal Advisor
Stifel, Nicolaus & Company, Incorporated
Denver, Colorado

Traffic and Revenue Consultant
CDM Smith Inc.

TABLE OF CONTENTS

OFFICIAL STATEMENT

$167,370,000

E-470 PUBLIC HIGHWAY AUTHORITY
Senior Revenue Bonds
Series 2020A

INTRODUCTION

*This Introduction is qualified in its entirety by the more detailed information included and referred to elsewhere in this Official Statement, including the inside front cover page and Appendices hereto. The offering of the Series 2020A Bonds (as defined below) to potential investors is made only by means of the entire Official Statement, including the inside front cover page and all such Appendices (the "**Official Statement**"). Terms used in this Introduction and not otherwise defined shall have the respective meanings assigned to them elsewhere in this Official Statement. Definitions of certain capitalized terms relating to the Resolutions and used in this Official Statement are set forth in **Appendix A** — "FORM OF THE RESOLUTIONS."*

General

This Official Statement is provided to furnish certain information in connection with the sale and delivery by the E-470 Public Highway Authority (the "**Authority**") of $167,370,000 aggregate principal amount of its Senior Revenue Bonds, Series 2020A (the "**Series 2020A Bonds**"). Proceeds of the Series 2020A Bonds, together with other legally available moneys, will be used to (i) refund all of the Authority's Senior Revenue Bonds, Series 2004B, to be outstanding as of September 1, 2020 with an aggregate accreted value of $170,350,202.85, and the Authority's Senior Revenue Bonds, Series 2010C, currently outstanding in the aggregate principal amount of $81,655,000 (collectively, the "**Refunded Bonds**"); and (ii) pay costs of issuance relating to the Series 2020A Bonds. *See* "PLAN OF FINANCE."

The Authority

The E-470 Public Highway Authority is a body corporate and political subdivision of the State of Colorado, established in January 1988 with all the powers, duties, and privileges permitted by the Public Highway Authority Law of the State, part 5 of article 4 of title 43, Colorado Revised Statutes, as amended (the "**Public Highway Law**"). The Board of Directors (the "**Board**") of the Authority is composed of one elected official from each of Adams County, Arapahoe County, Douglas County, the Cities of Aurora, Brighton, Commerce City, and Thornton, and the Town of Parker, Colorado (together, the "**Member Governments**"). The Authority is responsible for the financing, construction, and operation of the toll highway known as E-470 (the "**E-470 Toll Road**"). The Authority has no taxing powers. *See* "THE AUTHORITY" and "THE E-470 TOLL ROAD."

The E-470 Toll Road

The E-470 Toll Road, located on the eastern perimeter of the Denver metropolitan area and serving Denver International Airport ("**DEN**"), consists of a 47-mile beltway extending from Interstate 25 ("**I-25**") on the southern perimeter of the Denver metropolitan area passing the western boundary of DEN to I-25 on the northern perimeter of the Denver metropolitan area.

The E-470 Toll Road passes through the Member Governments. Certain operating information regarding the E-470 Toll Road is set forth under the caption "THE E-470 TOLL ROAD — Operation and Maintenance."

The Series 2020A Bonds

Authority for Issuance

The Series 2020A Bonds are being issued pursuant to the authority of the Public Highway Law, the Supplemental Public Securities Act, part 2 of article 57 of title 11, Colorado Revised Statutes, as amended, and the Public Securities Refunding Act, article 56 of title 11, Colorado Revised Statutes, as amended, and pursuant to an Amended and Restated Master Bond Resolution adopted by the Board of the Authority on May 14, 2020 (the "**Master Resolution**"), and a Series 2020A Supplemental Bond Resolution adopted by the Board on May 14, 2020 (together with the Master Resolution, the "**Resolutions**"). *See* "THE SERIES 2020A BONDS." The Resolutions provide, among other things, for the sources of payment of and security for the Series 2020A Bonds and the rights and remedies of the bondholders. *See* **Appendix A** — "FORM OF THE RESOLUTIONS."

Denominations and Payment

The Series 2020A Bonds are being issued in fully registered form in denominations of $5,000 and integral multiples thereof and will mature as shown on the inside front cover page hereof. The Series 2020A Bonds will bear interest as set forth on the front cover page hereof and as more fully described under the caption "THE SERIES 2020A BONDS."

U.S. Bank National Association, Denver, Colorado, or its successor, serves as the Trustee, registrar, paying agent, and the tender agent (the "**Trustee**," "**Registrar**" and "**Paying Agent**") for the Series 2020A Bonds pursuant to the Resolutions. The principal and Redemption Price of any Series 2020A Bond will be paid to the Owner thereof as shown on the registration records of the Registrar upon maturity or any prior redemption thereof and upon presentation and surrender to the Paying Agent. Interest on the Series 2020A Bonds (other than interest paid as part of the Redemption Price thereof) will be paid by check or draft of the Trustee mailed, on each Interest Payment Date, to the Owner thereof at his address as it last appears on the registration records of the Registrar at the close of business on the Record Date. Payment of interest by means of wire transfer may be used if mutually agreed to in writing between the Owner of $1,000,000 or more in aggregate principal amount of the Series 2020A Bonds and the Trustee, subject to certain requirements of the Resolutions.

Redemption Prior to Maturity

The Series 2020A Bonds are subject to redemption, at the option of the Board, at par prior to maturity as described under "THE SERIES 2020A BONDS – Prior Redemption."

Book-Entry System

The Series 2020A Bonds are fully registered bonds registered in the name of Cede & Co., as nominee for The Depository Trust Company ("**DTC**"), as securities depository for the Series 2020A Bonds. Upon offering, individual purchasers of the Series 2020A Bonds will not receive physical delivery of bond certificates, except as more fully described herein. Series 2020A Bonds will only be transferable on the register kept by the Registrar. *See* "THE SERIES 2020A BONDS – Generally" and **Appendix F**.

Security and Sources of Payment for the Series 2020A Bonds

The Series 2020A Bonds are special, limited obligations of the Authority, payable solely from and secured by a lien on the Trust Estate, to the extent provided under the Resolutions. The Trust Estate consists principally of Revenues (as defined in the Master Resolution) and certain other moneys on deposit under the Resolutions (including, but not limited to, the Senior Bonds Debt Service Reserve Account, as described herein). *See* the definition of "Trust Estate" in "FORM OF RESOLUTIONS – Definitions" in **Appendix A** hereto. *See also* "INVESTMENT CONSIDERATIONS – Impact of COVID-19 Pandemic." Highway tolls are the predominant source of Revenues available to pay debt service on the Series 2020A Bonds. Debt Service on the Series 2020A Bonds is payable from the Trust Estate *after* the payment of Operating Expenses. The Series 2020A Bonds are secured and are payable on a parity with the Authority's other Senior Bonds (as defined hereinafter), and prior to the pledge of such Trust Estate to the payment of any Subordinate Bonds that may hereafter be issued in accordance with the Resolutions. The Authority has not previously issued, and has no current plans to issue, Subordinate Bonds. Senior Bonds were outstanding as of April 30, 2020 in the aggregate principal amount of $1,460,399,525. This amount includes the Refunded Bonds. For a further description of the various outstanding Senior Bonds, s*ee* "THE SERIES 2020A BONDS" and "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Outstanding Senior Bonds," "– Pledge of Trust Estate," and "– Flow of Funds; Fund Balances" herein.

The Bonds, including the Series 2020A Bonds, shall not constitute or be construed to be a debt or multiple fiscal year direct or indirect debt or other financial obligation, or a pledge of the taxing power, faith, or credit of the State or any political subdivision of the State (other than the Authority, to the extent provided in the Resolutions). The Authority has no taxing powers.

Traffic and Revenue Projections

The Authority has retained CDM Smith Inc. (the "**Traffic and Revenue Consultant**") to prepare a comprehensive Traffic and Revenue Study dated May 2020 that provides estimates of future traffic volumes on the E-470 Toll Road and future toll revenues through the year 2050 (the "**May 2020 Comprehensive Traffic & Revenue Study**"). *See* "THE TRAFFIC & REVENUE STUDY." The May 2020 Comprehensive Traffic & Revenue Study is included herein at **Appendix C**.

The financial projections and other estimates contained in the May 2020 Comprehensive Traffic & Revenue Study are based on what the Traffic and Revenue Consultant believed to be reasonable evaluations of conditions as of the date of such document and on assumptions regarding future conditions. *SEE* "THE TRAFFIC & REVENUE STUDY," "INVESTMENT CONSIDERATIONS," "FORWARD-LOOKING STATEMENTS," AND APPENDIX C. INVESTORS ARE ADVISED TO REVIEW CAREFULLY THE MAY 2020 COMPREHENSIVE TRAFFIC & REVENUE STUDY AS WELL AS THE OTHER INFORMATION SET FORTH IN THIS OFFICIAL STATEMENT.

Continuing Disclosure Undertaking

Concurrently with the issuance and sale of the Series 2020A Bonds, the Authority will execute a continuing disclosure undertaking providing for the delivery to the Municipal Securities Rulemaking Board (the "**MSRB**"), through its Electronic Municipal Market Access ("**EMMA**") system with a portal at http://emma.msrb.org, of certain annual financial and operating reports and timely disclosure of certain enumerated events as more fully described herein. *See* "CONTINUING DISCLOSURE UNDERTAKING" and **Appendix E** hereto.

Tax Matters

In the opinion of Kutak Rock LLP, Bond Counsel, under existing laws, regulations, rulings and judicial decisions and assuming the accuracy of certain representations and continuing compliance with certain covenants, interest on the Series 2020A Bonds is excludable from gross income for federal income tax purposes and is not a specific preference item for purposes of the federal alternative minimum tax. Bond Counsel is also of the opinion that, under existing State of Colorado statutes, the Series 2020A Bonds and the income therefrom are exempt from State of Colorado taxation, except inheritance, estate, and transfer taxes. For a more detailed description of such opinions of Bond Counsel, *see* "TAX MATTERS."

Investment Considerations

Investment in the Series 2020A Bonds involves risks, some of which are discussed in this Official Statement. For a description of certain of such risks, including the impact of the coronavirus (COVID-19), *see* "INVESTMENT CONSIDERATIONS."

Professionals Involved in the Offering

J.P. Morgan Securities LLC, Morgan Stanley & Co. LLC and Jefferies LLC will act as the Underwriters in connection with the offering of the Series 2020A Bonds. *See* "UNDERWRITING."

U.S. Bank National Association acts as Trustee, Paying Agent and Registrar with respect to the Series 2020A Bonds.

Kutak Rock LLP, Denver, Colorado, is Bond Counsel to the Authority for the Series 2020A Bonds. Certain legal matters will be passed upon for the Authority by its special counsel, Hogan Lovells US LLP, Denver, Colorado and by its general counsel, Icenogle Seaver Pogue, P.C., Denver, Colorado. The Underwriters are being represented in connection with their purchase of the Series 2020A Bonds by Stradling Yocca Carlson & Rauth P.C., Denver, Colorado. Stifel serves as Municipal Advisor to the Authority. *See* "CONSULTANTS." The Authority's financial statements for the fiscal years ended December 31, 2019 and 2018, which are included in **Appendix B** hereto, were audited by KPMG LLP.

Other Matters

This Official Statement speaks only as of its date, and the information and expressions of opinion contained herein are subject to change without notice. Neither delivery of this Official Statement nor any sale made hereunder shall, under any circumstances, create any implication that there has been no change in the affairs of the Authority since the date hereof.

The summaries of and references to all agreements, documents, statutes, reports, certificates, and other instruments referred to herein do not purport to be complete, comprehensive, or definitive and each such summary or reference is qualified in its entirety by reference to each such agreement, document, statute, report, certificate, or instrument. Copies of any such agreements, documents, statutes, reports, certificates, and other instruments are available upon written request to the Authority's Director of Finance at the Authority's offices located at 22470 East Stephen D. Hogan Parkway, Aurora, Colorado 80018, telephone (303) 537-3470.

*No credit enhancement, including municipal bond insurance, is being provided with respect to the Series 2020A Bonds. It should be noted, however, that MBIA Insurance Corporation and its successors and assigns ("**MBIA**") issued various policies insuring the payment when due of the principal* *of and interest on certain of the Senior Bonds. Pursuant to the Administrative Services Agreement dated as of February 17, 2009, between MBIA and MBIA Insurance Corp. of Illinois (now known as National Public Finance Guarantee Corporation ("**National**")), MBIA ceded to National all of MBIA's U.S. public finance business, including the policies with respect to such Senior Bonds. As a result, National possesses rights to consent to, approve, or receive notices regarding certain actions taken with respect to the Senior Bonds. See* "FORM OF RESOLUTIONS – Certain Rights of National" in **Appendix A** hereto.

U.S. Bank National Association, as Trustee under the Resolutions, has not reviewed this Official Statement and has made no representations as to the information contained herein.

FORWARD-LOOKING STATEMENTS

This Official Statement, and particularly the information contained under the captions "PLAN OF FINANCE," "PROJECTED TOLL RATES AND REVENUES; PROJECTED COVERAGE," "THE AUTHORITY," "THE E-470 TOLL ROAD," "THE TRAFFIC & REVENUE STUDY," "INVESTMENT CONSIDERATIONS," and in Appendices C and H, contain statements relating to future results that are "forward-looking statements" as defined in the Private Securities Litigation Reform Act of 1995. When used in this Official Statement, the words "anticipate," "expect," "assume," "estimate," "projection," "plan," "budget," "forecast," "intend," and similar expressions identify forward-looking statements. The words or phrases "to date," "now," "currently," and the like are intended to mean as of the date of this Official Statement. Such statements are subject to risks and uncertainties that could cause actual results to differ materially from those contemplated in such forward-looking statements. Inevitably, some assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between forecasts and actual results, and those differences may be material. For a discussion of certain of such risks and possible variations in results, *see* the information under "INVESTMENT CONSIDERATIONS" and in Appendix C hereto.

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PLAN OF FINANCE

Sources and Uses of Funds

The following table sets forth the estimated sources and uses of funds in connection with the issuance of the Series 2020A Bonds:

Sources of Funds	
Series 2020A Bonds Par Amount	$167,370,000.00
Original Issue Premium	39,035,271.90
Other Legally Available Funds (1)	50,000,000.00
Total Sources of Funds	$256,405,271.90
Uses of Funds	
To Refund the Refunded Bonds (2)	$254,101,028.42
Costs of Issuance (3)	2,304,243.48
Total Uses of Funds	$256,405,271.90

(1) Consists of amounts transferred from the Authority's Senior Bonds Defeasance Subaccount of the General Surplus Account.
(2) *See* "Refunded Bonds" under this caption.
(3) Includes underwriters' fee, legal costs and expenses, fees of municipal advisor and rating agencies, and other expenses associated with the issuance of the Series 2020A Bonds. For information regarding the underwriting arrangements relating to the Series 2020A Bonds, *see* "UNDERWRITING."

Refunded Bonds

The Refunded Bonds consist of all of the Authority's Senior Revenue Bonds, Series 2004B, to be outstanding as of September 1, 2020 with an aggregate accreted value of $170,350,202.85* (the "**Series 2004B Bonds**"), and the Authority's Senior Revenue Bonds, Series 2010C, currently outstanding in the aggregate principal amount of $81,655,000 (the "**Series 2010C Bonds**"). The proceeds of the Series 2020A Bonds, together with other legally available funds, will be deposited in an escrow account established under the 2020A Escrow Agreement dated as of the delivery of the Series 2020A Bonds (the "**2020A Escrow Agreement**") between the Authority and U.S. Bank National Association, as escrow agent (the "**Escrow Agent**"), and used to redeem all of the Refunded Bonds on September 1, 2020 (the "**Redemption Date**") at a redemption price equal to 100% of the accreted value of the Series 2004B Bonds as of the Redemption Date and 100% of the principal amount of the Series 2010C Bonds plus accrued interest to the Redemption Date. A portion of the amounts deposited in the escrow account will be held uninvested in cash and the remainder used to purchase a portfolio of securities authorized by applicable law, which authorization includes direct noncallable obligations of the United States and noncallable obligations of an agency or instrumentality of the United States (the "**Federal Securities**") maturing in time to make such payment.

Under the 2020A Escrow Agreement, the escrow account is irrevocably pledged to the payment of the principal of and interest on such Refunded Bonds. Such maturing principal of and interest on the Federal Securities will not be available to pay debt service on the Series 2020A Bonds. Moneys on

*Accreted value as of April 30, 2020 is shown in Table 1.

deposit in the escrow account are not part of the Trust Estate securing the payment of the Series 2020A Bonds. Prior to, or simultaneously with, the execution and delivery of the Series 2020A Bonds, the Authority will give irrevocable instructions to provide notice to the owners of the Refunded Bonds that such Refunded Bonds will be called for redemption on September 1, 2020, on which date money will be applied to redeem such Refunded Bonds from funds held under the 2020A Escrow Agreement.

Causey, Demgen & Moore P.C., a nationally recognized accounting firm (the "**Verification Agent**"), will verify at the time of initial delivery of the Series 2020A Bonds to the Underwriters the mathematical accuracy of the schedules that demonstrate the Federal Securities will mature and pay interest in such amounts which, together with uninvested funds and other funds contributed by the Authority, in the escrow account will be sufficient to pay, on September 1, 2020, the principal of and accreted value and interest on the Refunded Bonds. (*See* "VERIFICATION.")

By the deposit of a portion of the Series 2020A Bonds proceeds and other legally available moneys with the Escrow Agent pursuant to the 2020A Escrow Agreement, and the investment thereof in the Federal Securities, the Authority will have effectuated the defeasance of the Refunded Bonds pursuant to the terms of the Master Resolution. As a result of such defeasance, such Refunded Bonds will no longer be outstanding under the Master Resolution and will be payable solely from moneys on deposit in the 2020A Escrow Account.

THE SERIES 2020A BONDS

The following is a summary of certain provisions of the Series 2020A Bonds. This summary of the Series 2020A Bonds is not intended to be an exhaustive discussion of the Series 2020A Bonds. Investors are advised that the Resolutions should be reviewed for the general terms of the Series 2020A Bonds. See ***Appendix A*** *— "FORM OF THE RESOLUTIONS." All capitalized terms used under this caption that are not defined in the body of this Official Statement are defined in* ***Appendix A****.*

Generally

General information describing the Series 2020A Bonds appears elsewhere in this Official Statement. That information should be read in conjunction with this summary, which is qualified in its entirety by reference to the Resolutions and the forms of Series 2020A Bonds included therein. *See* "APPENDIX A – FORM OF THE RESOLUTIONS."

The Series 2020A Bonds are being issued pursuant to the Resolutions, which constitute an irrevocable contract between the Authority and the owners of the Series 2020A Bonds. The Resolutions provide that the Authority will not take any action by which the rights and privileges of any owner of any Series 2020A Bond might be impaired or diminished. The Series 2020A Bonds are being issued pursuant to the authority of the Public Highway Law, the Supplemental Public Securities Act, part 2 of article 57 of title 11, Colorado Revised Statutes, as amended, and the Public Securities Refunding Act, article 56 of title 11, Colorado Revised Statutes, as amended. The Series 2020A Bonds are dated their date of delivery and bear interest from such date to maturity. Interest on the Series 2020A Bonds is payable on September 1 and March 1, commencing on March 1, 2021. Principal of the Series 2020A Bonds is payable on September 1 in the years and in the amounts shown on the inside front cover page of this Official Statement.

DTC will act as securities depository for the Series 2020A Bonds. The Series 2020A Bonds will be issued as fully registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully registered Series 2020A Bond certificate will be issued for each maturity (bearing interest at the specified rate) of the Series 2020A Bonds, each in the aggregate principal amount of such maturity (bearing interest at the specified rate), and will be deposited with DTC. *See* **Appendix F** – "BOOK-ENTRY ONLY SYSTEM."

Prior Redemption

Optional Redemption

The Series 2020A Bonds maturing on or prior to September 1, 2028, are not subject to optional redemption.

The Series 2020A Bonds maturing on September 1, 2034, 2035 and 2036 are subject to redemption prior to their respective maturities, at the option of the Board, on and after September 1, 2030, in whole or in part at any time, in such order of maturities as the Board shall determine and by lot within a maturity, in integral multiples of $5,000 (giving proportionate weight to Series 2020A Bonds in denominations larger than $5,000), in such manner as the Series 2020A Paying Agent may determine, at a redemption price equal to 100% of the principal amount of each Series 2020A Bond or portion thereof so redeemed plus accrued interest thereon to the redemption date.

The Series 2020A Bonds maturing on September 1, 2040, are subject to redemption prior to their maturity, at the option of the Board, on and after September 1, 2024, in whole or in part at any time, by lot, in integral multiples of $5,000 (giving proportionate weight to Series 2020A Bonds in denominations larger than $5,000), in such manner as the Series 2020A Paying Agent may determine, at a redemption price equal to 100% of the principal amount of each Series 2020A Bond or portion thereof so redeemed plus accrued interest thereon to the redemption date.

Notice and Effect of Redemption

The Authority is required to give written notice to the Trustee and the Series 2020A Paying Agent of its election to redeem the Series 2020A Bonds at least 10 Business Days prior to the date on which notice of redemption is required to be given to the Owners of such Series 2020A Bonds to be redeemed. When the Trustee receives notice from the Authority of its election or direction to redeem Series 2020A Bonds and when redemption of the Series 2020A Bonds is authorized or required, the Trustee shall give notice, in the name of the Authority, of the redemption of such Series 2020A Bonds, which notice shall specify the maturity of such Series 2020A Bonds to be redeemed, the Redemption Date, and the place or places where amounts due upon such Redemption Date will be payable and, if less than all of the Series 2020A Bonds are to be redeemed, the letters and numbers or other distinguishing marks of the Series 2020A Bonds so to be redeemed, and in the case of Series 2020A Bonds to be redeemed in part only, such notices shall also specify the respective portions thereof to be redeemed. Such notice shall further state that on such Redemption Date there shall become due and payable upon each Series 2020A Bond to be redeemed the Redemption Price thereof (or the Redemption Price of the specified portions thereof, in the case of Series 2020A Bonds to be redeemed in part only), together with interest accrued to the Redemption Date, as applicable, and that from and after such date interest thereon shall cease to accrue and be payable.

The Trustee shall provide a copy of such notice by Electronic Means or by first class mail postage prepaid, not less than 30 nor more than 60 days before the Redemption Date, to the Owners of the Series 2020A Bonds or portions of such Series 2020A Bonds which are to be redeemed, at their last addresses, if any, appearing upon the Register. The Trustee's obligation to give notice as described in the Resolutions is not conditioned upon the prior payment to the Trustee of funds sufficient to pay the Redemption Price of such Series 2020A Bonds to which such notice relates or interest thereon to the Redemption Date and may be given in conditional form, specifying that the redemption is subject to receipt by the Trustee of moneys sufficient to pay the Redemption Price of and accrued interest on such Series 2020A Bonds to be redeemed or to other conditions. The failure to give notice as in the Resolutions to any Owner of any such Series 2020A Bond or portion thereof to be redeemed shall not affect the validity of any proceedings for the redemption of any other such Series 2020A Bond for which such notice has been duly given.

Selection of Series 2020A Bonds for Redemption

If less than all of the Series 2020A Bonds of like maturity shall be called for prior redemption, the particular Series 2020A Bonds or portions of Series 2020A Bonds to be redeemed shall be selected by lot or other random method by the Trustee in such a manner as the Trustee may determine; provided that the portion of any Series 2020A Bond to be redeemed shall be in an authorized denomination and, in selecting Series 2020A Bonds for redemption, the Trustee shall treat each Series 2020A Bond as representing that number of Series 2020A Bonds as is obtained by dividing the principal amount or Maturity Value of such Series 2020A Bonds by the minimum denomination for such Series 2020A Bonds.

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SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS

Pledge of Trust Estate

General. The Series 2020A Bonds and other Senior Bonds are special, limited obligations of the Authority, payable solely from and secured by a lien on the Trust Estate, to the extent provided in the Resolutions. For a description of the security for the Series 2020A Bonds, *see* "FORM OF THE RESOLUTIONS – Pledge of Trust Estate," "– Special Limited Obligations," "– Flow of Funds," and "– Other Transfers to Debt Service Fund" in **Appendix A** hereto. Such pledge is prior to the pledge of the Trust Estate to payment of any Subordinate Bonds that may hereafter be issued in accordance with the Resolutions.

The Trust Estate established under the Resolutions includes, generally, all Revenues (as described below), all amounts deposited in the Revenue Fund, the Debt Service Fund (including the Accounts created therein with respect to the Senior Bonds and the First Tier Subordinate Bonds, if any), the Debt Service Reserve Fund (including the Accounts created therein with respect to the Senior Bonds and the First Tier Subordinate Bonds, if any), and certain other Funds and Accounts created under the Resolutions. The Resolutions provide that Revenues are to be applied first to pay the Operating Expenses and then to pay the Senior Bonds. *See* "FORM OF THE RESOLUTIONS – Pledge of Trust Estate" and "– Special Limited Obligations," in **Appendix A** hereto for a more complete description of the pledge of the Trust Estate. *See also* "FORM OF THE RESOLUTIONS – Flow of Funds" and "– Other Transfers to Debt Service Fund" in **Appendix A** hereto and "Senior Bonds Debt Service Reserve Account" and "Flow of Funds; Fund Balances" under this caption.

The Series 2020A Bonds shall not constitute or be construed to be a debt or multiple fiscal year direct or indirect debt or other financial obligation, or a pledge of the taxing power, faith, or credit of the State or any political subdivision (other than the Authority, to the extent provided in the Resolutions). The Authority has no taxing powers.

Revenues. The principal component of the Trust Estate consists of the Revenues. The term "**Revenues**" means all amounts received by the Authority from fees, tolls, rates, and charges for the privilege of traveling on the E-470 Toll Road imposed by the Authority pursuant to the Public Highway Law ("**Toll Revenue**") and certain other amounts derived from or in respect of the ownership or operation of the E-470 Toll Road as specifically set forth in the definition of "Revenues" in the "FORM OF RESOLUTIONS – Definitions" in **Appendix A** hereto. *See also* "Special Project Bonds" under this caption, "HISTORICAL TOLL RATES AND REVENUES; HISTORICAL DEBT SERVICE COVERAGE, "INVESTMENT CONSIDERATIONS" and Note 5 to the Authority's Audited Financial Statements and "Management Discussion and Analysis – Future Management Plans," both contained in **Appendix B** hereto.

Operating Expenses. In determining the amounts available to pay the Senior Bonds, including the Series 2020A Bonds, and any Subordinate Bonds, the Resolutions require the payment of Operating Expenses from available Revenues as a first priority. The term "**Operating Expenses**" means expenses for operation, maintenance, repairs, ordinary replacement, and ordinary reconstruction of the E-470 Toll Road, ordinary acquisition of equipment, and any other current expenses or obligations required to be paid by the Authority, the Member Governments, or any other Person under or pursuant to the provisions of the Resolutions, the Establishing Contract (as defined in the Master Resolution), or any other agreement between or among the Authority and any other person or persons, or by law, all to the extent properly and directly attributable to the operation of the E-470 Toll Road, but not any costs or expenses for new construction or any allowance for depreciation and not any payments or expenses relating to Related Financial Transactions or any taxes upon the property or revenues of the Authority. For further information regarding Operating Expenses, *see* the definition of "Operating Expenses" in "FORM OF THE RESOLUTIONS – Definitions" in **Appendix A** hereto.

Outstanding Senior Bonds

The Series 2020A Bonds are secured and are payable on a parity with the following Senior Revenue Bonds (the Series 2020A Bonds, together with such Senior Revenue Bonds, are collectively referred to as the "**Senior Bonds**"). *See* "Issuance of Additional Bonds" under this caption. The Authority has no outstanding debt or financial obligations other than the Outstanding Senior Bonds with a lien on the Trust Estate senior to or on parity with the Series 2020A Bonds.

TABLE 1

Outstanding Senior Bonds[1]
(as of April 30, 2020)

Bonds	Original Principal Amount	Outstanding Principal Amount[1]
Series 1997B Bonds	$ 342,217,730	$ 263,123,165 [2]
Series 2000B Bonds	252,848,750	460,736,253 [2]
Series 2004A Bonds	76,484,623	173,374,116 [2]
Series 2004B Bonds	70,705,810	167,212,246 [2][3]
Series 2006B Bonds	56,932,723	112,590,037 [2]
Series 2010A Bonds	21,834,746	42,478,708 [2]
Series 2010C Bonds	81,655,000	81,655,000 [3]
Series 2015A Bonds	41,550,000	20,590,000
Series 2017B Bonds	66,075,000	66,075,000 [4]
Series 2019A Bonds	72,565,000	72,565,000 [4]
Total	$1,082,869,304	$1,460,399,525

(1) Assumes all scheduled payments of principal and interest are made and all scheduled accretions (as applicable) are credited through April 30, 2020.
(2) These Senior Bonds are Capital Appreciation Bonds. The amounts presented include all scheduled accretions through April 30, 2020. *See* "PLAN OF FINANCE – Refunded Bonds" for the estimated accreted value of the Series 2004B Bonds as of the Redemption Date.
(3) These are the Refunded Bonds expected to be refunded in full with proceeds of the Series 2020A Bonds and other legally available funds. *See* "PLAN OF FINANCE."
(4) These Senior Bonds bear interest at a variable rate which has been swapped as described in "Existing Swap Agreements" under this caption.
Source: E-470 Public Highway Authority

Existing Swap Agreements

The Authority is a party to two floating-to-fixed interest rate swap agreements (together, the "**Swap Agreements**") with JP Morgan Chase Bank, N.A. (successor to Bear Stearns Financial Products, Inc.) ("**JPMorgan**") and Morgan Stanley Capital Services Inc. ("**MSCS**") in connection with the Series 2007 Bonds originally issued as auction rate bonds and remarketed in 2008 as term rate bonds and fixed rate bonds. Each Swap Agreement currently has a notional amount of $69,320,000, terminates on September 1, 2039, and provides for certain payments to or from JPMorgan and MSCS, as applicable, equal to the difference between the fixed rates (in each case 3.832%) payable by the Authority to each of JPMorgan and MSCS under the respective Swap Agreements and 67% of one-month U.S. dollar LIBOR payable by JPMorgan and MSCS to the Authority. According to the audited financial statements of the

Authority, as of December 31, 2019 and the unaudited interim financial statements as of April 30, 2020, the Swap Agreements had a combined negative fair value of ($50,169,451) and ($74,215,024), respectively.

The Authority has designated the Swap Agreements as Related Financial Transactions with respect to the Series 2017B Bonds and the Series 2019A Bonds. Consequently, the Regularly Scheduled Swap Payments payable by the Authority pursuant to the Swap Agreements are payable and secured by a lien on the Trust Estate on parity with the Senior Bonds, as further described in "FORM OF THE RESOLUTIONS – Particular Covenants of the Authority – Related Financial Transactions" in **Appendix A**. Any Termination Payments and Miscellaneous Swap Payments required to be made by the Authority pursuant to the Swap Agreements are subordinate to the payment of debt service on the Bonds and are payable from amounts on deposit in the Surplus Fund. *See* "FORM OF THE RESOLUTIONS – Surplus Fund" in **Appendix A**. *See* also "INVESTMENT CONSIDERATIONS – Hedge Risks."

MSCS and JPMorgan are each affiliates of one of the Underwriters of the Series 2020A Bonds, as described in "CERTAIN RELATIONSHIPS OF PARTIES."

Revenue Covenant

Pursuant to the Master Resolution, the Authority has covenanted that there shall be fixed, charged, and collected, pursuant to the Public Highway Law, the Establishing Contract, or otherwise such fees, assessments, tolls, or other charges in respect of the E-470 Toll Road as shall be required to produce Revenues which shall equal at least 1.30 times the Aggregate Debt Service due in each Fiscal Year, after provision for the payment of Operating Expenses and any transfers of Revenues to any other Fund or Account required under the Master Resolution or under the documents securing any Parity Obligations. Under the Public Highway Law, the Authority has the power to increase fees, tolls, rates, and charges for the privilege of traveling on the highway without voter approval and without supervision or regulation by any other board, agency, bureau, commission, or official. *See* "HISTORICAL TOLL RATE AND REVENUES; HISTORICAL DEBT SERVICE COVERAGE – Historical Debt Service Coverage on Senior Bonds" for calculation of the Senior Bonds debt service coverage for the period from 2010 through 2019.

Before the beginning of each such Fiscal Year, the Authority is required to review the financial status of the E-470 Toll Road in order to estimate and determine whether Revenues for the current Fiscal Year and for the following Fiscal Year will be sufficient to comply with the covenant described above. In connection with the preparation of the annual budget for each Fiscal Year, the Authority is required to prepare and file with the Trustee and National a copy of its estimate of Revenues, Operating Expenses, Debt Service on the Outstanding Bonds, and any transfers of Revenues required to be made to any other Fund or Account under the Resolutions or under the documents securing Parity Obligations, together with a statement of the pertinent estimates and assumptions. If the Authority in adopting any annual budget determines that Revenues may be inadequate to meet such covenant, or if the audited financial reports regarding the E-470 Toll Road prepared by the Authority show that the Authority did not satisfy such covenant for the prior Fiscal Year, the Authority is required to engage a Toll Road Consultant within 60 days of such determination or the date such audit is final, subject to the rights of National to approve and/or nominate a Toll Road Consultant for such purpose as provided in the Master Resolution. Such Toll Road Consultant is required to conduct a study and, within 60 days of such engagement, recommend such actions as will provide sufficient Revenues in the following Fiscal Year to comply with the covenant described above and that will provide additional Revenues in such following Fiscal Year and later years to eliminate any deficiency at the earliest practicable time. A copy of such study and recommendations must be filed with the Trustee and National. The Authority is required to take such recommended action no later than 60 days after the receipt of such recommendations from the Toll Road Consultant.

Except as set forth below, failure to comply with the revenue covenant described above will not constitute an "Event of Default" under the Master Resolution if either (i) the Authority complies with the revenue covenant described in the immediately preceding paragraph or (ii) the Toll Road Consultant provides a written opinion to the Trustee and National that any action which will comply with such requirements is impracticable at that time. For purposes of the preceding sentence, "impracticable" means (A) such action would not result in compliance with the revenue covenant described above, (B) the economic cost of taking such action exceeds the economic benefit resulting from such action, or (C) the Authority does not have sufficient available funds to pay the cost of taking such action. Notwithstanding the foregoing, if the failure to comply with the revenue covenant described above continues for a period of 36 consecutive months, such failure will constitute an Event of Default under the Master Resolution regardless of whether an event described in clause (i) or (ii) of the first sentence of this paragraph has occurred.

Flow of Funds; Fund Balances

Except as otherwise provided in the Resolutions, all Revenues must be delivered to the Trustee upon receipt by the Authority, and must be deposited by the Trustee in the Revenue Fund, and amounts in the Revenue Fund are to be used for the purposes and in the order of priority generally described in the following chart. More detailed information regarding the flow of funds under the Resolutions is set forth in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto. Any conflict between the chart below and the form of the Resolutions in **Appendix A** hereto shall be governed by the form of the Resolutions in **Appendix A** hereto.

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R E V E N U E S[1]

↓

REVENUE FUND

↓

O P E R A T I N G   E X P E N S E S

↓

Senior Bonds Debt Service Account

↓

REBATE FUND

↓

Senior Bonds Debt Service Reserve Account

↓

First Tier Subordinate Bonds Debt Service Account

↓

First Tier Subordinate Bonds Debt Service Reserve Account

↓

Second Tier Subordinate Bonds Debt Service Account

↓

Third Tier Subordinate Bonds Debt Service Account

↓

OPERATING RESERVE FUND

↓

Other Subordinate Debt

↓

SURPLUS FUND

(1) Includes all amounts derived from ownership or operation of the E-470 Toll Road. *See* "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Pledge of Trust Estate – Revenues."

Whenever the amount on deposit in the Operating Reserve Fund is in excess of the Operating Reserve Fund Requirement, the Master Resolution provides that the excess on deposit in such Account or Fund shall be transferred to the Revenue Fund and applied as described in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto. Whenever the amount on deposit in the Senior Bonds Debt Service Reserve Account is in excess of the Senior Bonds Debt Service Reserve Account Requirement and the other conditions described below in subparagraph (b) of the second paragraph under the caption "Investment of Funds" have been complied with, the Resolutions provide that the excess on deposit in such Account shall be transferred to the Revenue Fund and applied as described in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto.

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The balances in the following Authority Funds were as follows:

	Balances (December 31, 2019)	Balances (April 30, 2020)
Revenue Fund (Included Retained Balance)	$ 18,508,765	$ 10,512,564
Senior Bonds Debt Service Account	40,766,684	83,550,254
Senior Bonds Debt Service Reserve Account [1]	120,565,193	122,499,036
Operating Reserve Fund	10,762,138	11,046,784
General Surplus Account:		
Senior Bonds Defeasance Subaccount[2]	137,046,772	122,038,860 [2]
Capital Improvement Subaccount	212,591,179	226,027,138
Rainy Day Reserve Subaccount	25,115,902	25,769,257
Total	$565,356,633	$601,443,893

(1) Includes value of the $25 million reserve fund surety bond. *See* "Senior Bonds Debt Service Reserve Account" under this caption.

(2) $50 million will be transferred from this Subaccount and applied in connection with issuance of the Series 2020A Bonds as described in "PLAN OF FINANCE." *See* also "– Surplus Fund – Use of General Surplus Account" under this caption.

Source: E-470 Public Highway Authority

Senior Bonds Debt Service Reserve Account

Pursuant to the Resolutions, a Senior Bonds Debt Service Reserve Account within the Debt Service Reserve Fund was established solely for the benefit of the holders of the Senior Bonds, in an amount (the "**Senior Bonds Debt Service Reserve Account Requirement**") equal to the lesser of (i) the maximum Aggregate Debt Service payable during any Fiscal Year on all Senior Bonds or (ii) the maximum amount of sale proceeds of the Senior Bonds (as defined in the United States Treasury Regulations) that may be deposited in the Senior Bonds Debt Service Reserve Account without adversely affecting the exemption from federal income taxation of interest on the Senior Bonds, provided that, pursuant to the Resolutions, the Senior Bonds Debt Service Reserve Account Requirement will not be recalculated on the date the Series 2020A Bonds are originally issued and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the Series 2020A Bonds (which, pursuant to similar provisos made in connection with the issuance of the Series 2004 Bonds, the Series 2006B Bonds, the Series 2010 Bonds, the Series 2015A Bonds, the Series 2017B Bonds and the Series 2019A Bonds equals the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of each such series of Bonds) shall be the Senior Bonds Debt Service Reserve Account Requirement until any additional Senior Bonds are issued. On December 31, 2019, the Senior Bonds Debt Service Reserve Account Requirement was $118,033,648, which amount has been funded from moneys on deposit in the Senior Bonds Debt Service Reserve Account together with amounts available under a $25 million reserve fund surety bond provided by National. Amounts on deposit in the Senior Bonds Debt Service Reserve Account will be applied solely for the purpose of paying the principal, Maturity Value, and Redemption Price of and interest on the Senior Bonds (which include the Series 2020A Bonds) in the event amounts on deposit in the Senior Bonds Debt Service Account of the Debt Service Fund are insufficient to make such payments. *See* "FORM OF THE RESOLUTIONS – Other Transfers to Debt Service Fund" in **Appendix A** hereto and "Other Transfers to Debt Service Fund" under this caption.

If the amount on deposit in the Senior Bonds Debt Service Reserve Account is less than the Senior Bonds Debt Service Reserve Account Requirement, then, subject to the priorities described in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and under "Flow of Funds;

Fund Balances" under this caption on or before the last day of each month there will be transferred from the Revenue Fund into the Senior Bonds Debt Service Reserve Account an amount equal to 1/12 of the Senior Bonds Debt Service Reserve Account Requirement or the amount needed to attain the Senior Bonds Debt Service Reserve Account Requirement, whichever is lesser, which transfers will continue until the Senior Bonds Debt Service Reserve Account contains the Senior Bonds Debt Service Reserve Account Requirement. Notwithstanding the foregoing, while the $25 million surety bond provided by National is in place, all the cash and Investment Securities on deposit in the Senior Bonds Debt Service Reserve Account are required to be spent before any drawing on such surety bond, and following a drawing on the surety bond, moneys transferred to the Senior Bonds Debt Service Reserve Account are required to be used, first, to reimburse National for amounts drawn under the surety bond and, second, to replenish the cash balance in the Senior Bonds Debt Service Reserve Account. *See* "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and "Flow of Funds; Fund Balances" under this caption.

The Resolutions provide that the Trustee, at the written direction of the Authority at any time, with the written consent of National (which consent may be given or withheld at the sole discretion of National), shall substitute for the cash deposit in the Debt Service Reserve Fund or any Account or Subaccount thereof a letter of credit, surety bond, insurance policy, agreement guaranteeing payment, or other undertaking by a financial institution to insure that cash in the amount otherwise required to be maintained therein will be available to the Trustee as needed, provided that the Trustee receives evidence satisfactory to the Trustee from each Rating Agency that such substitution will not, by itself, result in a withdrawal of or reduction in its rating of any Bonds. Upon any such substitution, the cash deposit in such Fund, Account, or Subaccount must be transferred to the Senior Bonds Redemption Account of the Debt Service Fund, the Construction Fund or the Revenue Fund, as directed by the Authority.

Because the Debt Service Reserve Fund is established for the benefit of all Senior Bonds, amounts on deposit therein are subject to certain restrictions imposed thereon under the Master Resolution. These include, for example, certain restrictions on investments of moneys on deposit therein described under "Investment of Funds" under this caption, and certain requirements that National consent to substitution of a credit facility for cash in the Debt Service Reserve Fund, as described in the preceding paragraph.

Surplus Fund

General. The Surplus Fund, as well as the General Surplus Account and the Termination Payment Account within the Surplus Fund, are established under the provisions of the Master Resolution. On December 31, 2019 and April 30, 2020, the General Surplus Account contained approximately $374,753,853 and $373,835,255, respectively. For administrative purposes the Authority currently maintains three subaccounts in the General Surplus Account: the Senior Bonds Defeasance Subaccount, the Capital Improvement Subaccount, and the Rainy Day Reserve Subaccount. On December 31, 2019, such subaccounts contained approximately $137,046,772, $212,591,179, and $25,115,902, respectively. On April 30, 2020, such subaccounts contained approximately $122,038,860, $226,027,138, and $25,769,257, respectively.

The Authority utilizes the Senior Bonds Defeasance Subaccount for future debt call opportunities to manage the overall debt profile, and is planning to have $50 million applied in connection with issuance of the Series 2020A Bonds as described in "PLAN OF FINANCE." The Authority utilizes the Capital Improvement Subaccount for funding of the capital and renewal and replacement program, and expects to use such amounts, together with funding from current and future year net revenues, to fund the full 2020 through 2021 planned capital budgets along with the entire five-year capital plan totaling approximately $380.3 million. *See* "THE AUTHORITY – Financial Information Concerning the

Authority – Capital Improvement Plan." The Rainy Day Reserve Subaccount is available for use if so determined by the Authority or if the Authority encounters an emergency or disaster where funds are needed quickly. On December 31, 2019, the Termination Payment Account contained $0. As set forth in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and above under "Flow of Funds; Fund Balances," any money in excess of the retained balance remaining in the Revenue Fund at the end of any month may, in the discretion of the Authority, be transferred to the Surplus Fund. The Revenue Fund retained balance is an amount equal to one-half of the aggregate amount required to be transferred from the Revenue Fund to the Senior Bonds Debt Service Account during such month (currently $4,725,000). If on any date there are not sufficient moneys in the Revenue Fund to make the transfers to the Debt Service Fund required by the Resolutions, such deficiency must be satisfied from various Funds and Accounts established under the Resolutions, including the Surplus Fund, as described in "Other Transfers to Debt Service Fund" under this caption. The Authority intends to use funds on deposit in Surplus Fund subaccounts for their intended purposes.

Moneys transferred to the Surplus Fund pursuant to the Resolutions and, except for any Termination Payment received by the Authority, any other moneys deposited in or transferred to the Surplus Fund shall be deposited in the General Surplus Account. Any Termination Payments received by the Authority shall be deposited directly to the Termination Payment Account.

Use of General Surplus Account. Moneys held in the General Surplus Account shall be transferred to the Debt Service Fund or one or more of the Accounts thereof to the extent described under "Other Transfers to Debt Service Fund" below and otherwise shall be distributed to, or to the order of, the Authority at the written request of an Authorized Authority Representative to be applied: (i) prior to the Completion Date, for the purpose of paying Costs of the Project relating to portions of the Project that have been constructed, are under construction, or are contiguous to portions of the Project that have been constructed or are under construction; and (ii) following the Completion Date: (A) for the redemption of Bonds, (B) as may be required by the Establishing Contract, and (C) for any other purpose now or hereafter authorized or permitted by law; provided, however, that no moneys shall be distributed from the General Surplus Account for any purpose described in clause (i) or (ii) if such distribution would reduce the balance in the General Surplus Account below $20,000,000 unless National has consented to such distribution in writing. Notwithstanding the foregoing (including, but not limited to, the proviso in the immediately preceding sentence), amounts on deposit in the General Surplus Account shall be used at any time (I) to pay any Termination Payments or Miscellaneous Swap Payments payable by the Authority, (II) to make any payments due and owing to MBIA or National, and (III) to make any payments required upon the execution and delivery of a Related Financial Transaction or any Credit Facility.

Certain funds from the Senior Bonds Defeasance Subaccount of the General Surplus Account in the amount of $50 million will be transferred and used as described in "PLAN OF FINANCE – Sources and Uses of Funds." In addition, due to the COVID-19 pandemic and its impacts on the region and nation, the Authority had transferred approximately $18.9 million to the Senior Bonds Debt Service Account to be applied towards debt service through April 30, 2020, resulting in a balance as of April 30, 2020 of $122,038,860, and transferred an additional $9.45 million for the month of May 2020. *See* "INVESTMENT CONSIDERATIONS – Impact of COVID-19 Pandemic." Following such transfers, the Authority has retained approximately $115.6 million within the Subaccount, and expects that approximately $65.6 million will remain in the Senior Bonds Defeasance Subaccount following the use of $50 million as described in "PLAN OF FINANCE – Sources and Uses of Funds." In addition, the Authority may transfer an approximate amount of $11.65 million from this Subaccount to the Senior Bonds Debt Service Account for debt service due on September 1, 2020. *See* footnote (4) to Table 11.

Use of Termination Payment Account. Moneys held in the Termination Payment Account shall be used to make any payments required to be made by the Authority upon the execution and delivery of a

Related Financial Transaction, unless National consents in writing to the release of such moneys from the Termination Payment Account. Moneys held in the Termination Payment Account shall be retained therein until National has consented in writing to the execution and delivery of the Related Financial Transaction or to the release of such moneys to the General Surplus Account as described herein. Any Termination Payments released from the Termination Payment Account and not used to make a payment upon the execution and delivery of a Related Financial Transaction shall be deposited to the General Surplus Account.

Authority's Right to Deposit Other Money. Nothing in the Resolutions shall prohibit the Authority from depositing directly into the Surplus Fund or any of the Accounts thereof moneys that, prior to such deposit, are not part of the Trust Estate.

Operating Reserve Fund

Under the provisions of the Master Resolution, the Operating Reserve Fund is established and is required to be funded over time with Revenues and then maintained in an amount equal to 1/6 of budgeted Operating Expenses, as determined by the Authority, for the current fiscal year (the "**Operating Reserve Fund Requirement**"). On December 31, 2019, $10,762,138 was on deposit in the Operating Reserve Fund, and as of such date the Operating Reserve Requirement was $10,451,117. On April 30, 2020, $11,046,784 was on deposit in the Operating Reserve Fund with no change to the requirement. If the Operating Reserve Fund contains less than the Operating Reserve Fund Requirement, then, subject to the priorities described in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and above under "Flow of Funds; Fund Balances," on or before the last day of each month there will be transferred from the Revenue Fund to the Operating Reserve Fund the amount needed to attain the Operating Reserve Fund Requirement. If on any date there are not sufficient moneys in the Revenue Fund to make the transfers to the Debt Service Fund required by the Master Resolution, such deficiency must be satisfied from moneys deposited in various of the Funds and Accounts established under the Resolutions, including the Operating Reserve Fund, as described in "FORM OF THE RESOLUTIONS – Other Transfers to Debt Service Fund" in **Appendix A** hereto and in "Other Transfers to Debt Service Fund" under this caption. Subject to such transfers to the Debt Service Fund, amounts on deposit in the Operating Reserve Fund are to be distributed to, or to the order of, the Authority at the written request of an Authorized Authority Representative to be applied to Operating Expenses not paid from other sources. *See* "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and "Flow of Funds; Fund Balances" under this caption.

Other Transfers to Debt Service Fund

Senior Bonds. Under the provisions of the Master Resolution, if on any date there are not sufficient moneys in the Revenue Fund to make the required deposits to the Senior Bonds Debt Service Account on such date, moneys are required to be transferred to the Senior Bonds Debt Service Account from the following Funds, Accounts, and Subaccounts, in the priority in which listed, in an amount which, together with the amount to be transferred thereto from the Revenue Fund on that date, will be sufficient to establish the balance required by the Master Resolution to be on deposit therein:

(a) From the Surplus Fund or any Account thereof (subject to the priorities set forth below under "Priorities Between Tiers of Bonds");

(b) From the Senior Bonds Debt Service Reserve Account;

(c) From the Project Account (subject to the priorities set forth below under "Priorities Between Tiers of Bonds"), which Account currently has a $0 balance and the Authority has no obligation to replenish this Account; and

(d) If an Event of Default with respect to the Senior Bonds has occurred and is continuing, from the Operating Reserve Fund (subject to the priorities set forth below under "Priorities Between Tiers of Bonds").

For a more complete description of other transfers to the Senior Bonds Debt Service Account, *see* "FORM OF THE RESOLUTIONS – Other Transfers to Debt Service Fund" in **Appendix A** hereto.

Subordinate Bonds. Under the provisions of the Master Resolution, if on any date there are not sufficient moneys in the Revenue Fund to make the required deposits, if any, to the First Tier Subordinate Bonds Debt Service Account, the Second Tier Subordinate Bonds Debt Service Account, or the Third Tier Subordinate Bonds Debt Service Account to pay the debt service requirements on any First Tier Subordinate Bonds, Second Tier Subordinate Bonds, and Third Tier Subordinate Bonds, respectively, moneys are required to be transferred to the applicable Debt Service Accounts from various Funds and Accounts as described in "FORM OF THE RESOLUTIONS – Other Transfers to Debt Service Fund" in **Appendix A** hereto. As described therein, subject to the priorities set forth in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and below under "Priorities Between Tiers of Bonds," and subject to certain other limitations set forth in the Master Resolution, the amounts on deposit in the General Surplus Account, the First Tier Subordinate Bond Debt Service Reserve Account (for First Tier Subordinate Bonds only), the Project Account, and, if an Event of Default has occurred and is continuing, the Operating Reserve Fund may be transferred to the applicable Subordinate Bond Debt Service Accounts if amounts in the Revenue Fund are not sufficient to make the required deposits. For a more complete description of other transfers to the Debt Service Accounts for Subordinate Bonds, *see* "FORM OF THE RESOLUTIONS – Other Transfers to Debt Service Fund" in **Appendix A** hereto.

Priorities Between Tiers of Bonds. If the amount to be transferred as described above under this caption to a Debt Service Account for more than one Tier of Bonds from any Fund, Account, or Subaccount other than the Project Account exceeds the balance then on deposit in the Fund, Account, or Subaccount from which moneys are to be transferred, the Master Resolution provides that the moneys available in such Fund, Account, or Subaccount shall be transferred to such Debt Service Accounts in the order in which such Debt Service Accounts are to be funded from moneys in the Revenue Fund as described in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and in "Flow of Funds; Fund Balances" under this caption. Any moneys transferred to a Debt Service Account for the First Tier Subordinate Bonds, the Second Tier Subordinate Bonds, or the Third Tier Subordinate Bonds from the Project Account as described above under this caption shall be transferred only to the extent of the proportionate share of the moneys on deposit in the Project Account on the first date on which moneys are transferred from the Project Account to the Debt Service Account for such Tier of Bonds that bears the same ratio to the total amount of moneys then on deposit in the Project Account on such date as the ratio of (i) the Outstanding principal amount on such date of such Tier of Bonds bears to (ii) the Outstanding principal amount on such date of all Bonds.

Investment of Funds

Moneys held in any Fund or Account to be held by the Trustee or any Depository shall be invested and reinvested by the Trustee as promptly as practicable, in accordance with a Letter of Instructions, except that moneys drawn on the Bond Insurance Policy shall not be invested, and moneys in any Funds or Account held by the Authority shall be invested and reinvested by the Authority, in each case to the fullest extent practicable and permitted by the laws of the State, in Investment Securities;

provided, however, that moneys held in the Senior Bonds Debt Service Reserve Account shall only be invested in (A) Defeasance Investment Securities, (B) Investment Securities held in the Senior Bonds Debt Service Reserve Account established under the 1986 Bond Documents, as of the date of issuance of the Series 1997 Bonds, and (C) other Investment Securities approved by National in writing. Except as described below in the last paragraph under this caption "Investment of Funds," Investment Securities in all Funds and Accounts shall mature, or the principal of and accrued interest on such Investment Securities shall be available for withdrawal without penalty, not later than such times as shall be necessary to provide moneys when needed for payment to be made from such Funds and Accounts; provided, however, that (i) in the case of the Senior Bonds Debt Service Reserve Account, if the Net Revenues are not in the amount necessary to satisfy the Authority's revenue covenant (*see* "Revenue Covenant" under this caption and "FORM OF THE RESOLUTIONS – Particular Covenants of the Authority – Revenue Covenant" in **Appendix A** hereto) at any time after September 1, 2001, until such time as the Net Revenues satisfy such covenant, the Investment Securities therein shall be limited to: (1) Defeasance Investment Securities that mature, or the principal of and accrued interest on such Investment Securities shall be available for withdrawal without penalty, within two years of the date of deposit therein; (2) Investment Securities held in the Senior Bonds Debt Service Reserve Account established under the 1986 Bond Documents as of the date of issuance of the Series 1997 Bonds; and (3) Investment Securities approved by National in writing; and (ii) in the case of the First Tier Subordinate Bonds Debt Service Reserve Account, no less than 20% of the Amortized Value of the Investment Securities therein must at all times mature, or the principal of and accrued interest on such Investment Securities must be available for withdrawal without penalty, within three years of the date of deposit therein.

Except as otherwise described in this paragraph or provided in the Resolutions, interest earned or profits realized from investing any moneys deposited in the Funds and Accounts or any Subaccounts thereof will be transferred to the Revenue Fund and applied as described in "FORM OF THE RESOLUTIONS – Flow of Funds" in **Appendix A** hereto and as summarized in "Flow of Funds; Fund Balances" under this caption. Notwithstanding the foregoing:

(a) interest and profits from the Rebate Fund, the Project Account, the Capitalized Interest Account, and any Account or Subaccount of any of such Funds, Accounts, or Subaccounts shall be retained in such Fund, Account, or Subaccount;

(b) interest and profits from the Senior Bonds Debt Service Reserve Account shall be applied as follows: (i) regardless of when such interest and profits are received, such interest and profits shall be retained in the Senior Bonds Debt Service Reserve Account if and to the extent the amount on deposit in the Senior Bonds Debt Service Reserve Account is not equal to the Senior Bonds Debt Service Reserve Account Requirement, and (ii) to the extent such interest and profits are not required to be applied pursuant to clause (i), any interest and profits received after September 1, 2001, (A) shall be retained in the Senior Bonds Debt Service Reserve Account if the Net Revenues are not in the amount required by the revenue covenant as described in "– Revenue Covenant" under this caption and (B) to the extent not required to be applied pursuant to clause (A), shall be transferred to the Revenue Fund; and

(c) interest and profits from the Operating Reserve Fund shall be retained therein to the extent required to attain the Operating Reserve Fund Requirement.

Investment Securities acquired as an investment of moneys in any Fund or Account created under the provisions of the Master Resolution shall be and remain a part of such Fund or Account except to the extent that, following the transfer or withdrawal of such security or an interest therein or the transfer or withdrawal of the proceeds from the liquidation of such security or an interest therein out of such Fund or

Account, the amount remaining on deposit in such Fund or Account is equal to or in excess of the amount required to be on deposit therein under the Master Resolution. In computing the amount in the Operating Reserve Fund, Investment Securities shall be valued on the date of deposit therein and not less than every six months thereafter at their Amortized Value plus accrued interest; provided that time deposits shall be valued at cost plus accrued interest. Investment Securities held in the Senior Bonds Debt Service Reserve Account must mature within five years of the date of deposit therein unless a longer maturity is approved by National in writing. In computing the amount in the Debt Service Reserve Fund, Investment Securities must be valued at Fair Market Value on the date of deposit therein and not less than once each year thereafter. Except as otherwise provided in the Resolutions, the Trustee shall sell, or present for redemption, any Investment Security so purchased as an investment whenever it shall be requested in writing by an Authorized Authority Representative to do so or whenever it shall be necessary in order to provide moneys to meet any payment or transfer from any Fund or Account held by it. The Trustee shall not be liable or responsible for any loss resulting from any such investment.

Issuance of Additional Bonds

No bonds in addition to the Bonds may be issued under the Resolutions unless the following requirements are satisfied. Certain additional requirements for the issuance of Bonds are described in "FORM OF THE RESOLUTIONS – Provisions For Issuance of Bonds" in **Appendix A** hereto.

(a) For all additional Series of Bonds not including certain completion bonds as described in further detail in **Appendix A** hereto and certain Refunding Bonds described in paragraph (b) below, the conditions set forth in the following subparagraphs of this paragraph (a) must be met; provided that none of such conditions need be met if the written consent of National is obtained for the issuance of such additional Series of Bonds:

(i) A certificate or report of a Toll Road Consultant to the effect that for each 12-month period beginning on the first day of the first calendar month following the date of issuance of the Series of Bonds to be issued, Net Revenues (based upon such assumptions as shall be set forth in such certificate or report and subject to the adjustment provided in this paragraph) are estimated to be in an amount not less than (A) if the Series of Bonds to be issued is Senior Bonds, 1.30 times the Aggregate Debt Service for each such 12-month period, and (B) if the Series of Bonds to be issued is First, Second, or Third Tier Subordinate Bonds (or bonds or other obligations subordinate thereto), 1.20 times the Aggregate Debt Service for each such 12-month period. For purposes of this subparagraph, (w) Aggregate Debt Service for each such 12-month period shall not include Aggregate Debt Service due during such 12-month period on any Bonds that are Subordinate to the Series of Bonds to be issued; (x) Aggregate Debt Service for each such 12-month period shall include Aggregate Debt Service due during such 12-month period on the Series of Bonds to be issued and Aggregate Debt Service due during such 12-month period on any Series of Bonds, other than Bonds that are Subordinate to the Series of Bonds to be issued, that, in the opinion of the Toll Road Consultant, will have to be issued in order to complete the Applicable Portion of the Project defined in the Supplemental Resolution authorizing the Series of Bonds to be issued; and (y) Aggregate Debt Service and Net Revenues for each such 12-month period shall include the interest due during such 12-month period on the Series of Bonds to be issued and all Outstanding Bonds that are not Bonds that are Subordinate to the Series of Bonds to be issued to the extent such interest is to be paid from proceeds of Bonds or other funds held or to be held in the Capitalized Interest Account of the Construction Fund and investment earnings on such proceeds and other funds; and

(ii) A certificate satisfactory to National of an Authorized Authority Representative dated as of the date of issuance of such additional Series of Bonds, stating that portions of the E-470 Toll Road between Parker Road and 120th Avenue are open and operating and toll revenues have been collected from persons traveling on such E-470 Toll Road for at least 12 calendar months, provided that this clause (ii) will not apply when there are no Senior Bonds Outstanding that are insured by National; and

(iii) A certificate of an Authorized Authority Representative dated as of the date of issuance of such additional Series of Bonds, stating that there exists no Event of Default under the Master Resolution; and

(iv) The Trustee and National shall have received written evidence (or other evidence satisfactory to the Trustee and National) from each Rating Agency that the issuance of such additional Series of Bonds will not, by itself, result in a withdrawal of or reduction of its rating of any Bonds or Parity Obligations; and

(b) Without regard to the limitations described in subparagraphs (a) (i), (ii) and (iii) above, but subject to satisfaction of subparagraph (a) (iv) above and the rights of National as established by the Resolutions (*see* "FORM OF RESOLUTIONS – Certain Rights of National" in **Appendix A** hereto), (1) for any Refunding Bonds that are Senior Bonds and that are issued to refund Senior Bonds, (A) a Toll Road Consultant's certificate or opinion that the revenue covenant described in "Revenue Covenant" above under this caption will be met through the final maturity date of such Refunding Bonds and (B) a certificate or opinion of a Consultant with expertise in investment banking that the issuance of the Refunding Bonds and the defeasance of the Bonds refunded by the Refunding Bonds will result in present value savings, provided that none of the conditions of this paragraph (b) need be met if the written consent of National is obtained for the issuance of such Refunding Bonds; and (2) for any Refunding Bonds that are not Senior Bonds, a Toll Road Consultant's certificate or opinion that the revenue covenant described in "Revenue Covenant" above under this caption will be met through the final maturity date of such Refunding Bonds, provided that none of the conditions of this paragraph (b) need be met if the written consent of National is obtained for the issuance of such Refunding Bonds; and

(c) For all Series of Senior Bonds that are not permitted by (b) above, the written consent of National is obtained, which National may give or withhold in its sole discretion.

Parity Obligations and Subordinate Obligations

The Authority reserves the right to issue or incur Parity Obligations and to pledge the Revenues to the payment of such Parity Obligations on a parity with the pledge of the Revenues to payment of any Bonds issued under the Resolutions; but only if all the following conditions are met: (a) all conditions to the issuance of the additional Bonds described under "Issuance of Additional Bonds" above are met with respect to such Parity Obligations (determined for such purpose as if such Parity Obligations were Bonds); (b) such Parity Obligations shall have no right to, or lien on, (i) any moneys or investments held in any Fund, Account, or Subaccount other than the Revenue Fund or (ii) any other portion of the Trust Estate other than the Revenues; (c) the Parity Obligation Instrument under which such Parity Obligations are issued incorporates the provisions of, and appoints the Trustee as trustee for the owners of such Parity Obligations for purposes of enforcing the provisions of, the Resolutions relating to defaults and remedies; and (d) following the issuance of such Parity Obligations, such Parity Obligations shall be treated as Bonds and debt service on such Parity Obligations shall be treated as Debt Service on Bonds for purposes of the Resolutions, including, but not limited to, the provisions relating to the issuance of additional Bonds and the revenue covenants described in "Toll Revenue – Revenue Covenant" under this caption.

The Authority has reserved the right under the Master Resolution to issue Subordinate Lien Obligations with a pledge of the Revenues subordinate to those of the Senior Bonds (including the Series 2020A Bonds). However, the Authority has no current plans to issue any such Subordinate Lien Obligations.

Special Project Bonds

Notwithstanding any other provisions of the Resolutions, the Authority reserves the right to issue, pursuant to any instrument, revenue bonds which are secured by liens on and pledges of revenues and proceeds derived from any Special Project and are not Authority Bonds or Parity Obligations. In order for a project to be a Special Project, (a) the Special Project must not include any portion of the limited access highway between I-25 South and I-25 North, including the interchanges at I-25 South and I-25 North, or any property related thereto, except that the Special Project may be located on or in the right-of-way for the E-470 Toll Road so long as the Special Project will not, in the opinion of a Toll Road Consultant, materially adversely affect the operation of the highway or materially reduce the amount of Net Revenues that would be received in the absence of the Special Project, (b) the Authority must declare in writing that it is a Special Project and is not to be part of the E-470 Toll Road project, and (c) the costs of construction, acquisition, improvement, operation, and maintenance of such Special Project must be paid directly from, or from the proceeds of a financing transaction under which the amounts payable by the Authority are payable from, (i) sources that are not included in Revenues or (ii) moneys in the General Surplus Account. A Special Project shall not be deemed to be a part of the E-470 Toll Road project and the revenues from a Special Project shall not be included in Revenues. The Authority has no current plans to issue any Special Project Bonds.

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DEBT SERVICE REQUIREMENTS

Debt Service for Series 2020A Bonds

The following schedule shows, for each 12-month period commencing on January 1 of any calendar year and ending on December 31 of such calendar year ("**Fiscal Year**"), the estimated total debt service (excluding any optional prior redemptions) payable for the Series 2020A Bonds through their respective final maturity dates.

TABLE 2

Series 2020A Bonds Debt Service

Fiscal Year	Principal[1]	Interest[2]	Total Series 2020A Debt Service Requirements[3]
2021	$ --	$ 10,065,446	$ 10,065,446
2022	--	8,368,500	8,368,500
2023	1,500,000	8,368,500	9,868,500
2024	4,245,000	8,293,500	12,538,500
2025	2,685,000	8,081,250	10,766,250
2026	27,210,000	7,947,000	35,157,000
2027	16,280,000	6,586,500	22,866,500
2028	17,095,000	5,772,500	22,867,500
2029	--	4,917,750	4,917,750
2030	--	4,917,750	4,917,750
2031	--	4,917,750	4,917,750
2032	--	4,917,750	4,917,750
2033	--	4,917,750	4,917,750
2034	17,950,000	4,917,750	22,867,750
2035	11,080,000	4,020,250	15,100,250
2036	19,325,000	3,466,250	22,791,250
2037	--	2,500,000	2,500,000
2038	--	2,500,000	2,500,000
2039	--	2,500,000	2,500,000
2040	50,000,000	2,500,000	52,500,000
Total	**$167,370,000**	**$110,476,196**	**$277,846,196**

(1) Payable September 1.
(2) Payable September 1 and March 1, commencing March 1, 2021.
(3) Numbers may not add due to rounding.
Source: Municipal Advisor

Combined Debt Service

The following schedule shows the Authority's estimated total combined debt service requirements for the Outstanding Senior Bonds and the Series 2020A Bonds to be paid through their respective maturity dates.

TABLE 3

Combined Debt Service for
Outstanding Senior Bonds and Series 2020A Bonds

	Outstanding Senior Bonds[1]		Series 2020A Bonds		
Fiscal Year	**Principal**	**Interest[2]**	**Principal**	**Interest**	**Total Senior Bonds Debt Service[2][3]**
2020	$ 43,919,572	$ 67,112,047	$ --	$ --	$ 111,031,619
2021	22,395,161	66,553,267	--	10,065,446	99,013,874
2022	21,458,800	69,683,919	--	8,368,500	99,511,219
2023	20,658,483	72,179,236	1,500,000	8,368,500	102,706,219
2024	19,788,386	74,851,476	4,245,000	8,293,500	107,178,363
2025	19,047,864	77,394,855	2,685,000	8,081,250	107,208,969
2026	29,795,144	42,255,346	27,210,000	7,947,000	107,207,490
2027	23,771,402	60,567,237	16,280,000	6,586,500	107,205,139
2028	22,243,683	62,096,934	17,095,000	5,772,500	107,208,117
2029	16,916,870	93,196,769	--	4,917,750	115,031,389
2030	15,807,140	94,306,499	--	4,917,750	115,031,389
2031	14,718,250	95,395,389	--	4,917,750	115,031,389
2032	13,826,298	96,289,319	--	4,917,750	115,033,367
2033	12,988,530	97,125,109	--	4,917,750	115,031,389
2034	15,842,634	68,496,005	17,950,000	4,917,750	107,206,389
2035	18,773,925	73,329,714	11,080,000	4,020,250	107,203,889
2036	14,626,905	69,788,712	19,325,000	3,466,250	107,206,867
2037	48,451,019	75,155,681	--	2,500,000	126,106,700
2038	58,064,521	67,051,291	--	2,500,000	127,615,812
2039	59,046,609	65,663,524	--	2,500,000	127,210,132
2040	6,472,167	45,912,833	50,000,000	2,500,000	104,885,000
2041	6,034,228	46,350,772	--	--	52,385,000
Total	**$524,647,591**	**$1,580,755,932**	**$167,370,000**	**$110,476,196**	**$2,383,249,719**

(1) Excludes debt service on the Refunded Bonds which are being refunded with the proceeds of the Series 2020A Bonds, except for the payments made prior to the closing date of June 18, 2020. *See* "PLAN OF FINANCE."
(2) Includes compounded interest to maturity on Capital Appreciation Bonds. Interest payments include related swap payments and receipts. The interest rate after the initial term rate period for the Series 2017B Bonds and the Series 2019A Bonds is assumed to be 5%.
(3) Numbers may not total due to rounding.
Source: Municipal Advisor

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HISTORICAL TOLL RATES AND REVENUES; HISTORICAL DEBT SERVICE COVERAGE

Historical and Current Toll Rates

The following table summarizes the historical and current passenger car (classified as two axle vehicles) toll rates from fiscal years 2010 through 2020. The footnotes below and the May 2020 Comprehensive Traffic & Revenue Study attached as **Appendix C** hereto discuss passenger and commercial vehicle toll rates.

TABLE 4

Historical and Current Passenger Car Toll Rates

Fiscal	License Plate Toll Customers		ExpressToll Customers	
Year	Interchange Toll	Barrier Toll(1)	Interchange Toll	Barrier Toll(1)
2010	$1.00	$2.25/2.50	$0.90	$2.00
2011	1.20	2.70/3.00	0.95	2.15/2.40
2012	1.25	2.80/3.15	1.00	2.25/2.50
2013	1.30	2.95/3.25	1.05	2.35/2.60
2014	1.40	3.05/3.40	1.10	2.45/2.70
2015	1.45	3.15/3.45	1.15	2.50/2.75
2016	1.50	3.25/3.55	1.20	2.60/2.85
2017	1.55	3.40/3.70	1.25	2.70/2.95
2018	1.95	4.15/4.50	1.25	2.70/2.95
2019	2.05	4.30/4.65	1.25	2.70/2.95
2020(2)	2.05	4.30/4.65	1.25	2.70/2.95

(1) The 1st barrier toll listed is for Toll Plaza A from fiscal years 2010-2017 and for Toll Plazas A and C for fiscal years 2018 through 2020. Multiple axle vehicles are charged an additional toll rate as shown in the 2nd barrier toll listed above for each axle over two axles.

(2) 2020 toll rates provided are for two-axle vehicles only. For multi-axle vehicles classified as three+ axles, the ExpressToll rates are $4.10 at Toll Plazas A and C and $4.50 at Toll Plazas B, D, and E for three axles, and $2.05 at Toll Plazas A and C and $2.25 at Toll Plazas B, D, and E for each additional axle from the hours of 9:00 a.m. to 12:00 p.m. daily. Between the hours of 12:00 p.m. to 9:00 a.m., a three-axle vehicle ExpressToll rate is $5.15 at Toll Plazas A and C and $5.60 at Toll Plazas B, D, and E, and $2.60 at Toll Plazas A and C and $2.80 at Toll Plazas B, D, and E for each additional axle thereafter. LPT rates for multi-axle are charged an additional LPT toll rate as shown for each axle over two axles. The policy for ExpressToll multi-axle discounted rates from the base ExpressToll rate is for 2020 and 2021, and is not determined for beyond 2021 at this time. *See* the May 2020 Comprehensive Traffic & Revenue Study attached as **Appendix C** hereto.

Source: E-470 Public Highway Authority

For more detailed information about these historical passenger car toll rates, *see* **Appendix G** hereto.

Board Toll Rate Policy for 2018-2020

The Board approved and adopted Resolution 17-04, "Regarding the Adoption of a Toll Rate Increase" on November 9, 2017 to amend the Authority's future 2018 through 2020 toll rate structure. Resolution 17-04 made three key changes to the toll rates for this three year period including keeping ExpressToll rates frozen at the 2017 toll rate levels, decreasing toll rates for Toll Plaza C to match Toll Plaza A, and increasing the differential for LPT customers over the three year period. This action was reaffirmed for 2019 toll rates. On November 14, 2019, the Board approved and adopted Resolution 19-03, "Regarding the Adoption of a Toll Rate Schedule," to adjust and restructure the toll rates for 2020 for commercial vehicles and LPT customers. For commercial vehicles classified as three+ axles, which represents approximately 4% of total transactions on the E-470 Toll Road, the Authority enacted a two-year pilot program to encourage commercial vehicles to use the roadway during non-peak hours between 9:00 a.m. and 12:00 p.m. daily with an approximate 25% discount from the ExpressToll base rate for each additional axle, and provided an overall reduction for multi-axle vehicles of 5% from the ExpressToll base rate for each additional axle during the hours of 12:00 p.m. to 9:00 a.m. daily. The Board also approved a freeze of the LPT toll rates to remain at the 2019 level.

For a discussion of the toll rate policy adopted on May 14, 2020 for rates through 2021, *see* "PROJECTED TOLL RATES AND REVENUES; PROJECTED COVERAGE – Future Board Toll Rate Policy."

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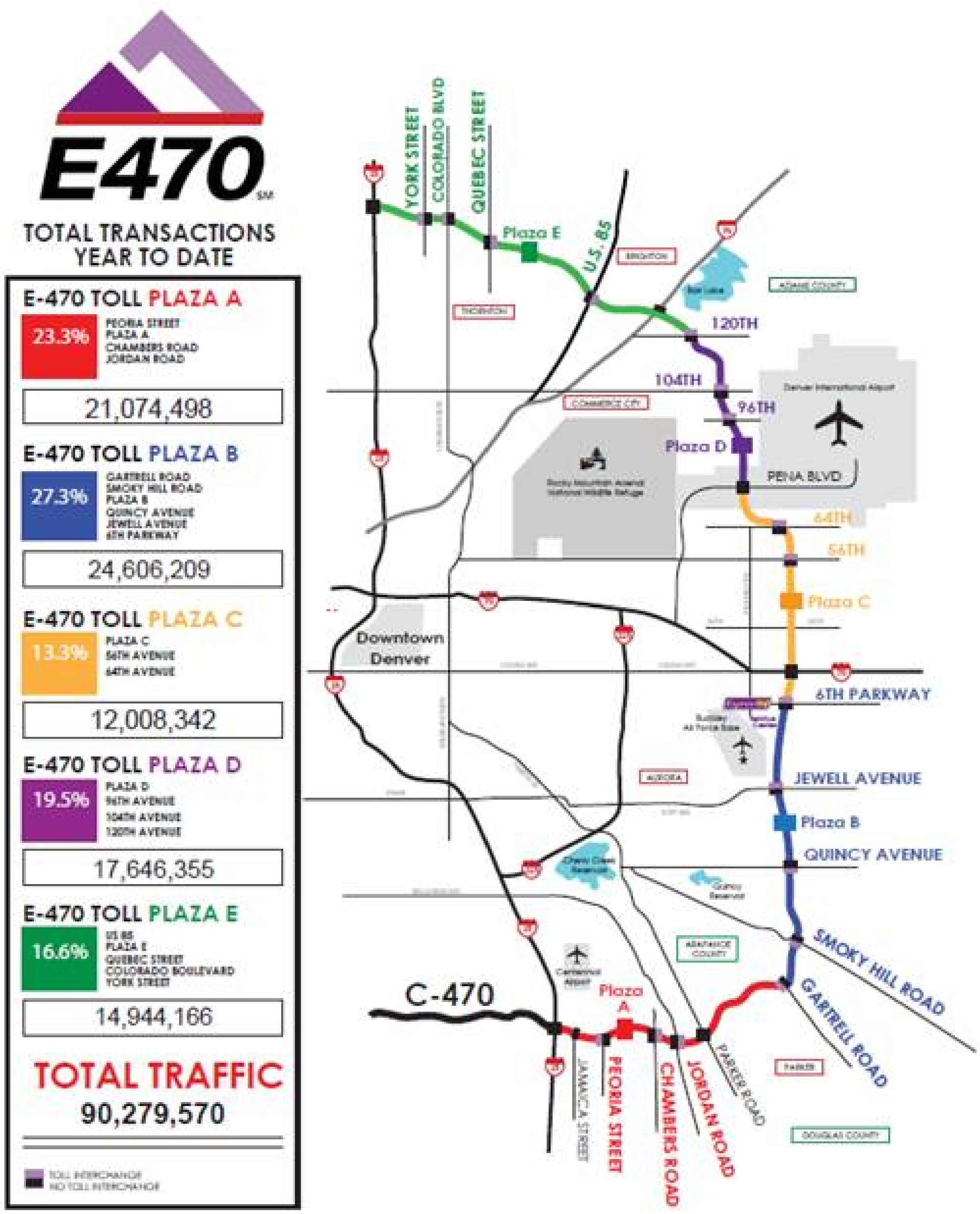
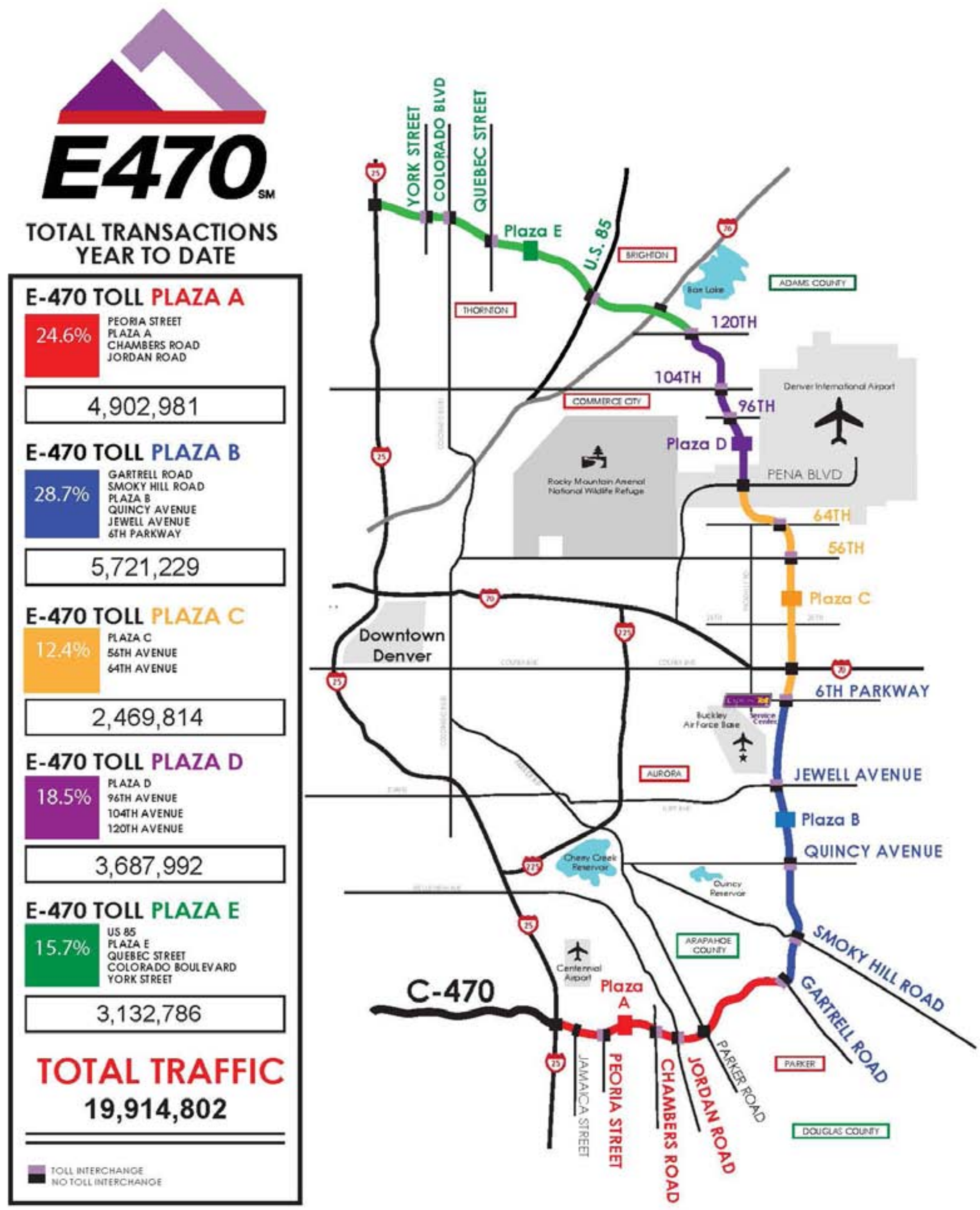
2019 Transactions by Location

The below illustration provides the transactional activity along the E-470 Toll Road for fiscal year 2019. Approximately 50.6% of the transaction volume occurs south of I-70 at this time, but there has been 5.5% growth in transactions on the E-470 Toll Road north of I-70 compared to 1.3% transaction growth on the southern end of the roadway.



2020 Transactions by Location

The below illustration provides the transactional activity along the E-470 Toll Road for the first four months of 2020. Approximately 53.3% of the transaction volume occurs south of I-70 at this time, but there has been 26.7% decrease in transactions on the E-470 Toll Road north of I-70 compared to 24.0% transaction decrease on the southern end of the roadway as compared to the first four months of 2019. *See* " – 2020 Toll Transactions" under this caption.



2020 Toll Transactions

The Authority has been closely tracking traffic volume on the E-470 Toll Road as a result of the recent coronavirus (COVID-19) developments. Below are tables summarizing toll transactions 2020 year to date in comparison to such transactions in 2019, as well as March, April and May toll transactions to date in comparison to March, April and May transactions in 2019.

TABLE 5

E-470 Toll Transactions

Week Period	2020 Toll Transactions (Sunday-Saturday)	Percent Change from Prior Entire Week Period in 2020	Percent Change from Same Period in 2019	Cumulative Change Year to Date 2020 versus 2019 as of Ending Period
March 1 to 7	1,585,278	2.2%	2.9%	3.7%
March 8 to 14	1,453,901	(8.3)%	5.6%	3.9%
March 15 to 21	827,061	(43.1)%	(51.5)%	(1.7)%
March 22 to 28	590,518	(28.6)%	(64.7)%	(7.3)%
March 29 to 31*	209,272	N/A	N/A	(8.9)%
March Totals	**4,666,030**	**N/A**	**(32.1)%**	**(8.9)%**
April 1 to 4**	293,029	(14.9)%	(69.3)%	(12.3)%
April 5 to 11	534,104	6.3%	(66.5)%	(16.2)%
April 12 to 18	454,980	(14.8)%	(73.7)%	(20.4)%
April 19 to 25	562,848	23.7%	(68.0)%	(23.7)%
April 26 to 30*	458,917	N/A	N/A	(25.3)%
April Totals	**2,303,878**	**N/A**	**(68.5)%**	**(25.3)%**
May 1 to 2**	190,007	15.3%	(62.5)%	(26.1)%
May 3 to 9	727,058	12.0%	(58.7)%	(28.1)%
May 10 to 16	779,083	7.2%	(58.4)%	(29.9)%
May 17 to 23	872,125	11.9%	(53.5)%	(31.3)%
May 24 to 30	858,673	(1.5)%	(50.9)%	(32.3)%
May 31*	94,020	N/A	N/A	(32.6)%
May Totals	**3,520,966**	**N/A**	**(56.7)%**	**(32.6)%**

* Partial week shown; percent for change shown in the last section of the week ending row.
** Percentage shown is for the entire week (Sunday to Saturday) – March 29-April 4 total transactions were 502,301, and April 26-May 2 total transactions were 648,924.
Source: E-470 Public Highway Authority

Historical Net Toll Revenue

General. Highway tolls are the predominant source of revenue available to pay debt service on the Senior Bonds. The Authority's 2020 Budget contemplates that 93% of its revenues will be derived from collections of tolls and certain enforcement and adjudication fees. Toll revenues from two-axle passenger vehicles represent approximately 96% of total net toll revenues. *See* "THE AUTHORITY."

The following table sets forth the Authority's historical toll transactions and net toll revenues for fiscal years 2010 through 2019 and budgeted for 2020:

TABLE 6

Historical Toll Transactions and Net Toll Revenue

Fiscal Year	Toll Transactions	Percent Increase	Net Toll Revenue[1]	Percent Increase
2010	51,297,941	6.9%	$ 99,001,315	3.5%
2011	52,080,386	1.5	111,362,630	12.5
2012	53,965,816	3.6	120,064,437	7.8
2013	58,402,732	8.2	133,739,697	11.4
2014	66,365,038	13.6	155,704,874	16.4
2015	74,609,047	12.4	179,568,340	15.3
2016	79,975,235	7.2	200,868,585	11.9
2017	83,175,170	4.0	223,272,562	11.2
2018	87,338,800	5.0	242,784,501	8.7
2019	90,279,570	3.4	260,147,431	7.2
2020 [2]	95,227,000	5.5	265,354,000	2.0

(1) Net toll revenue for purposes of this table includes earned toll revenue and other fees resulting from toll violations and is net of an allowance for uncollectible amounts. Derived from the audited financial statements of the Authority for the periods ended December 31, 2010 through December 31, 2019.

(2) Budgeted. Toll transactions for the period January 1, 2020 through April 30, 2020 were 19,914,802 as compared to 26,657,740 toll transactions recorded during the first four months of 2019, which represents a 25.3% decrease from 2019. Net toll revenues and other fees for the period January 1, 2020 through April 30, 2020 were $58,298,911 (unaudited) as compared to $78,261,493 net toll revenue and other fees collected during the first four months of 2019, which represents a 25.5% decrease from 2019.

Source: E-470 Public Highway Authority

2019 Traffic and Revenue. For the fiscal year ended December 31, 2019, transactions grew during the year compared to the same period in 2018 at a rate of 3.4% to 90.3 million transactions, and was at 97.8% of the 2019 budgeted projections. *See* **Appendix C**. Based upon information available to the Authority, for fiscal year 2019, rejected transactions represent 8.7% or $25.3 million of 2019 gross toll revenue, which improved from 2018 of approximately 9.4% or a value of $25.8 million. For billable tolls, the LPT and AVI unpaid (as described hereinafter) transactions represent 5.5% or $16.1 million of gross toll revenue, which compares to approximately 6.1% or $16.7 million in 2018. The Authority also collected approximately $11.1 million and $9.7 million in 2019 and 2018, respectively, in toll fees and fines from late-paying customers that are intended to offset collection costs and uncollectible amounts. Therefore, the total estimated uncollectible rate was equal to 1.7% and 2.5% of gross toll revenue for 2019 and 2018, respectively, with an estimated value of approximately $5.0 million and $7.0 million, respectively. The uncollectible rate has decreased due to technological improvements and efficiencies. The Authority expects the total estimated annual uncollectible rate to remain fairly consistent year over year with continual improvements in the future planned due to technology and process improvements, but those improvements cannot be estimated at this time. For unaudited traffic and revenue information for the period ended December 31, 2019, *see* the Dashboard Report posted on EMMA of the MSRB.

2020 Year to Date Traffic and Revenue. For the first four months of 2020 with the period ending April 30, 2020, transactions decreased by 25.3% as compared to the first four months of 2019. For the first five months of 2020 with the period ending May 31, 2020, transactions decreased by 32.6%

compared to the first five months of 2019. Before noticeable traffic impacts to the E-470 Toll Road, the Authority's year to date transactions through February were 3.8% above toll transaction levels when compared to the same period in 2019. However, due to the recent significant events caused by COVID-19, the Authority's toll transaction volume in March 2020 was down 32.1% when compared to March of 2019, down 68.5% in April 2020 when compared to April of 2019, down 56.7% in May 2020 when compared to May of 2019, and is 63.7% of forecasted 2020 transactions through May 31, 2020. *See* "INVESTMENT CONSIDERATIONS."

Other Revenues

Sources of other Authority revenues include investment income (unrestricted), tolling services transaction fees from other entities, cellular tower leases, permit fees, and other miscellaneous income. Such other revenues are expected to account for approximately 6.9% of budgeted revenues in 2020 with a total of $19,566,000 and accounted for 7.9% of actual revenues in 2019 with a total of $22,261,405. *See* "THE AUTHORITY – Financial Information Concerning the Authority – Budgetary Process; Budget Summaries" for the Authority's budget and actual comparisons for the fiscal year ending December 31, 2019. Other revenues as of December 31, 2019 and April 30, 2020 are as follows:

	As of December 31, 2019	2020 YTD Through April 30, 2020
Unrestricted Investment Income	$12,252,963	$3,909,094
Tolling Services Revenue	7,615,671	1,702,775
Cell Tower Leases	257,750	87,197
Permits and Fees	990,359	122,570
Other Miscellaneous Income	1,144,662	1,183,658
	$22,261,405	$7,005,294

Source: E-470 Public Highway Authority

The Authority also has entered into tolling services agreements and intergovernmental agreements with other entities as a service provider to process electronic toll collections. These agreements are with the Northwest Parkway, LLC, the High Performance Transportation Enterprise, a division of the Colorado Department of Transportation ("**HPTE**"), and Plenary Roads Denver LLC ("**Plenary**"), HPTE's concessionaire for the US 36 Express Lanes Project and the I-25 Central managed lanes. In November 2007, the Northwest Parkway Public Highway Authority ("**NPPHA**") entered into a concession and lease agreement ("**NPPHA Concession Agreement**") with Brisa/CCR – Brisa Auto-Estradas de Portugal SA/Companhia de Concessoes Rodoviarias ("**Brisa**"), pursuant to which Brisa was engaged as the Northwest Parkway, LLC to perform long-term operation and management for the Northwest Parkway toll road. Brisa sold its interest in the Northwest Parkway, LLC, and accordingly its interest in the NPPHA Concession Agreement to a consortium comprised of HICL Infrastructure Company, DIF Infrastructure IV and Northleaf Capital Partners. The Authority entered into a new tolling services agreement with the Northwest Parkway, LLC on January 1, 2020 with a term extending to January 1, 2030.

The Authority provides tolling services to HPTE and Plenary under the Concession TSA and the HPTE TSA described in "TRANSPORTATION NETWORK AND POTENTIAL COMPETITION" herein. In March 2014, HPTE transferred the long-term operations and maintenance of the I-25 Central managed lanes to Plenary as part of the US 36 Express Lanes Project. HPTE and Plenary opened the US 36 Express Lanes (Federal Boulevard to 88th Street) in 2015 and later opened the second phase of the US 36 Express Lanes (88th Street to Table Mesa Drive) in 2016. The Authority provides tolling services for both roadways (I-25 Central and US 36) under the Concession TSA and provides tolling services to HPTE for non-concessioned roads under the HPTE TSA. HPTE separately opened the I-70 Mountain Express Lanes toll facilities in 2015 as well as the I-25 North Segment 2 (US 36 to 120th Avenue) toll facilities in 2016. Both of these roadways as well as any future HPTE express/managed lanes are governed by the HPTE TSA, with a term through June 30, 2023. The Authority performs other toll-related services for HPTE and Plenary, which include the installation of toll equipment on their new facilities at specific locations and software development within the back office system which is part of the E-470 ExpressToll® System. HPTE is currently in the process of planning and constructing additional express/managed lanes (including the I-25 North Segment 3 Project and the C-470 Express Lanes Project and potentially for the I-70 Westbound Peak Period Shoulder Lane). These express/managed lanes are expected to be added to the HPTE TSA.

As of December 31, 2019 and 2018, the Authority received approximately $7.6 million and $7.1 million, respectively, as a reimbursement for processing electronic toll transactions and performing other toll-related services under these agreements. Through the first four months of 2020, the Authority received approximately $1.7 million as reimbursement for processing electronic toll transactions and performing other toll-related services under these agreements.

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Historical Debt Service Coverage on Senior Bonds

The following table sets forth the Authority's historical debt service coverage on Senior Bonds for fiscal years 2010 through 2019:

TABLE 7

Historical Debt Service Coverage on Senior Bonds

Fiscal Year	Total Revenue[(1)]	Operating Expenses [(1)]	Vehicle Registration Fee Bonds Aggregate Debt Service Due[(3)]	Net Revenue Available to Pay Debt Service	Total Senior Bonds Debt Service[(1)]	Senior Bonds Debt Service Coverage
2010	$116,342,777	$27,680,671	$ --	$ 88,662,106	$ 63,744,083	1.39x
2011	128,042,821	25,529,628	--	102,513,193	65,099,797	1.57x
2012	136,530,008	27,685,622	--	108,844,386	74,737,478	1.46x
2013	151,322,785	30,606,102	--	120,716,683	81,657,745	1.48x
2014	175,569,001	32,976,647	--	142,592,354	83,630,014	1.71x
2015	200,036,176	37,925,250	--	162,110,926	91,119,525	1.78x
2016	227,784,390	42,334,906	--	185,449,484	97,231,865	1.91x
2017	249,565,793[(2)]	46,165,326	1,066,228	202,334,239	95,246,810	2.12x
2018	266,108,940[(2)]	49,809,319	1,464,750	214,834,871	101,729,596	2.11x
2019	282,408,836	54,333,954	--	228,074,882	108,844,013	2.10x

(1) Derived from the audited financial statements of the Authority for the periods ended December 31, 2010 through December 31, 2019. Total Revenue includes Net Toll Revenue which is net of an allowance for uncollectible amounts. *See* "Toll Revenue – Historical Net Toll Revenue" under this caption and "PROJECTED TOLL RATES AND REVENUES; PROJECTED DEBT SERVICE COVERAGE – TABLE 10: Total Revenue Projection."

(2) Vehicle Registration Fees were collected prior to and during 2018. The Vehicle Registration Fees were terminated on September 1, 2018 and will not be collected in the future.

(3) Vehicle Registration Fee Bonds Aggregate Debt Service Due includes the aggregate debt service due and paid from the Vehicle Registration Fees (VRF) Debt Service Fund in such fiscal year on the 2009 VRF Series Bonds, unless paid from the General Surplus account. Debt service due on Vehicle Registration Fee Bonds before 2017 was paid from the VRF Economic Defeasance Escrow Account and did not count towards debt service during this period for debt service coverage purposes. The 2009 VRF Series Bonds matured in September 2018 and are no longer outstanding.

Source: E-470 Public Highway Authority

For information regarding projected debt service coverage on Senior Bonds, *see* "PROJECTED TOLL RATES AND REVENUES; PROJECTED COVERAGE – TABLE 11: Projected Debt Service Coverage on Senior Bonds."

PROJECTED TOLL RATES AND REVENUES; PROJECTED DEBT SERVICE COVERAGE

Projected Toll Rates

The following table summarizes the passenger car toll rates previously planned for fiscal years 2021 through 2025. Given the economic and associated toll revenue impacts of the COVID-19 pandemic, the Authority, in consultation with its Municipal Advisor, Traffic and Revenue Consultant and Bond Counsel has reconsidered the previously planned policy adjustment to ensure compliance with all bond covenants and to preserve the integrity of the Authority's operations and finances. The Authority currently anticipates that vehicle tolls and toll rate increases will be implemented in accordance with the Board toll rate schedule described in "Future Board Toll Rate Policy" below. The Authority's Board, however, has the authority to alter the toll rate schedule in the future and may do so if necessary to comply with the Authority's revenue covenant.

TABLE 8

Scheduled Passenger Car Toll Rates

Fiscal	License Plate Toll Customers		ExpressToll Customers	
Year	Interchange Toll	Barrier Toll(1)(2)	Interchange Toll	Barrier Toll(1)(2)
2021	$2.05	$3.40/4.00/4.35	$1.25	$2.15/2.50/2.75
2022	2.05	3.40/4.00/4.35	1.25	2.15/2.50/2.75
2023	2.05	3.40/4.00/4.35	1.25	2.15/2.50/2.75
2024	2.05	3.40/4.00/4.35	1.25	2.15/2.50/2.75
2025	2.05	3.40/4.00/4.35	1.25	2.15/2.50/2.75

(1) The 1st barrier toll listed is for Toll Plazas A, the 2nd barrier toll listed is for Toll Plaza C, and the 3rd barrier toll listed is for Toll Plazas B, D and E.

(2) Fiscal year 2021 to 2025 rates provided are for two-axle vehicles only. For multi-axle vehicles classified as three+ axles, the ExpressToll rates are recalculated from the base ExpressToll rate above using a 5% discount for hours of 12:00 p.m. to 9:00 a.m. for each additional axle, and an additional 20% discount for each additional axle during the hours of 9:00am to 12:00pm daily. LPT rates for multi-axle vehicles are charged an additional LPT toll rate as shown for each axle over two axles.

Source: E-470 Public Highway Authority

Future Board Toll Rate Policy

On May 14, 2020, the Board of the Authority approved Resolution 20-01, "Regarding Extension of Resolution 19-03's Toll Rate Schedule for Calendar Year 2021," such that toll rates beginning on January 1, 2021 will be the same as those imposed by the Board of the Authority for 2020. In light of the many unknowns presented by the continued COVID-19 pandemic, toll rate changes for 2020 and after will be carefully considered by the Authority's staff in consultation with the Authority's Municipal Advisor, Traffic and Revenue Consultant and Bond Counsel.

Projected Toll Revenue and Coverage

The tables on the following pages set forth the estimated annual toll revenues available to pay operating expenses and debt service, the gross revenue projection for the E-470 Toll Road and projected debt service coverage on the Senior Bonds. The tables were prepared by the Authority based on its own information and information furnished by the Municipal Advisor and the Traffic and Revenue Consultant. None of the Authority, the Municipal Advisor, the Underwriters, or the Traffic and Revenue Consultant warrant or represent that the estimates and projections will be met. In addition, the Authority gives no assurances that the actual results of its financial operations will meet or exceed the estimates and projections set forth herein and assumes no obligation to update any such information. *See* "FORWARD-LOOKING STATEMENTS" and "INVESTMENT CONSIDERATIONS – Traffic and Revenue Projections."

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TABLE 9
Projected Toll Transactions and Net Toll Revenue [1]

Fiscal Year	Projected Toll Transactions	Projected Net Toll Revenue [2]
2020[3]	59,905,000	$162,727,000
2021[4]	88,003,000	238,354,000
2022	89,957,000	243,731,000
2023	92,148,000	249,832,000
2024[3][4]	96,055,000	259,987,000
2025[5]	97,475,000	269,306,000
2026	99,869,000	273,459,000
2027[4]	103,629,000	284,107,000
2028[3]	106,569,000	292,169,000
2029[4]	109,921,000	301,179,000
2030[5]	112,133,000	312,543,000
2031[4]	116,818,000	325,199,000
2032[3]	121,161,000	336,614,000
2033[4]	126,488,000	350,791,000
2034	131,189,000	362,925,000
2035[4] [5]	137,811,000	389,071,000
2036[3]	143,532,000	401,580,000
2037	146,533,000	409,738,000
2038[4]	150,840,000	421,768,000
2039	154,442,000	431,637,000
2040[3][4] [5]	156,020,000	443,501,000
2041	159,341,000	452,357,000
2042	163,204,000	462,694,000
2043	167,189,000	473,312,000
2044[3]	171,769,000	485,546,000
2045[5]	173,461,000	498,222,000
2046	176,696,000	506,904,000
2047	180,012,000	515,768,000
2048[3]	183,912,000	526,257,000
2049	186,891,000	534,063,000
2050[5]	188,172,000	546,614,000

(1) For purposes of this table, toll transactions and net toll revenue (excluding other toll fees) for 2020 through 2050 reflect forecasts set forth in Table 4-7 of the May 2020 Comprehensive Traffic & Revenue Study. *See* **Appendix C**. *See* "THE TRAFFIC & REVENUE STUDY," and "INVESTMENT CONSIDERATIONS – Traffic and Revenue Projections."

(2) For purposes of this table, net toll revenue represents gross toll revenue adjusted for uncollectible and unpaid revenue. *See* the May 2020 Comprehensive Traffic & Revenue Study in **Appendix C**, "THE TRAFFIC & REVENUE STUDY," "INVESTMENT CONSIDERATIONS – Traffic and Revenue Projections," and "THE E-470 TOLL ROAD - Toll Collection System."

(3) Leap Year.

(4) Widening of various segments of the E-470 mainline is expected.

(5) Under the updated forecast, assumed a 2.0 Percent Systemwide Toll Increase.

Source: E-470 Public Highway Authority

TABLE 10
Total Revenue Projection

Fiscal Year	Projected Net Toll Revenue[1]	Projected Toll Fees and Violation Revenue[2]	Projected Investment Income[3]	Projected Other Revenue[4]	Projected Total Revenue
2020	$162,727,000	$6,760,000	$7,225,000	$5,756,000	$182,468,000
2021	238,354,000	8,720,000	6,800,000	9,900,000	263,774,000
2022	243,731,000	8,980,000	7,000,000	10,206,000	269,917,000
2023	249,832,000	9,250,000	4,210,000	10,512,000	273,804,000
2024	259,987,000	9,530,000	4,340,000	10,828,000	284,685,000
2025	269,306,000	9,820,000	3,470,000	11,155,000	293,751,000
2026	273,459,000	10,110,000	3,570,000	11,492,000	298,631,000
2027	284,107,000	10,410,000	3,180,000	11,839,000	309,536,000
2028	292,169,000	10,720,000	3,280,000	12,206,000	318,375,000
2029	301,179,000	11,040,000	3,380,000	12,583,000	328,182,000
2030	312,543,000	11,370,000	3,480,000	12,971,000	340,364,000
2031	325,199,000	11,710,000	3,580,000	13,369,000	353,858,000
2032	336,614,000	12,060,000	3,690,000	13,777,000	366,141,000
2033	350,791,000	12,420,000	3,800,000	14,195,000	381,206,000
2034	362,925,000	12,790,000	3,910,000	14,624,000	394,249,000
2035	389,071,000	13,170,000	4,030,000	15,063,000	421,334,000
2036	401,580,000	13,570,000	4,150,000	15,512,000	434,812,000
2037	409,738,000	13,980,000	4,270,000	15,981,000	443,969,000
2038	421,768,000	14,400,000	4,400,000	16,461,000	457,029,000
2039	431,637,000	14,830,000	4,530,000	16,951,000	467,948,000
2040	443,501,000	15,270,000	4,670,000	17,451,000	480,892,000
2041	452,357,000	15,730,000	4,810,000	17,972,000	490,869,000
2042	462,694,000	16,200,000	4,950,000	18,510,000	502,354,000
2043	473,312,000	16,690,000	5,100,000	19,070,000	514,172,000
2044	485,546,000	17,190,000	5,250,000	19,640,000	527,626,000
2045	498,222,000	17,710,000	5,410,000	20,230,000	541,572,000
2046	506,904,000	18,240,000	5,570,000	20,840,000	551,554,000
2047	515,768,000	18,790,000	5,740,000	21,470,000	561,768,000
2048	526,257,000	19,350,000	5,910,000	22,110,000	573,627,000
2049	534,063,000	19,930,000	6,090,000	22,770,000	582,853,000
2050	546,614,000	20,530,000	6,270,000	23,450,000	596,864,000

(1) *See* the last column of Table 9.
(2) For purposes of this table, the 2020 and 2021 amounts are based on revised estimates from the Authority's budget considering the COVID-19 pandemic. Amounts thereafter have been projected to increase at 3% per year, rounded.
(3) For purposes of this table, the 2020 and 2021 amounts are based on revised estimates from the Authority's budget considering the COVID-19 pandemic. All amounts thereafter have been projected to increase annually at 3% with adjustments from anticipated receipts from securities held in the Trust Estate. The balance of the Senior Bonds Debt Service Reserve Account is assumed to be released in 2041.
(4) For purposes of this table, the 2020 and 2021 amounts are based on revised estimates from the Authority's budget considering the COVID-19 pandemic. Amounts thereafter are projected to increase at 3% per year, rounded. A majority of revenues are derived from transaction processing fees for other Colorado toll facilities with other revenues making up the remainder.
Source: E-470 Public Highway Authority

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TABLE 11
Projected Debt Service Coverage on Senior Bonds

Fiscal Year	Projected Total Revenue [1]	Projected Operating Expenses [2]	Projected Net Revenue Available to Pay Debt Service	Total Senior Bonds Debt Service [3]	Projected Senior Bonds Debt Service Coverage (x)
2020[4]	$182,468,000	$52,570,000	$129,898,000	$ 71,031,619 [4]	1.83
2021	263,774,000	58,410,000	205,364,000	99,013,874	2.07
2022	269,917,000	60,160,000	209,757,000	99,511,219	2.11
2023	273,804,000	61,960,000	211,844,000	102,706,219	2.06
2024	284,685,000	63,820,000	220,865,000	107,178,363	2.06
2025	293,751,000	65,740,000	228,011,000	107,208,969	2.13
2026	298,631,000	67,720,000	230,911,000	107,207,490	2.15
2027	309,536,000	69,750,000	239,786,000	107,205,139	2.24
2028	318,375,000	71,840,000	246,535,000	107,208,117	2.30
2029	328,182,000	73,980,000	254,202,000	115,031,389	2.21
2030	340,364,000	76,190,000	264,174,000	115,031,389	2.30
2031	353,858,000	78,460,000	275,398,000	115,031,389	2.39
2032	366,141,000	80,820,000	285,321,000	115,033,367	2.48
2033	381,206,000	83,250,000	297,956,000	115,031,389	2.59
2034	394,249,000	85,750,000	308,499,000	107,206,389	2.88
2035	421,334,000	88,320,000	333,014,000	107,203,889	3.11
2036	434,812,000	90,970,000	343,842,000	107,206,867	3.21
2037	443,969,000	93,710,000	350,259,000	126,106,700	2.78
2038	457,029,000	96,520,000	360,509,000	127,615,812	2.82
2039	467,948,000	99,410,000	368,538,000	127,210,132	2.90
2040	480,892,000	102,400,000	378,492,000	104,885,000	3.61
2041	490,869,000	105,470,000	385,399,000	52,385,000	7.36
2042	502,354,000	108,630,000	393,724,000	--	--
2043	514,172,000	111,890,000	402,282,000	--	--
2044	527,626,000	115,250,000	412,376,000	--	--
2045	541,572,000	118,710,000	422,862,000	--	--
2046	551,554,000	122,270,000	429,284,000	--	--
2047	561,768,000	125,940,000	435,828,000	--	--
2048	573,627,000	129,720,000	443,907,000	--	--
2049	582,853,000	133,610,000	449,243,000	--	--
2050	596,864,000	137,620,000	459,244,000	--	--

(1) *See* last column of Table 10.
(2) For purposes of this table, the 2020 and 2021 amounts are revised estimates from the Authority's budget considering the COVID-19 pandemic. Annual increases of 3% (rounded) are assumed thereafter.
(3) *See* last column of Table 3. Excludes debt service on the Refunded Bonds.
(4) 2020 Debt Service projects utilizing approximately $40 million from the General Surplus Account towards current year debt service (including approximately $28.35 million previously transferred and approximately $11.65 million expected to be transferred prior to September 1, 2020), therefore reducing 2020 debt service from $111,031,619 to $71,031,619. *See* "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Surplus Fund – Use of General Surplus Account."

Source: E-470 Public Highway Authority

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THE AUTHORITY

General

The Public Highway Law became effective on August 27, 1987. Under the Public Highway Law, public highway authorities may be created within metropolitan regions of the State for the purpose of financing and constructing beltways and other transportation improvements. In accordance with the Public Highway Law and the E-470 Memorandum of Understanding, on January 13, 1988, Adams County, Arapahoe County, and Douglas County entered into an Establishing Contract (the "**Original Establishing Contract**"). On the same day, the Director of the State Division of Local Government issued a Certificate of Organization (the "**Certificate**") for the Authority, establishing the Authority as a separate political subdivision of the State and a body corporate. The Cities of Aurora, Brighton, Commerce City, and Thornton and the Town of Parker, subsequently became parties to the Original Establishing Contact and are Member Governments of the Authority. The Original Establishing Contract was amended and restated by all of the Member Governments with the Second Amended and Restated Establishing Contract effective March 1, 2011. The Third Amended and Restated Establishing Contract was adopted by all Member Governments effective December 13, 2018 (as amended from time to time, the "**Establishing Contract**"). On July 24, 1997, the Authority accepted the cities of Broomfield (now known as the City and County of Broomfield) and Greeley and Weld County as non-voting affiliate members. The City of Arvada was added as a non-voting affiliate member effective May 14, 1998, and on August 28, 2014, the City of Lone Tree was accepted as a non-voting affiliate member.

Management

The Establishing Contract provides for a board of directors for the Authority in which all legislative power of the Authority is vested. Each Member Government, as a party to the Establishing Contract, has the right to appoint one director to the board of directors who shall be an elected official of the Member Government. The current Board of the Authority is as follows:

BOARD OF DIRECTORS

Director	Title/Member Government	Director Since
Chaz Tedesco, Chairperson	County Commissioner, Adams County	2013
Roger Partridge, Vice Chair	County Commissioner, Douglas County	2013
John Diak, Secretary	Council Member, Town of Parker	2018
Francoise Bergan, Treasurer	Council Member, City of Aurora	2018
Bill Holen, Director	County Commissioner, Arapahoe County	2012
Craig Hurst, Director	Council Member, City of Commerce City	2020
Matt Johnston, Director	Mayor Pro Tem, City of Brighton	2020
Jessica Sandgren, Director	Mayor Pro Tem, City of Thornton	2020

Ex-Officio Directors (Non-Voting)	Representing
George Teal	Denver Regional Council of Governments
Doug Tisdale	Regional Transportation District
Kelly Brown	Colorado Department of Transportation/HPTE

Affiliate Member Directors (Non-Voting)	Representing
David Jones	Council Member, City of Arvada
Steve Moreno	County Commissioner, Weld County
John Gates	Mayor, City of Greeley
Laurie Anderson	Council Member, City and County of Broomfield
Jackie Millet	City of Lone Tree

The Authority's staff currently includes the following department heads:

DEPARTMENT HEADS

Tim Stewart, Executive Director
Jessica Carson, Director of Operations
Jason Myers, Director of Finance
Neil Thomson, Director of Engineering and Roadway Maintenance
Ken Smith, Director of Information Technology

The Authority's offices are currently located at 22470 East Stephen D. Hogan Parkway, Aurora, Colorado 80018; its telephone number is (303) 537-3470; and its telecopy number is (303) 537-3472.

All Authority department heads are responsible for administration of employees, consultants, and budgeting within their respective areas. Set forth below is certain information relating to the professional experience and areas of responsibility for each of the department heads.

Tim Stewart, Executive Director. Mr. Stewart became the Executive Director in February 2016. Prior to joining the Authority, Mr. Stewart served the Oklahoma Turnpike Authority (OTA) for 32 years beginning in field maintenance services and advancing to Director of Patron Services, Director of Maintenance, Director of Planning and Operations, and Deputy Director & Chief Operating Officer, a position he held beginning in 2005. Mr. Stewart was named the Executive Director of the OTA in April of 2013 and served in that role until he accepted the Executive Director position with E-470. Mr. Stewart also serves on the Board of Directors of the International Bridge, Tunnel & Turnpike Association (IBTTA) and began serving as its 2nd Vice President effective January 1, 2016. Mr. Stewart was elected as 1st Vice President and served in that role in 2017, and served as the IBTTA's President in 2018. Mr. Stewart is a graduate of Oklahoma State University with a degree in Civil Engineering Technology.

Jessica Carson, Director of Operations. Jessica Carson began her career with E-470 in 2007 as the Operations Coordinator, and became the Director of Operations in May 2019. Ms. Carson leads the E-470 Operations team, which is responsible for, among other things, tolling services, customer service, roadside assistance, image processing, incident management, email marketing efforts, media buys, traditional and digital advertising content, the social media presence, public relations, community relations and customer correspondence. Ms. Carson has a double major from the University of Iowa in Journalism/Mass Communication and Psychology, and a minor in English. In addition, she obtained her MBA from the University of Colorado's Leeds School of Business in 2017.

Jason Myers, Director of Finance. Mr. Myers became the Authority's Director of Finance in August of 2016, and previously served as the Director of Tolling Services/Deputy Director of Finance. As the Authority's Director of Finance, Mr. Myers is responsible for overseeing all accounting, finance, treasury, debt and cash management, audit, budget and financial risk management functions of the Authority. From April of 2015 to August of 2016, Mr. Myers was responsible for overseeing the

Authority's efforts and activities regarding tolling services including back office and toll integration services provided to external agencies including the CDOT and is private operators. Prior to 2015, Mr. Myers served as the Authority's Controller for five years, and worked for eight years at KPMG LLP as a Senior Audit Manager on various financial statement audit and consulting engagements. Mr. Myers is a licensed Certified Public Accountant in the state of Colorado, a Chartered Global Management Accountant (CGMA), and is a member of the AICPA, COCPA, and GFOA. Mr. Myers holds a Bachelor of Science degree in Accounting from Metropolitan State College at Denver.

Neil Thomson, Director of Engineering and Roadway Maintenance. Mr. Thomson became the Authority's Director of Engineering and Roadway Maintenance in February 2012. He previously served as Construction Manager since 2003 when he oversaw the E-470/I-70 Interchange project, Segment I widening and the new interchanges at Chambers Road and Jamaica Street. From 1997 to 2003, he served as the Authority's Construction Engineer overseeing large scale projects such as Segments II/III and Segment IV as well as smaller pavement overlays and maintenance building projects. Prior to working at the Authority, Mr. Thomson was Utility Engineer at RTD in Denver and a Project Engineer for the Highways Department in Edinburgh, Scotland. Mr. Thomson holds a Bachelor of Science degree in civil engineering from Heriot-Watt University, Scotland, and is a registered professional engineer in the state of Colorado.

Ken Smith, Director of Information Technology. Mr. Smith became the Director of Technology in September 2018, leading the IT team including security, program management, quality assurance, information technology infrastructure and software development. Prior to joining the Authority, Mr. Smith served as the Vice President of Information Technology at Istonish, Inc, leading their technical team in designing and delivering outsourced IT services for a variety of customers ranging from smaller local firms to Fortune 500 companies conducting business internationally. Mr. Smith has also led IT teams for Children's Hospital Colorado, Chateau Communities and Ammericom Direct Marketing, developing a blend of business analysis, program and project management, infrastructure development, process reengineering and staff leadership capabilities that he has utilized to successfully lead all phases of large scale initiatives from design and requirements creation through architecture, development and deployment. Mr. Smith attended the University of Kansas for an undergraduate degree and Regis University for Graduate Studies in Information Technology.

Powers of the Authority

Statutory Powers. Under the Public Highway Law, as more specifically outlined therein, a public highway authority has the following powers without voter approval (except as limited by the TABOR Amendment, as described below in this section), unless limited by the contract creating such authority:

- to construct, finance, operate, or maintain public highways as defined by the Public Highway Law;

- to take private property by condemnation;

- to establish and collect tolls on any highway provided by the authority;

- to establish and collect a highway expansion fee from persons developing property within the boundaries of the authority;

- to establish local improvement districts within the boundaries of the authority and to assess property which is especially benefited by highways provided by the authority;

- to establish value capture areas within the boundaries of the authority to obtain the incremental growth in revenues in certain local property or sales and use tax revenues resulting from the provision of highways by the authority;

- to issue bonds;

- to pledge its revenues to the payment of bonds; and

- to succeed to the obligations of other governmental entities (such as Arapahoe County and the predecessor to the Authority).

Under the Public Highway Law, a public highway authority may also accept federal funds under certain circumstances as outlined therein.

The Public Highway Law provides that the board of directors of a public highway authority may include property within or exclude property from the boundaries of the authority upon the satisfaction of certain requirements set forth therein. Property may be included within the authority boundaries only if it is within the boundaries of the members of the authority, is contiguous to property within the boundaries of the authority at the time of inclusion, and is not more than two and one-half miles from the proposed center line of the public highway. Prior to such inclusion or exclusion of property, notice of the proposed action must be provided and a public hearing with respect to the proposed inclusion or exclusion of property must be held as described in the Public Highway Law. Thereafter, the board of directors of the authority, with the affirmative vote of two-thirds of its members, may adopt a resolution including or excluding all or any portion of the property described in the notice.

TABOR Amendment. At the general election held in November 1992, the electors of the State of Colorado approved a voter-initiated amendment to the Colorado Constitution, sometimes referred to as the taxpayer's bill of rights or "TABOR" (the "**TABOR Amendment**"). The TABOR Amendment generally requires, among other things, that any "district" must obtain voter approval prior to imposing any new tax or tax rate increase, creating any multiple-fiscal year direct or indirect debt or other financial obligation, or increasing fiscal year spending from year-to-year in excess of inflation plus local growth. A "**district**" is defined under the TABOR Amendment to include the State of Colorado or any local government, excluding "enterprises" (government-owned businesses authorized to issue their own revenue bonds and receiving under 10% of annual revenue in grants from all Colorado state and local governments combined).

Although the Colorado Supreme Court in May 1995 ruled that the Authority was a "district" and not an "enterprise" under TABOR since the Authority had the ability to levy certain taxes, the Colorado General Assembly enacted legislation in March 1996 declaring its intention that public highway authorities be permitted to qualify as enterprises under the TABOR Amendment, and eliminated the power to impose taxes as inconsistent with the establishment of a public highway authority as an "enterprise" under the TABOR Amendment. The Arapahoe County District Court held in June 1996 that the Authority was now an "enterprise" and not a "district," and that the TABOR Amendment was not applicable to the Authority. Subsequently, the Public Highway Law was amended to include Section 43-4-502(3), C.R.S., which was the Colorado legislature's determination that the Authority constitutes an enterprise as described in the TABOR Amendment, and, therefore, that the spending, revenue, and debt limitations under the TABOR Amendment do not apply to the Authority's operations.

Contracts and Agreements. Although certain essential governmental functions of the Authority may not be delegated by contract to private third parties, the Authority may contract for construction, operations and maintenance, and financial advisory services, among other things. Throughout its existence, the Authority has engaged a number of national engineering firms to advise it on a variety of E-470 Toll Road matters. The Authority currently has contracts with various contractors to provide maintenance services associated with operating the E-470 Toll Road, including snow and ice removal, roadway and roadside maintenance, pavement and cement pavement maintenance, lighting, bridge repair, sign maintenance, landscape maintenance, and guardrail maintenance. The Authority also currently has a contract with WSP USA Services, Inc. for toll operations, toll maintenance, and management tasks, and the Colorado State Patrol for law enforcement. *See* "THE E-470 TOLL ROAD – Operation and Maintenance" herein.

Authority Liability

As provided in the Colorado Governmental Immunity Act, Article 10 of Title 24, Colorado Revised Statutes ("**Immunity Act**"), public entities and their employees acting within the course and scope of their employment shall be immune from liability for tort claims under Colorado state law based on the principle of sovereign immunity except for those specifically identified events or occurrences defined in the Immunity Act. The Authority has been deemed a "public entity" for purposes of the Immunity Act by the Colorado Court of Appeals. The exceptions in the Immunity Act allow liability for, among other things, injuries resulting from a dangerous condition which interferes with the movement of traffic on any public highway, road, street, or sidewalk; a dangerous condition caused by failure to realign a turned stop or yield sign or to repair a traffic signal displaying conflicting directions; a dangerous condition caused by known accumulation of snow and ice that physically interferes with public access on walks leading to a public building; the operation of a motor vehicle owned or leased by the public entity, except for emergency vehicles; a dangerous condition of any public building of the public entity; and the operation and maintenance of or a dangerous condition of public water, gas, sanitation, electrical, or power facilities. Where recovery is permitted, the Immunity Act generally limits the maximum amount that may be recovered under the Immunity Act for injuries occurring on or after January 1, 2018 as follows: (a) for any injury to one person in any single occurrence, the sum of $387,000; or (b) for an injury to two or more persons in any single occurrence, the sum of $1,093,000, except in such instance, no person may recover in excess of $387,000. Lower amounts are recoverable for injuries accruing prior to January 1, 2018. The Immunity Act does not limit recovery against a public employee who is acting outside the course and scope of his/her employment. The Immunity Act specifies the sources from which judgments against public entities may be collected and provides that public entities are not liable for punitive or exemplary damages. Punitive or exemplary damages may be assessed, however, against a public employee personally who is acting outside the course and scope of his/her employment. The Immunity Act does not prohibit claims against public entities or their employees under federal law, contract law, or under other common law theories.

Financial Information Concerning the Authority

Summaries from the Management's Discussion and Analysis. Summaries extracted from the narrative discussion and analysis of the results of operations of the Authority in the Authority's audited financial statements for fiscal year ended December 31, 2019 are set forth below. The entire audited financial statements of the Authority for the fiscal years ended December 31, 2019 and 2018 are attached as **Appendix B** hereto.

2019 Financial Highlights

- Transactions on the E-470 Toll Road experienced growth of 3% from 87.3 million transactions in 2018 to 90.3 million transactions in 2019. This was the highest annual traffic on record and was the tenth straight year of traffic growth for the Authority. Traffic grew 5% from 83.2 million transactions in 2017 to 87.3 million transactions in 2018.

- Operating revenues increased 7% from 2018 to 2019 improving from $249.9 million to $267.7 million, the highest annual revenue on record. Operating revenues grew from $228.2 million to $249.9 million, or 9.5% from 2017 to 2018, respectively.

- Operating expenses, before depreciation, increased 9% from 2018 to 2019 from $52.8 million to $57.4 million. Operating expenses, before depreciation, increased 4% from 2017 to 2018 from $50.6 million to $52.8 million.

- Debt service coverage, a critical measurement of the Authority's annual operations, for fiscal year 2019 was 2.10 versus an original budgeted ratio of 1.98. Debt service coverage for fiscal year 2018 was 2.11 versus a budgeted 1.94 and was 2.12 versus a budgeted 1.75 in 2017.

- In March 2019, the Authority refinanced approximately $72.5 million related to the 2017A LIBOR Index Term Rate bonds. The 2017A bonds were subject to optional early redemption on or after March 1, 2019 with a mandatory tender and remarketing date of September 1, 2019, and the Authority exercised the early redemption option to take advantage of lower interest rates and debt service savings. The successful refunding resulted in the Series 2019A LIBOR Index Term Rate bonds of $72.5 million with no change to the principal amounts or maturities. The issuance of the Series 2019A LIBOR Index bonds saved the Authority over 48 basis points (bps) in monthly interest costs. In conjunction with the bond transaction, the Authority received reaffirmed ratings from both S&P and Moody's at A and A2, respectively. Moody's moved to a positive outlook.

- Also in conjunction with the 2019A bond transaction, the Authority removed the swap insurance on the two interest rate swaps that have been insured by MBIA – administered by National Public Finance Guarantee (NPFG) – since 2007 and paid the swap counterparties a total of $974 thousand to terminate the policies. This was done in part due to negotiations with NPFG and based on the insurer rights within the swap and bond documents and will benefit the Authority in the future with greater flexibility for any swap changes.

- During 2019, the Authority began construction of the significant multi-year widening project to expand the E-470 Toll Road from two lanes to three lanes in each direction from Quincy Avenue to I-70. Construction is scheduled be completed in late 2020 or early 2021 with a total budgeted project cost over a three year period of $98.3 million. The Capital Improvements Fund of the General Surplus account will fund all costs of the widening project along with the Authority's entire five year capital budget program.

- The Authority's back office toll collection system processed approximately 28.3 million and 27.7 million tolled transactions on other Colorado roadways in 2019 and 2018, respectively. There were no new toll facilities opened in 2019 for which the Authority provides back office services. Toll collection or system costs originally incurred by the Authority for services provided to other entities are charged to the applicable entity (CDOT, HPTE, Plenary, or NWP). Tolling services revenues to recover these costs in 2019 and 2018 totaled approximately $7.5 million and $7.1 million, respectively.

- The Authority's board of directors voted in November 2018 to reaffirm the Authority's existing toll rate structure for 2019 which continued to freeze ExpressToll rates at 2017 levels and maintained the LPT premium of approximately 58% over ExpressToll rate levels. The forecasts with the 2019 toll rate structure supports the Authority's debt management plan to achieve level debt service in the near future and meet projected capital funding needs, and the toll rate structure is subject to annual board affirmation.

- The 2019 ExpressToll rate for a two axle vehicle was $2.70 at mainline toll plazas A and C and $2.95 at mainline toll plazas B, D, and E. ExpressToll rates increase incrementally at the mainline toll plazas if the vehicle has more than two axles. All ramp tolling points charged a rate of $1.25 (regardless of axle count) for ExpressToll accounts. The 2019 LPT toll rate for a two axle vehicle was $4.30 at mainline toll plazas A and C and $4.65 at mainline toll plazas B, D, and E. LPT toll rates also increase incrementally at the mainline toll plazas if the vehicle has more than two axles. All ramp tolling points charged a rate of $2.05 (regardless of axles) for LPT accounts.

Summary of Operations and Financial Position. The Authority's operating revenues, which include toll revenues, other toll related fees, and tolling services revenues, for 2019 were $267.7 million, a 7% increase over the $249.9 million in 2018. Toll revenues, net of related bad debts, were $249.0 million and $233.1 million of total operating revenues in 2019 and 2018, respectively. This increase was primarily due to increased overall toll transactions of 3% from 2018 and an incremental toll increase for LPT customers beginning on January 1, 2019 for all tolling points. Toll revenues, net of related bad debts, for fiscal year 2019 were $0.4 million above the $248.6 million 2019 operating budget. Traffic on the E-470 Toll Road during 2019 produced for 90.3 million transactions, with approximately 73% of the corresponding toll revenues coming from ExpressToll accounts. Operating revenues for 2018 were $249.9 million, a 9.5% increase over the $228.2 million in 2017. This increase was primarily due to increased overall toll transactions of 5% from 2017 and an incremental toll increase for LPT customers beginning on January 1, 2018 for all tolling points. Operating revenues for 2017 were $228.2 million, an 11% increase over 2016, which was also due to increased overall toll transactions and an incremental toll increase beginning on January 1, 2017.

Total operating expenses, before depreciation, for 2019 were $57.4 million, a 9% increase over the $52.8 million in 2018. The increase was primarily due to higher toll collection costs from the 3% increase in E-470 toll transaction volume in 2019, coupled with a 2% increase in tolled transactions incurred on other Colorado toll facilities. Costs incurred for other toll facilities are recovered and recorded as tolling services revenue. Costs such as call center and administrative law court labor, operations support labor, registered vehicle owner information retrieval, credit card fees, snow plows and snow removal materials, and law enforcement, offset by a decrease in image processing labor and printing and postage on bills and notices, accounted for $3.3 million of the overall $4.6 million increase from the prior year. There were no other individually significant fluctuations. Total operating expenses, before depreciation, for 2018 were $52.8 million, a 4% increase over the $50.6 million in 2017. The increase was primarily due to higher toll collection costs from the 5% increase in E-470 toll transaction volume in 2018, coupled with a 15% increase in tolled transactions incurred on other Colorado toll facilities. Costs incurred for other toll facilities are recovered and recorded as tolling services revenue. Costs such as call center and administrative law court labor, printing and postage on bills and notices, registered vehicle owner information retrieval, credit card fees, and law enforcement, offset by a decrease in image processing labor, accounted for $1.7 million of the overall $2.2 million increase from the prior year. There were no other individually significant fluctuations.

Senior Revenue Bond principal and interest payments from the senior debt service fund during 2019 and 2018 were $108.8 million and $101.7 million, respectively, on outstanding bonds, and includes the interest rate swap differentials. In 2019 and 2018, $0 and approximately $1.5 million in principal and interest was due and separately paid on the 2009 VRF Series Bonds, respectively. In 2018, all principal and interest was paid from the VRF Bonds Debt Service account which was funded from current year VRF revenues as specified in the Master and Supplemental Bond Resolutions (the Bond Resolutions).

The VRF bonds matured on September 1, 2018. The Authority's board of directors voted in April 2018 to discontinue collection of the $10 annual vehicle registration fee, effective August 1, 2018, which was assessed on certain areas within Adams, Arapahoe, and Douglas counties and pledged to the VRF bonds.

The Authority's financial position is healthy. The debt service coverage ratio for 2019 was 2.10, which exceeded the 1.30 coverage requirement of aggregate senior debt service from net revenues under the Bond Resolutions. This is compared to debt service coverage of 2.11 in 2018 and 2.12 in 2017. As of December 31, 2019, the Authority's unrestricted cash and investments within the General Surplus Fund totaled $374,753,853 (audited). Based upon unaudited, internally-prepared estimates as of April 30, 2020, unrestricted cash and investment balances within the General Surplus Fund for the Authority were approximately $373,835,255.

In addition, the Authority's Senior Bonds Debt Service Reserve Account is fully funded as of April 30, 2020, with a balance of $122,499,036 as compared to the required balance of $118,033,648 and is invested in a mixture of cash and investments, together with amounts available under a $25 million reserve fund surety bond provided by National.

Budgetary Process; Budget Summaries. The Authority utilizes a planning based budget process. The Authority creates a two-year operating budget for Board review prior to formal adoption in one-year increments. It also reviews a five-year capital plan with the Board annually, prior to adopting the next year's capital budget. Any budget amendments are presented to and approved by the Board during the year if deemed necessary by the Authority. Set forth below is the Authority's 2019 Budget together with actual information for 2019. Also set forth is the Authority's 2020 Budget which was reviewed by the Board in October 2019 and was appropriated and approved by the Board in December 2019 along with year to date budget information through April 30, 2020.

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E-470 PUBLIC HIGHWAY AUTHORITY

Fiscal Year 2019 Budget Summary

	2019 Budget	2019 Actual
REVENUE		
Net Tolls and Toll Fees	$258,526,000	$260,147,431
Unrestricted Investment Income	7,500,000	12,252,963
Tolling Services Revenues	8,084,500	7,615,671
Other Authority Revenues	905,000	2,392,771
TOTAL REVENUES	**$275,015,500**	**$282,408,836**
EXPENDITURES		
Salary and Burden Expenses	$ 7,785,000	$ 8,080,092
Toll Operations	28,089,400	25,825,914
Roadway Maintenance and Engineering	8,327,800	7,444,701
Finance	8,732,000	8,385,772
Executive Director and Board of Directors	1,272,000	1,084,020
Information Technology	3,853,700	3,513,455
TOTAL OPERATING EXPENDITURE BUDGET	**$ 58,059,900**	**$ 54,333,954**
Net Revenues Available for Debt Service	$216,955,600	$228,074,882
Senior Debt Service	109,500,000	108,844,013
CAPITAL BUDGET	**$ 70,724,100**	**$ 46,051,150**

Source: E-470 Public Highway Authority

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Fiscal Year 2020 Budget Summary

	2020 Budget	2020 YTD Budget Through April 30	2020 Actual Through April 30 (unaudited)
REVENUE			
Net Tolls and Toll Fees	$265,354,000	$77,748,656	$58,298,911
Unrestricted Investment Income	8,500,000	2,833,333	3,909,094
Tolling Services Revenues	10,050,000	3,350,000	1,702,775
Other Authority Revenues	1,016,000	338,667	1,393,425
TOTAL REVENUES	**$284,920,000**	**$84,270,656**	**$65,304,205**
EXPENDITURES			
Salary and Burden Expenses	$ 8,868,530	$ 2,969,494	$ 2,862,085
Toll Operations	28,759,000	9,586,333	8,165,835
Roadway Maintenance and Engineering	8,107,300	3,721,481	2,565,207
Finance	9,739,400	3,302,904	2,545,323
Executive Director and Board of Directors	1,199,470	399,824	254,683
Information Technology	6,033,000	2,011,000	1,214,081
TOTAL OPERATING EXPENDITURE BUDGET	**$62,706,700**	**$21,991,036**	**$17,607,214**
Net Revenues Available for Debt Service	$222,213,300	$62,279,620	$47,696,991
Senior Debt Service	113,211,000 (1)	37,737,001	18,821,730 (2)
CAPITAL BUDGET	**$94,541,100**		**$14,730,749**

(1) As budgeted. Actual scheduled debt service is shown in Table 3 for Fiscal Year 2020 which differs from budgeted debt service for such year as a result of the refunding of the Series 2010C Bonds (prior to transfers made from Surplus Fund described in footnote 2).

(2) Actual net of Surplus Fund transfers of $18.9M through April 30, 2020. *See* "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Surplus Fund – Use of General Surplus Account" and footnote 4 to Table 11.

Source: E-470 Public Highway Authority

2020 Budget and Year to Date Comparison. The Authority budgeted to expend approximately $22.0 million in operating expenses during the first four months of 2020, but expended approximately $17.6 million. This variance is primarily due to decreased March and April traffic as a result of the COVID-19 pandemic which drives a decrease in direct costs of collection, and overall snow removal expenses coming in under budget to date. *See* additional discussion in "INVESTMENT CONSIDERATIONS."

Capital Improvement Plan. The Authority budgeted to expend approximately $70.7 million for capital projects during 2019, but expended $46.1 million. Projects in 2019 included continuing the widening project from Quincy Avenue to I-70, of which a three-mile section of the project comprising one southbound lane from Jewell Avenue to Quincy Avenue opened in December 2019; the purchase of temporary concrete barriers for use in the current and future widening projects; replacement of rooftop HVAC units at the Authority's headquarters building; and various enhancements to the Authority's toll collection system and technical environment. As of December 31, 2019, capital expenditures were under budget due to several budgeted projects being shifted to 2020 including the Quincy Avenue interchange improvement and the construction of additional storage facilities at Maintenance Support Site A. Additionally, the Authority expects that, from 2020 through 2024, it will undertake approximately $380.3 million in major capital improvement projects for the E-470 Toll Road, which includes completion of the road widening project between Quincy Avenue and I-70 expanding from two lanes to three lanes in each direction, the next scheduled road widening project between I-70 and Pena Boulevard, design of the subsequent road widening project between Pena Boulevard and I-76, various pavement resurfacing and interchange improvements, and software and hardware upgrades. Regular renewal and replacement expenses are also included in the foregoing amount. These capital improvements costs (including regular renewal and replacement expenses) are anticipated to be funded with amounts on deposit in the Capital Improvement Subaccount of the General Surplus Account. There is no assurance that such Subaccount will have sufficient amounts to fund these or any other future capital improvements.

The Authority has no deferred maintenance, as all assets are maintained and reviewed on a recurring basis. As required under the Master Resolution, the Authority conducts an annual asset certification by a qualified independent consultant to inspect the Authority's assets and provide a written report summarizing the inspection results. The inspection includes identifying whether completed portions of the E-470 Toll Road have been maintained appropriately, review of the Authority's annual budget to assess the estimated cost of maintenance and improvements needed for the upcoming fiscal year, and upcoming safety initiatives for improvement of the highway. The most recent certification report, which rated 11 of the 13 components of the E-470 Toll Road in "excellent condition" and the other 2 components in "good condition," can be found at www.E-470.com on the investor relations page under Other Information. **The information provided on the Authority's website is not a part of this Official Statement and should not be relied upon in making an investment decision with respect to the Series 2020A Bonds.**

Financial Statements. The audited financial statements of the Authority for the fiscal years ended December 31, 2019 and 2018 are included in **Appendix B** hereto.

Investments. The Authority invests its funds in accordance with applicable State laws. *See* Notes 3 and 4 to the audited financial statements of the Authority for the fiscal years ended December 31, 2019 and 2018, attached hereto as **Appendix B**, for a description of the Authority's investments and practices with respect to such investments.

Retirement Plans. The Authority has established two retirement plans for its regular employees. One plan is a defined-contribution plan administered by the International City/County Management Association (ICMA) Retirement Corporation. The Authority contributes 6.2% of all compensation of regular employees to the plan, up to the maximum Federal Insurance Contribution Act (FICA) base level. Plan members are also required to contribute 6.2% of their annual covered salary to the plan. The plan provisions and contribution requirements are established by and can be amended by the Authority's Board. The Authority and its employees each contributed approximately $0.4 million in 2019 and $0.3 million in 2018. Employees are immediately vested.

In addition, the Authority contributes to a defined-contribution 401(a) Retirement Plan administered by ICMA Retirement Corporation and covering 10% of all compensation for regular employees. Employees are not allowed to contribute to this plan. The plan provisions and contribution requirements are established by and can be amended by the Authority's Board. Employees are 50% vested at the date of hire and 100% vested after one year of service. The Authority also matches employee contributions to the available 457 deferred compensation retirement plan up to $3,000 per employee per year, and these employer contributions are deposited into the 401(a) Retirement Plan due to the IRS annual deferral limit for 457 plans. The Authority contributed approximately $0.7 million to this plan in 2019 and approximately $0.7 million in 2018. The Authority does not have any other defined pension plans and does not have other post-retirement employee benefit obligations.

First Quarter 2020 – Unaudited Financial Information. For unaudited financial and other information about the Authority and its operations, *see* the E-470 Public Highway Authority Board of Directors Quarterly Dashboard Report March 31, 2020, dated as of April 23, 2020 (the "**Dashboard Report**") posted on the Electronic Municipal Market Access system ("**EMMA**") of the Municipal Securities Rulemaking Board (the "**MSRB**"). Such information is unaudited and provided as of the date of the Report. Material changes may have occurred with respect to such information since that date, and the Authority has not undertaken to update or revise such Report if such changes occur.

THE E-470 TOLL ROAD

General

The E-470 Toll Road is a 47-mile, limited-access highway generally running along the eastern perimeter of the Denver metropolitan area, operating as a toll highway and extending state highway C-470 from a location intersecting I-25, south of the Denver Tech Center ("**I-25 South**"), running east and north through the Member Governments of Adams County, Arapahoe County, Douglas County, the Cities of Aurora, Brighton, Commerce City and Thornton, and the Town of Parker, passing along the western edge of DEN and intersecting I-25 North of Denver ("**I-25 North**").

Operation and Maintenance

The Authority has collected tolls on use of Segment I since July 1991, on use of the opened portions of Segments II and III in phases, beginning in October 1998 and in May 1999, and on use of Segment IV in August 2002 and January 2003. *See* "Toll Collection System" under this caption for a description of the toll collection system and of tolls imposed for use of the E-470 Toll Road. *See* "THE AUTHORITY – Financial Information Concerning the Authority – Capital Improvement Plan" for information about certain planned capital improvements to the E-470 Toll Road.

Day-to-day operation and maintenance of the E-470 Toll Road are being provided under several contracts for roadway operation, facility and toll maintenance and management, roadside maintenance, roadway maintenance, and management consulting services. The Authority originally contracted with ALLTECH, Inc. as the Operations Contractor under the 2017 Customer Services Contract dated as of January 1, 2017 (the "**Operations Agreement**"). ALLTECH, Inc. was a Delaware corporation affiliated with WSP/Parsons Brinkerhoff and, as of December 31, 2018 via an Assignment and Novation Agreement, ALLTECH, Inc. assigned its rights and delegated its obligations under the Operations Agreement to WSP USA Services, Inc. Under the Operations Agreement, WSP USA Services, Inc. provides certain operations, toll maintenance, and management tasks. The Operations Agreement term runs through December 31, 2021. Under the Operations Agreement, WSP USA Services, Inc. is to submit an annual budget for approval by the Authority.

The Authority contracts for all maintenance of the E-470 Toll Road and the Right-of-Way. These include separate contracts for asphalt repair, concrete repair, guardrails, snow removal and ice control, sweeping, traffic control, lighting, fencing, mowing and landscaping, and pavement striping and sign repair.

Toll Collection System

General. The Authority has 5 mainline tolling points and 32 ramp tolling points located at certain interchanges. On January 1, 2009, the Authority implemented an all-electronic toll collection system. However, paying cash tolls remained an option until July 4, 2009. The all electronic toll collection system uses two methods to collect tolls. The first method, ExpressToll® collection system, utilizes a transponder to recognize the vehicle and collect the toll from a prepaid ExpressToll® account. The second method, a LicensePlateToll® (LPT) collection system, captures images of the vehicle of which the registered owner will receive a statement of use for toll collection.

ExpressToll® customers are required to prepay their accounts by cash, check, or credit card. The account is typically set up to automatically replenish itself to a predetermined amount using a stored credit card on file. For accounts that are paid by cash or check, once the account balance is reduced to a predetermined level, an invoice is mailed to collect payment on the account. Effective January 1, 2018 and continuing through 2019 with the current toll rate policy, LPT customers pay approximately a 58% premium over ExpressToll® customers. As of December 31, 2019, there were approximately 978,000 ExpressToll® accounts opened, and within those accounts, there were 1.8 million transponders issued. As of December 31, 2019, approximately 72.9% of all toll transactions were ExpressToll® based.

Customers who drive E-470 without an ExpressToll® account automatically become an LPT customer. Cameras installed at each toll plaza location capture images of the vehicle's license plate. The image is processed and sent to either the state's Department of Motor Vehicles or to a third party vendor to acquire out-of-state registered owner information of the vehicle. LPT tolls are accumulated for 30 days, and then a statement is mailed to the customer for all tolls incurred during those 30 days. If the statement is not paid in full by the due date, a second statement is issued with a $5 late fee added to the amount due. If the second statement is not paid in full by the due date, a third statement is issued. If the third statement is not paid in full by the due date, the account becomes delinquent and is referred to a third party collection agency with a $20 collection fee added to the amount due.

The delinquent account remains with the third party collection agency for 120 days. If after 120 days the account is not paid in full, a civil penalty assessment notice is issued for the unpaid tolls, late fee, and collection fee and adds a $25 civil penalty to the amount due. Civil penalty assessment notices that remain unpaid after 30 days are deemed a complaint to appear for adjudication of a toll evasion in an Authority administrative adjudication proceeding. The administrative adjudication process may result in the customer being issued a hearing officer's final order of liability with an additional $20 adjudication fee. Delinquent accounts which remain unpaid after the administrative adjudication process may result in a hold placed on the customer's vehicle registration.

ExpressToll customers with negative account balances (i.e., did not keep payment information up to date but still use the E-470 Toll Road and incur tolls) that are past due are converted to License Plate Toll accounts after maintaining a consistent negative balance for approximately 60 days with no payments. If converted, these accounts begin the LPT process in the third statement phase (right before collections), and then follow the LPT billing process referenced above with higher toll rates and more fees and fines assessed, with the potential for customer vehicle registration hold.

Uncollectible Amounts. Since the implementation of the LPT system, the Authority has experienced a higher percentage of uncollectible tolls than it did prior to LPT. Uncollectible revenues consist of: "rejected" transactions where the license plate cannot be read and/or the registered owner of the vehicle cannot be identified; "LPT unpaid" transactions where the license plate was read, the customer was billed, but the bill is unpaid; and "AVI unpaid" transactions where an ExpressToll® customer has driven the road without sufficient prepaid balance to cover the toll transactions incurred. Based on data from January 2010 through December 2019, rejected transactions represent 9.4% of gross toll revenue, while LPT and AVI unpaid transactions represent 4.5% of gross toll revenue, with a total uncollectible rate of 13.9% of gross toll revenue.

Enforcement Provisions. Under the Public Highway Law, the Authority is authorized to adopt, by resolution, regulations pertaining to the enforcement of toll collection and providing a civil penalty for toll evasion. The civil penalty for any toll evasion is authorized by the Public Highway Law to range from $10 to $250 per violation in addition to any costs imposed by a court. The Authority is authorized to use state of the art technology, including, but not limited to, automatic vehicle identification photography, to aid in the collection of tolls and enforcement of toll violations. In addition, the Public Highway Law authorizes State and local law enforcement authorities to enter into traffic and toll enforcement agreements with the Authority. The Authority's Board of Directors has adopted, as amended, the E-470 Public Highway Authority Toll Collection, Evasion and Administrative Adjudication Rules, effective September 27, 2018, and pursuant thereto is collecting civil penalties utilizing its statutory ability to enforce toll evasions. The Authority is currently in the process of updating its administrative law court documents and process, which updates are expected to be complete in the second quarter of 2020. The update process will necessitate some revisions to the current Toll Collection, Evasion and Administrative Adjudication Rules to ensure due process is maintained. In May 2013, the Authority approved the implementation of vehicle registration holds on LPT customer vehicles whose owners have not paid a hearing officer's final order of liability. Since then, the Authority and the State Department of Revenue have implemented such vehicle registration holds with respect to users of License Plate Toll across all tolled facilities in Colorado, including the E-470 Toll Road. The Authority is currently evaluating the impacts of these measures.

In addition to these measures, various changes were contemplated by legislation which became effective on January 1, 2016, and many such changes were required to be implemented by July 1, 2016. These changes to various provisions within article 3 of title 42 of the Colorado Revised Statutes as well as Section 17-24-109.5, C.R.S. addressed matters relating to the use of temporary license plates in Colorado. The Authority experienced positive results in toll collections over the first eighteen months after implementation in July 2016, resulting in a decrease of 42% of rejected images related to Temporary Tags that could now be identified and billed to the customer or $6.7 million over that same time period.

Interoperability. The Authority approved joining the Central United States Interoperability ("**CUSIOP**") Hub, or Central Hub, in 2019 but given technical requirements to read multiple toll tag protocols, the Hub has not yet approved the Authority as a member. The CUSIOP Hub currently includes Texas, Oklahoma, and Kansas tolling agencies, with Colorado being the fourth state to join. The Authority's membership in the CUSIOP Hub means account holders in Colorado will be able to utilize their ExpressToll transponders and accounts on Kansas, Oklahoma, and Texas toll roads, and Kansas, Oklahoma, and Texas visitors can pay their tolls in Colorado with their home state transponders and accounts. There are also other Hubs formed within the United States including the northeast, southeast, and western states that plan to become interoperable with the CUSIOP Hub in the future, providing greater ability for customers to travel across state lines using their home state tolling account. The Authority does not presently know the impact of joining the CUSIOP or other regional hubs around the country.

Insurance

The Authority carries special form Civil Works Property insurance on the E-470 Toll Road, covering physical damage to its toll plazas, personal property, interchanges, bridges, roadways, and appurtenant structures, with a blanket limit of $297,374,552 subject to flood and earthquake sub-limits of $5,000,000 each in the aggregate and a named storm sublimit of $25,000,000 per occurrence, with per occurrence deductibles ranging up to $50,000, and loss of revenue of $7,500,000. The Authority carries special form Property insurance on its administrative, maintenance, and toll plaza buildings with a $30,312,671 blanket limit and its business personal property (to include electronic data processing equipment) with a $17,044,127 blanket limit, both subject to a $25,000 per occurrence deductible; there is also coverage for earthquake and flood with sub-limits of $51,811,344 in the aggregate, with $50,000 per occurrence deductibles each. The Authority also carries business interruption and extra expense coverage at a total limit of $4,454,546, subject to a 24-hour waiting period. Additionally, the Authority carries General Liability, Public Officials Errors and Omissions, Employment Practices Liability, Employee Benefits Liability, and Excess Liability insurance, for total liability limits up to $20,000,000 per occurrence/$21,000,000 aggregate and with per occurrence deductibles ranging up to $10,000. The Authority carries Privacy and Network Liability insurance with $10,000,000 per occurrence and aggregate limits for third-party coverages, with $10,000,000 of business interruption coverage and is subject to a $100,000 per claim retention. The Authority also carries Workers' Compensation coverage at statutory limits, with Employer's Liability limits of $1,000,000 per coverage part and a $5,000 per occurrence deductible. Beyond the coverages detailed above, the Authority maintains Commercial Automobile, Commercial Crime, and Storage Tank/Pollution Liability. *See* "THE AUTHORITY – Authority Liability" for a discussion of the Immunity Act providing immunity to the Authority for certain liabilities.

Other Information

Resources of the Authority have been allocated to marketing of, and business development for, the E-470 Toll Road. The Authority is an active member in a number of chambers of commerce and economic development agencies. The Authority has won a number of awards relating to its work on the E-470 Toll Road, including among others, the Colorado Asphalt Paving Association's "Best in Colorado" Asphalt Paving Award for numerous projects: 120th Avenue to Parker Road in 1999, Segment IV in 2003, Jamaica to Toll Plaza A in 2009, and 120th Avenue to Toll Plaza E in 2011. Additionally, the Authority has been recognized by the National Asphalt Pavement Association's Quality in Construction Award for 1999 and 2004, the Best Portland Cement Award for Segment IV in 2004, and National Design-Build Award from the Design-Build Institute for the construction of the I-70 flyover ramp in 2008. The Authority has also been recognized with numerous toll innovation awards from the International Bridge Tunnel and Turnpike Association including social responsibility award for solar installation and President's Award in 2013, and innovating financing for Segments II and III in 1996, and the Turnpike Association's Toll Excellence Award for Customer Service for its use of business analytics in 2006. Recently, the Authority won the award for Excellence in Program Delivery from the Colorado Asphalt Pavement Association in 2017 for the road widening project, the 2018 IBTTA Toll Excellence Award in Administration and Finance for the Senate Bill 15-090 and the Authority's Temporary Tag Initiative, and the 2018 APEX Award for Print Media Design of the ExpressToll and E-470 Tolling Services Brochures.

The Authority solicited proposals for development of next generation toll lane software and equipment along the E-470 Toll Road. The effort began when the Authority conducted an RFQ in 2018 and 2019 and shortlisted the respondents to four qualified companies. Evaluation is currently underway to determine if new toll lane software and equipment should be installed at all tolling points along the corridor. The RFP responses were received in October of 2019 and the Authority's staff recommended a preferred vendor, Electronic Transaction Consultants Corporation, a Texas Corporation. The Board awarded a contract to Electronical Transaction Consultants Corporation in an amount not-to-exceed $24,800,000 and subject to final approval of the Executive Director and Authority general counsel, on April 23, 2020. The Contract was signed effective May 20, 2020. At this time, the impact on the Authority operations or financial status, if any, is not known.

The Authority solicited proposals from development entities interested in repurposing/ redeveloping the abandoned mainline toll plaza locations along the E-470 Toll Road comprising four toll plazas including all locations excepting Toll Plaza C (just north of I-70), and including both northbound and southbound locations. This RFP included the possibility of service stations (food, fuel, rest areas, etc.) or office space or other uses that would benefit the Authority, and would be charged rent under a master agreement/ground lease arrangement. RFP responses were received in December 2019 and the Authority's staff recommended Petrogas Group US, Inc. (D/B/A as "Applegreen") as the preferred proposer over 7-Eleven, Inc. The Board of the Authority concurred with the recommendation to approve negotiation of a memorandum of understanding with Applegreen on April 23, 2020, and Executive Director execution of the same, subject to review and approval of general and special counsel. Authority staff, and special and general counsel, are working on the first draft of the memorandum of understanding and expect to release the same by early June, 2020. The current schedule anticipates finalizing the lease(s)/agreement(s) by the end of 2020 with development starting thereafter. At this time, the impact on the Authority operations or financial status, if any, is not known.

The Authority maintains its website at www.E-470.com. As part of this website, the Authority posts monthly information, including year-to-date budget, traffic and toll revenue information. **The information provided on the Authority's website is not a part of this Official Statement and should not be relied upon in making an investment decision with respect to the Series 2020A Bonds.**

Although the Authority has prepared the information on its website for the convenience of those seeking information regarding the Authority, no decision in reliance upon such information should be made. Typographical or other errors may have occurred in converting the original source documents to their digital format, and the Authority assumes no liability or responsibility for errors or omissions contained on its website. Further, the Authority disclaims any duty or obligation to update or maintain the availability of the information contained on the website or any responsibility or liability for any damages caused by viruses contained within the electronic files on the website. The Authority also assumes no liability or responsibility for any errors or omissions or for any updates to dated information contained on the website.

THE TRAFFIC & REVENUE STUDY

The Traffic and Revenue Consultant was retained by the Authority to prepare the May 2020 Comprehensive Traffic & Revenue Study to provide estimates of future traffic volumes on the E-470 Toll Road and future toll revenues. The May 2020 Comprehensive Traffic & Revenue Study replaces the prior traffic and revenue studies prepared for the Authority. The May 2020 Comprehensive Traffic & Revenue Study is included herein at **Appendix C**. **The Traffic and Revenue Consultant has not reviewed or updated the assessments or estimates set forth in the May 2020 Comprehensive Traffic & Revenue Study since its date. Accordingly, the information included in the May 2020 Comprehensive Traffic & Revenue Study does not take into account facts and circumstances that have occurred between the date of that Study and the date of the Official Statement. *See* "THE AUTHORITY – Financial Information Concerning the Authority – *Summary of Operations*" and "HISTORICAL TOLL RATES AND REVENUES; HISTORICAL DEBT SERVICE COVERAGE" for actual traffic and revenue information for the period ended December 2019 and for certain 2020 toll transaction information.**

The May 2020 Comprehensive Traffic & Revenue Study provides a summary of the traffic and revenue forecasts based on the current toll rate structure, which was introduced on January 1, 2020. The Study also details the refinement and calibration process of the travel demand model used in developing the forecasts, as well as the assumptions underlying these forecasts, such as toll rates, values of time, vehicle operating costs and toll revenue leakage. The forecasts also recognize travel patterns along the E-470 Toll Road through the incorporation of anonymous trip data gleaned from E-470's 87.3 million transactions observed in 2018. Using the transaction data, the individual transactions were linked, creating trip patterns and trip lengths along the E-470 Toll Road which were used in travel demand model calibration and in the forecasting of future usage of the E-470 Toll Road. The traffic forecasts also incorporated the results of an independent review of socioeconomic forecasts, the latest traffic data and counts, a detailed analysis of traffic profiles on the E-470 Toll Road, and the most recent highway improvement assumptions.

The final products of the analysis are the estimates of annual traffic and toll revenue under the current toll rate assumptions, a comparison of these forecasts with the last CDM Smith forecasts from December 2018, and select sensitivity tests dealing with the potential traffic and revenue impacts associated with the COVID-19 pandemic, reduced regional growth forecasts and reduced value of time assumptions.

It is essential that prospective investors read and understand the May 2020 Comprehensive Traffic & Revenue Study in order to understand the basis for the projections of Revenues for the E-470 Toll Road. The May 2020 Comprehensive Traffic & Revenue Study relies on numerous explicit and implicit assumptions. Prospective investors should carefully consider the reasonableness of the explicit and implicit assumptions in such Study. Actual Revenues generated by the E-470 Toll Road have varied from past Revenue projections and likely will continue to vary, perhaps significantly, from the Revenue projections included in such Study. ***See* "INVESTMENT CONSIDERATIONS – Traffic and Revenue Projections."**

INVESTMENT CONSIDERATIONS

The Authority's ability to derive Revenues from the use and operation of the E-470 Toll Road in amounts sufficient to pay debt service on the Bonds, including the Series 2020A Bonds, depends upon numerous factors, many of which are not within the control of the Authority. Described below are certain factors that could affect the E-470 Toll Road and Revenues derived from the operation thereof, as well as certain other factors which may affect the repayment of the Bonds.

Impact of the COVID-19 Pandemic

The outbreak of COVID-19, a respiratory disease caused by a novel strain of coronavirus, has been declared a pandemic by the World Health Organization. Since its discovery in late 2019, it has spread globally, including throughout the United States. In the United States, there has been a focus on containing COVID-19 by prohibiting non-essential travel and limiting person-to-person contact. Nationwide, states and local governments have issued "stay at home" or "shelter in place" orders, which have and are continuing to severely restrict movement and limit businesses and activities to essential functions. This has dramatically altered the behavior of businesses and people in a manner that has had and is continuing to have negative effects on global and local economies. In Colorado specifically, Governor Polis issued a "stay at home" order on March 25, 2020 that was in effect through April 26, 2020. On April 27, 2020, Governor Polis announced a transition from "stay at home" to "safer at home," which will allow for retail businesses to open for curbside pickup; real estate showings to resume; and voluntary or elective medical, dental, and veterinary procedures to resume with certain precautions in place. As of May 1, 2020, retail businesses were permitted to open for in-person shopping and personal care businesses will be allowed to reopen with certain precautions in place. As of May 4, 2020, offices were permitted to reopen with 50% of their workforce so long as social distancing measures were in place. However, in the Denver metropolitan area, stay at home orders remained in place through May 8, 2020, including in Denver, Adams, Arapahoe, Boulder, Broomfield, and Jefferson Counties. Guidance was issued by the Governor effective May 27 for restaurants in connection with dine-in services. These COVID-19 measures are changing rapidly, often daily and in some cases, multiple times in a single day. Unemployment claims are accelerating in many areas due to these development concerning COVID-19. (Orders issued by the State may be viewed at https://covid19.colorado. gov)

The extent to which the coronavirus impacts the Authority's operations and its financial condition will depend on future developments, which are highly uncertain and cannot be predicted with confidence, including the duration of the outbreak and the Statewide stay-at-home order. Highway tolls are the predominant source of revenue available to the Authority to pay debt service on its outstanding bonds. The ultimate use of the E-470 Toll Road by motorists and the level of toll revenues to be generated through such use are influenced by numerous factors. The COVID-19 pandemic has had, and is likely to continue to have, an adverse impact on the level of such toll revenues, but the degree of the impact is extremely difficult to predict at this time. We note that multiple rating agencies issued negative outlook reports in March for the U.S. toll road sector as a result of the pandemic. Furthermore, S&P has assigned a "negative outlook" to the Authority's rated debt, along with the entire toll road sector. On the other hand, Fitch reaffirmed the Authority's current rating and outlook (A Stable) in April 2020 despite the uncertainty caused by COVID-19.

The Authority has been closely tracking traffic volume on the E-470 Toll Road as a result of these recent developments. *See* "HISTORICAL TOLL RATES AND REVENUES; HISTORICAL DEBT SERVICE COVERAGE – 2020 Toll Transactions." While traffic volume has been negatively impacted and will likely remain reduced for the immediate future, the Authority currently has unrestricted funds which are available to pay debt service when due. However, there is no certainty that such unrestricted funds together with toll revenues will be sufficient to pay debt service or that the continued spread of the coronavirus in the United States and the State will not have a material adverse effect on the Authority's operations and its financial condition and, while such unrestricted funds are pledged to the payment of the Bonds while they are on deposit in the Surplus Fund, the Resolutions permit the Authority to withdraw such unrestricted funds from the General Surplus Account of the Surplus Fund for any lawful purpose so long as there is no current shortfall in the Debt Service Fund. See "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Surplus Fund – Use of General Surplus Account," "– Pledge of Trust Estate," "– Flow of Funds; Fund Balances" and "– Other Transfers to Debt Service Fund" herein.

Traffic and Revenue Projections

Highway tolls are the predominant source of revenue available to pay debt service on the Senior Bonds, including the Series 2020A Bonds. The May 2020 Comprehensive Traffic & Revenue Study projects the future traffic volume of the E-470 Toll Road and future toll revenues of the E-470 Toll Road. The Traffic and Revenue Consultant has not reviewed or updated the assessment or estimates set forth in the May 2020 Comprehensive Traffic & Revenue Study since its date. Accordingly, the information included in the May 2020 Comprehensive Traffic & Revenue Study does not take into account facts and circumstances that occurred between the date of that study and the date of this Official Statement. *See* "THE AUTHORITY – Financial Information Concerning the Authority – *Summary of Operations*" and "HISTORICAL TOLL RATES AND REVENUES; HISTORICAL DEBT SERVICE COVERAGE." The achievement of financial and other projections is dependent upon future events that cannot be assured. The ultimate use of the E-470 Toll Road by motorists and the level of toll revenues to be generated through such use will be influenced by numerous factors, including, among others, household and employment trends within the E-470 Toll Road corridor area (including telecommuting practices which have been and may further be increased due to COVID-19), the level of congestion on alternative freeways and arterial highways and time savings experienced by using the E-470 Toll Road, the levels of tolls and their rate of increase over time, the availability of fuel and level of fuel prices, and the construction of new or improved competitive roadways, transit facilities, or transportation modes. *See* **Appendix C**.

The traffic projections of the Traffic and Revenue Consultant are sensitive to changes in, among other assumptions, national, state and local economies, population, household, and employment levels, commuting practices, as well as future levels of activity at Denver International Airport ("**DEN**"). For example, in the event growth in households or employment in the Denver area and the E-470 corridor occurs at rates below that projected or growth in enplanements at DEN occurs at a rate below that projected, traffic levels may be negatively impacted and traffic and revenue projections may not be realized. Neither the Authority nor the Traffic and Revenue Consultant can make any assurances that growth projections in the May 2020 Comprehensive Traffic & Revenue Study will be realized. *See* "THE TRAFFIC & REVENUE STUDY" and "FORWARD-LOOKING STATEMENTS."

The levels of traffic and revenues projected by the Traffic and Revenue Consultant in the May 2020 Comprehensive Traffic & Revenue Study are based upon the toll schedule for vehicle tolls established by the Authority in May 2020 based upon recommendations of the Traffic and Revenue Consultant. *See* "HISTORICAL TOLL RATES AND REVENUES; HISTORICAL DEBT SERVICE COVERAGE" and **Appendices G** and **H** hereto. Furthermore, the variations in distribution of ExpressToll® and LPT customers are likely to impact the toll revenues. For example, higher than expected rates of LPT customers would result in higher gross toll revenues, but could provide lower net toll revenues given higher operating and collection costs. *See* "THE E-470 TOLL ROAD – Toll Collection System – *Uncollectible Amounts*." The impact of future toll rate increases on traffic volume and revenues may vary from the projections of the Traffic and Revenue Consultant. An increase in toll rates may, for example, result in reduced traffic and cause a reduction in toll revenues available to pay debt service on the Series 2020A Bonds. This may occur because motorists no longer believe that any time savings obtained by using the E-470 Toll Road is worth the expense of using it. Although the Authority does not intend to change the pricing structure in a way that would materially reduce the net revenues, the Authority cannot assure that such changes in the toll rate structure will not have a negative impact on the net revenues. Furthermore, if the revenues realized are below projections, the Authority may raise toll rates to pay debt service on the Senior Bonds or otherwise satisfy the revenue covenant under the Resolutions. There is no assurance that Revenues resulting from tolls will increase proportionately or at all as a consequence of changes in toll structure.

Actual results have varied from past projections and forecasts and likely will continue to vary from the projections and forecasts contained in the May 2020 Comprehensive Traffic & Revenue Study. If the levels of toll revenues generated by the E-470 Toll Road are significantly lower than the projections in the May 2020 Comprehensive Traffic & Revenue Study, the Authority may not have sufficient funds to pay all debt service requirements on the Series 2020A Bonds or the debt service coverage ratios projected in Table 11 – "Projected Debt Service Coverage on Senior Bonds" may not be achieved.

Operating Costs

The costs of operating and maintaining the E-470 Toll Road, payable under the terms of operation and maintenance (O&M) contracts (*see* "THE E-470 TOLL ROAD – Operation and Maintenance" and "– Toll Collection System"), as well as the administrative expenses of the Authority, are included in Operating Expenses (as defined in the Resolutions). Operating Expenses are payable *prior* to the payment of debt service on the Senior Bonds, including the Series 2020A Bonds. There can be no assurance that there will be no unexpected or unexpectedly costly roadway maintenance requirements that exceed amounts available to the Authority from other sources. The Authority has three major O&M contracts covering maintenance of the toll collection system, operation of the customer service center, and maintenance of the roadway itself together with snow removal as required. The O&M contracts are scheduled to expire before the final maturity of the Series 2020A Bonds, and there can be no assurance that the contracts or any additional renewals thereof can be negotiated within the assumed costs reflected in the projections in this Official Statement. *See* "THE E-470 TOLL ROAD – Operation and Maintenance." If the actual costs significantly exceed the costs assumed in the Traffic and Revenue

Consultant's projections, the Authority may not have sufficient funds to pay all debt service requirements on the Series 2020A Bonds.

Construction Costs – Master Plan for Capital Improvements

In connection with the capital improvement projects included in the Authority's master plan, there is the possibility of time delays and cost increases resulting from (i) design and construction problems and resulting change orders, (ii) environmental litigation or environmental administrative matters, (iii) the unavailability or cost of acquiring right-of-way, (iv) archeological, historic and unidentified subsurface conditions, (v) utility relocation problems, (vi) hazardous materials, (vii) force majeure events, (viii) litigation, or (ix) inflation. As a result, there can be no assurance that the costs of completion for the capital improvement projects under the Authority's master plan will not exceed current estimates, or that the completion of such projects will not be delayed beyond the scheduled completion date. Variations in cost estimates and delays in construction could be material. Furthermore, the Authority's master plan is subject to change, including the improvement projects and costs included therein.

There is also a possibility of insolvency or bankruptcy of the contractors during construction of one or more of the capital improvement projects included in the Authority's master plan. While the contractors will be required to provide a performance bond and a payment bond, there can be no assurance that such bonds will be sufficient to assure timely completion of such projects. Moreover, in the event that a default occurs under a construction contract by the contractor, there is a possibility of litigation between the Authority and the providers of the performance bonds and payment bonds and/or the contractor, which could further delay construction and the completion of such projects. Any such delays and/or cost overruns could result in a substantial increase in the costs of the capital improvement projects in the master plan.

DEN Activity

The use of the E-470 Toll Road by motorists and the level of toll revenues to be generated through such use will be influenced in part by DEN activity and associated vehicular traffic (including airport trips for airport employees, passengers, and air service and air cargo) as well as use of the train now in service from Union Station in downtown Denver to DEN. Airports in the United States, including DEN, have been acutely impacted by the broad-based economic shutdown resulting from efforts to stop the spread of COVID-19, including reductions in flights and declines in passenger volumes. The outbreak has adversely affected domestic and international travel and travel-related industries. Airlines are reporting unprecedented downturns in passenger volumes that, in turn, have resulted in significant reductions in scheduled service nationwide. The activity levels at DEN and the commercial airlines that service DEN may also be affected by many other factors including, without limitation: service and cost competition, mergers, the availability and cost of fuel and other necessary supplies, national and international disasters and hostilities, terrorism, the cost and availability of employees, airline bankruptcies, strikes and other employee disruptions, the maintenance and replacement requirements of aircraft, the availability of routes and slots at various airports, litigation liability, regulation by the federal government, environmental risks and regulations, noise abatement concerns and regulation, the onset of war and the threat of renewed terrorist attacks, federal and state bankruptcy, and insolvency laws and other risks. In a recent Operational Update dated May 21, 2020, DEN reported that traffic through TSA checkpoints was down approximately 89% during the week of May 10 to May 16, 2020 as compared to the same week in 2019.

Transportation Network and Potential Competition

Construction of competing transportation improvements may adversely impact vehicular use of and toll revenues for the E-470 Toll Road.

In 2008, Jefferson County, the City of Arvada, and the City and County of Broomfield created the Jefferson Parkway Public Highway Authority ("**JPPHA**") for the purpose of extending the current beltway around the western perimeter of the Denver metropolitan area from approximately Colorado State Highway 128 near the Northwest Parkway to Colorado State Highway 93, such extension being referred to as the Jefferson Parkway. The Jefferson Parkway Public Highway Authority engaged in a request for qualifications process in 2018 which resulted in the submission of five statements of qualifications from public private partnership teams, which were narrowed by the JPPHA Board to three qualified candidates from whom JPPHA has solicited requests for proposal. In 2019 the JPPHA planned to issue a request for proposals to a subset of those teams which submitted responses to the request for qualifications. However, while JPPHA was conducting voluntary soils sampling in its proposed right-of-way just west of Indiana Street in a portion of the Rocky Flats buffer area, one anomalous soil sample was found with elevated plutonium levels. JPPHA is working with the Colorado Department of Health and Environment ("**CDPHE**") on additional sampling and CDPHE may initiate a risk analysis specifically for construction activities for the Parkway for both workers and nearby residents. A determination on the extent and duration of such an analysis is anticipated to be made in the next several months. Several months ago, the City and County of Broomfield's city council adopted a resolution seeking to withdraw from the JPPHA. COVID-19 has delayed withdrawal discussions among the JPPHA members. The Authority cannot predict the impact upon possible construction of Jefferson Parkway of the current Jefferson Parkway actions, the City and County of Broomfield's resolution or procurement process issues. Further, the Authority cannot predict the impact the Jefferson Parkway, when and if constructed, might have on vehicular use of and toll revenues for the E-470 Toll Road.

In 2013, the High Performance Transportation Enterprise ("**HPTE**"), a division of the Colorado Department of Transportation ("**CDOT**"), entered into a concession agreement with Plenary Roads Denver LLC ("**Plenary**") under which Plenary agreed to design, build, finance, operate and maintain a managed manage expansion of highway US-36 between Broomfield and Boulder. In exchange, Plenary has been granted the right to collect tolls on the managed lanes along the entire length of US-36 from I-25 to Boulder. The Authority, HPTE, and Plenary executed an interim tolling services agreement for the existing I-25 managed lanes in early 2014, and entered into a Managed Lanes Tolling Services Agreement by and among HPTE, the Authority and Plenary dated May 7, 2015 for the I-25 Central managed lanes and the US 36 managed lanes for the entire concession term (the "**Concession TSA**"). The Authority and HPTE have also entered into a separate Managed Lanes Tolling Services Agreement covering HPTE tolling facilities, which may be expanded from time to time per the terms of the agreement and which currently includes I-25 North Segment 2 and the I-70 Mountain Express Lane (the "**HPTE TSA**"), with a current term date of June 30, 2023. Under these agreements the Authority provides certain electronic toll collection back office, administrative and adjudication services for a fee. These agreements provide economies of scale for toll collection costs and seamless interoperability for customers on Colorado toll facilities, allowing them to maintain and manage one toll account. As part of the agreements, the Authority collects electronic tolls for the other tolling facilities and transfers the funds daily to NWP (ExpressToll® only) and to HPTE/Plenary (ExpressToll®, LPT, and other fees) for transactions that occurred and were collected on their toll facilities. The Authority cannot predict the impact the managed lane expansion of other future express lanes have on vehicular use of and toll revenues for the E-470 Toll Road.

On March 25, 2015, HPTE and CDOT released a request for qualifications for a concessionaire to design, build, finance, operate and maintain an expansion project along Interstate 70 between Interstate 25 and Tower Road in Denver (the "**Central 70 Project**"). The Central 70 Project is expected to include both managed toll lanes and untolled general purpose lanes. Additionally, it is anticipated that HPTE will open other express lanes in the future, including the I-25 North Segment 3 Project and the C-470 Express Lanes Project. Kiewit Meridiam Partners was selected as the concessionaire and entered into a Project Agreement dated November 21, 2017 with HPTE. Construction of the Central 70 Project commenced in August 2018 and the completion date is slated for 2022. The Authority cannot predict the impact that these express lanes might have on vehicular use of and toll revenues for the E-470 Toll Road.

Impact of General Economic Factors

The general state of the national and Colorado economies and employment has improved over the last several years. However, domestic and international economic and financial uncertainties have had, and may once again have, negative repercussions upon the national and global economies, including a scarcity of credit, lack of confidence in the financial sector, volatility in the financial markets, federal and state budget difficulties, reduced business activity, increased consumer bankruptcies, and increased business failures and bankruptcies. Congress, the Federal Reserve Board, and other agencies of the federal government and foreign governments have taken various actions that are designed to enhance liquidity, improve the performance and efficiency of credit markets, and generally stabilize securities markets and stimulate spending. There can be no assurance these actions will be effective or continue.

The impact of the economic uncertainties, including without limitation its impact on the availability of credit, personal, corporate, and governmental revenues, may adversely affect future revenues and expenses and, consequently, the ability of the Authority to repay the Senior Bonds. Revenues and expenses may also be adversely affected by future economic conditions, which may include an inability to control expenses in periods of inflation, higher unemployment rates, reduction of new construction activities and weaker housing market in the areas surrounding the E-470 Toll Road, higher fuel prices, and other factors. In addition, general market disruptions have affected and could continue to adversely affect the value of the Authority's investments.

These and other risks may adversely affect the Authority and jeopardize its ability to generate Revenues and its ability to make payments on the Senior Bonds.

Hedge Risks

The Authority previously entered into Swap Agreements and may in the future enter into additional hedge instruments with respect to the Senior Bonds. *See* "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Existing Swap Agreements" for a description of the Authority's existing Swap Agreements.

The Swap Agreements provide for a termination event in the event that the Authority's credit rating is downgraded below investment grade by either Moody's or S&P. *See* "RATINGS" herein for information on the Authority's current credit ratings. The Swap Agreements also provide for other termination events resulting from credit related circumstances. Such events could result in termination payments being due from the Authority to the respective counterparties under the Swap Agreements. The amount of any termination payment would be determined at the time of termination of the swap. Based upon the market conditions prevailing at the time of termination, the amount of any such termination payment(s) payable by the Authority to one or more swap providers, or by one or more of the swap providers to the Authority, could be substantial and could have a material adverse impact on the liquidity position of the Authority. As of December 31, 2019 and April 30, 2020, the Swap Agreements had a combined negative fair value of ($50,169,451) and ($74,215,024), respectively. Under the terms of the Resolutions, payment of the swap termination payments is subordinate to the payment of debt service on the Bonds and such termination payments are payable from the Surplus Fund. *See* "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Existing Swap Agreements," " – Surplus Fund" and "– Flow of Funds."

The Swap Agreements may also expose the Authority to basis risk. If the expected relationship between the variable interest rates on the applicable Senior Bonds of the Authority and the variable rates received by the Authority under the related Swap Agreements is not maintained, the rates received by the Authority from the respective counterparties may be inadequate to cover the Authority's total interest payments due on the applicable Senior Bonds.

Changes and Reforms Relating to LIBOR

On July 27, 2017, the Financial Conduct Authority (the "**FCA**") announced that it will no longer persuade or compel banks to submit rates for the calculation of the LIBOR rates after December 31, 2021 (the "**FCA Announcement**"). All of the Authority's Swap Agreements use a LIBOR based rate as a reference rate for determining the payment obligations of the counterparties thereunder. Additionally, certain series of the Authority's outstanding bonds (such as the Series 2017B Bonds and Series 2019A Bonds) use a LIBOR based rate as a reference rate for determining the interest rate on such series of bonds. It is not possible to predict the effect of the FCA Announcement, any changes in the methods pursuant to which the LIBOR rates are determined or any other reforms to LIBOR that may be enacted, any of which may adversely affect the determination of LIBOR rates or result in the phasing out of LIBOR as a reference rate. Any such effects could result in a sudden or prolonged increase or decrease in reported LIBOR rates, or result in the replacement of LIBOR with other reference rates, and could have a negative impact on the market value of the Authority's Swap Agreements and the payment obligations of the counterparties thereunder, and/or significantly increase the interest payable on the Authority's outstanding floating rate bonds.

Default and Remedies; No Acceleration

The Resolutions do not provide for any acceleration of the Series 2020A Bonds if an Event of Default occurs. The rights of the holders of the Series 2020A Bonds and the enforceability of the Series 2020A Bonds may be subject to bankruptcy, insolvency, reorganization, moratorium, and other similar laws affecting creditors' rights and are in many respects dependent upon regulatory and judicial enforcement actions which are often subject to discretion and delay. Enforcement may be subject to the exercise of judicial discretion in accordance with general principles of equity, and may be limited by the reasonable exercise of police powers of the State of Colorado and by restrictions on remedies against public entities. No assurances can be given that a court or regulatory agency would enforce the rights or types of remedies available under the Resolutions. The various legal opinions to be delivered concurrently with the delivery of the Series 2020A Bonds will be qualified as to the enforceability of these rights and remedies, for example, by limitations imposed by bankruptcy, insolvency, reorganization, and other similar laws affecting creditors' rights and by principles of equity.

Information Technology and Cybersecurity Risks

The Authority is dependent on information and computing technology to conduct general business operations, including electronic toll transactions, toll collections and customer account services. These systems may be subject to disruptions or security breaches, which could materially disrupt the Authority's business operations, cause reputational damage, and/or give rise to losses or legal liability. The Authority's information technology department continually monitors these threats and has implemented practices, policies, security systems, and design features to protect the security of its information technology systems and data. However, no assurance can be given that such measures will fully prevent potential business continuity or cybersecurity risks arising from events wholly or partially beyond the Authority's control, including electrical telecommunications outages, natural disasters, or cyber-attacks, or large scale political events, including terrorist attacks. Any such occurrence could materially and adversely affect the Authority's operations and reputation, which could lead to decreased financial performance that insurance may not cover and may require the Authority to expend significant resources to correct the failure or disruption.

LITIGATION

There is no action, suit, proceeding, inquiry, or investigation at law or in equity or before or by any court, public board, or body pending or, to the knowledge of the Authority, threatened against or affecting the Authority or, to its knowledge, any basis therefor, wherein an unfavorable decision, ruling or finding would materially adversely affect the operations or properties of the Authority, the transactions contemplated by this Official Statement or the validity of the Series 2020A Bonds, the Resolutions, or any agreement or instrument to which the Authority is a party and which is used or completed for use in the transactions contemplated by this Official Statement.

CONSULTANTS

The Authority retained CDM Smith Inc. to prepare the May 2020 Comprehensive Traffic & Revenue Study, which is included herein at **Appendix C** of this Official Statement in reliance upon the knowledge and expertise of CDM Smith Inc. Stifel, Nicolaus & Company, Incorporated, Denver Colorado, has acted as Municipal Advisor to the Authority with respect to the issuance of the Series 2020A Bonds.

FINANCIAL STATEMENTS

The audited financial statements of the Authority for the fiscal years ended December 31, 2019 and 2018, are included herein at **Appendix B**. KPMG LLP, the Authority's independent auditor, has not been engaged to perform and has not performed, since the date of its report included herein at **Appendix B**, any procedures on the financial statements addressed in that report. KPMG LLP also has not performed any procedures relating to this Official Statement.

TAX MATTERS

General Matters

In the opinion of Kutak Rock LLP, Bond Counsel, under existing laws, regulations, rulings and judicial decisions, interest on the Series 2020A Bonds is excludable from gross income for federal income tax purposes and is not a specific preference item for purposes of the federal alternative minimum tax. The opinion described above assumes the accuracy of certain representations and compliance by the Authority with covenants designed to satisfy the requirements of the Code that must be met subsequent to the issuance of the Series 2020A Bonds. Failure to comply with such requirements could cause interest on the Series 2020A Bonds to be included in gross income for federal income tax purposes retroactive to the date of issuance of the Series 2020A Bonds. The Authority has covenanted to comply with such requirements. Bond Counsel has expressed no opinion regarding other federal tax consequences arising with respect to the Series 2020A Bonds.

The accrual or receipt of interest on the Series 2020A Bonds may otherwise affect the federal income tax liability of the owners of the Series 2020A Bonds. The extent of these other tax consequences will depend on such owners' particular tax status and other items of income or deduction. Bond Counsel has expressed no opinion regarding any such consequences. Purchasers of the Series 2020A Bonds, particularly purchasers that are corporations (including S corporations and foreign corporations operating branches in the United States of America), property or casualty insurance companies, banks, thrifts or other financial institutions, certain recipients of social security or railroad retirement benefits, taxpayers entitled to claim the earned income credit, taxpayers entitled to claim the refundable credit in Section 36B of the Code for coverage under a qualified health plan, or taxpayers who may be deemed to have incurred or continued indebtedness to purchase or carry tax exempt obligations, should consult their tax advisors as to the tax consequences of purchasing or owning the Series 2020A Bonds.

Bond Counsel is also of the opinion that, under existing State of Colorado statutes, the Series 2020A Bonds and the income therefrom are exempt from State of Colorado taxation, except inheritance, estate, and transfer taxes. Bond Counsel has expressed no opinion regarding other tax consequences arising with respect to the Series 2020A Bonds under the laws of Colorado or any other state or jurisdiction.

Original Issue Premium

The Series 2020A Bonds that have an original yield below their respective interest rates, as shown on the inside cover of this Official Statement (collectively, the "**Premium Bonds**"), are being sold at a premium. An amount equal to the excess of the issue price of a Premium Bond over its stated redemption price at maturity constitutes premium on such Premium Bond. A purchaser of a Premium Bond must amortize any premium over such Premium Bond's term using constant yield principles, based on the purchaser's yield to maturity (or, in the case of Premium Bonds callable prior to their maturity, generally by amortizing the premium to the call date, based on the purchaser's yield to the call date and giving effect to any call premium). As premium is amortized, the amount of the amortization offsets a corresponding amount of interest for the period, and the purchaser's basis in such Premium Bond is reduced by a corresponding amount resulting in an increase in the gain (or decrease in the loss) to be recognized for federal income tax purposes upon a sale or disposition of such Premium Bond prior to its maturity. Even though the purchaser's basis may be reduced, no federal income tax deduction is allowed. Purchasers of the Premium Bonds should consult their tax advisors with respect to the determination and treatment of premium for federal income tax purposes and with respect to the state and local tax consequences of owning a Premium Bond.

Recognition of Income Generally

Section 451 of the Code was amended by Pub. L. No. 115-97, enacted December 22, 2017 (sometimes referred to as the Tax Cuts and Jobs Act), to provide that taxpayers using an accrual method of accounting for federal income tax purposes generally will be required to include certain amounts in income, including original issue discount, no later than the time such amounts are reflected on certain financial statements of such taxpayer. The application of this rule may require the accrual of income earlier than would have been the case prior to the amendment of Section 451 of the Code. Investors should consult their own tax advisors regarding the application of this rule and its impact on the timing of the recognition of income related to the Series 2020A Bonds under the Code.

Backup Withholding

As a result of the enactment of the Tax Increase Prevention and Reconciliation Act of 2005, interest on tax-exempt obligations such as the Series 2020A Bonds is subject to information reporting in a manner similar to interest paid on taxable obligations. Backup withholding may be imposed on payments to any owner of the Series 2020A Bonds that fails to provide certain required information including an accurate taxpayer identification number to any person required to collect such information pursuant to Section 6049 of the Code. The reporting requirement does not in and of itself affect or alter the excludability of interest on the Series 2020A Bonds from gross income for federal income tax purposes or any other federal tax consequence of purchasing, holding, or selling tax-exempt obligations.

Changes in Federal and State Tax Law

From time to time, there are legislative proposals in the Congress and in the states that, if enacted, could alter or amend the federal and state tax matters referred to under this heading "TAX MATTERS" or adversely affect the market value of the Series 2020A Bonds. It cannot be predicted whether or in what form any such proposal might be enacted or whether if enacted it would apply to bonds issued prior to enactment. In addition, regulatory actions are from time to time announced or proposed and litigation is threatened or commenced which, if implemented or concluded in a particular manner, could adversely affect the market value of the Series 2020A Bonds. It cannot be predicted whether any such regulatory action will be implemented, how any particular litigation or judicial action will be resolved, or whether the Series 2020A Bonds or the market value thereof would be impacted thereby. Purchasers of the Series 2020A Bonds should consult their tax advisors regarding any pending or proposed legislation, regulatory initiatives, or litigation. The opinions expressed by Bond Counsel are based on existing legislation and regulations as interpreted by relevant judicial and regulatory authorities as of the date of issuance and delivery of the Series 2020A Bonds, and Bond Counsel has expressed no opinion as of any date subsequent thereto or with respect to any pending legislation, regulatory initiatives, or litigation.

PROSPECTIVE PURCHASERS OF THE SERIES 2020A BONDS ARE ADVISED TO CONSULT THEIR OWN TAX ADVISORS PRIOR TO ANY PURCHASE OF THE SERIES 2020A BONDS AS TO THE IMPACT OF THE CODE UPON THEIR ACQUISITION, HOLDING OR DISPOSITION OF THE SERIES 2020A BONDS.

LEGAL MATTERS

A form of the legal opinion of Kutak Rock LLP, Denver, Colorado, Bond Counsel, that will be delivered in connection with the issuance of the Series 2020A Bonds is attached as **Appendix D** hereto. Certain legal matters will be passed upon for the Authority by its special counsel Hogan Lovells US LLP, Denver, Colorado, and its general counsel Icenogle Seaver Pogue, PC, Denver, Colorado. The Underwriters have been represented by Stradling Yocca Carlson & Rauth P.C., Denver, Colorado. Certain fees of legal counsel are contingent upon the successful offering of the Series 2020A Bonds.

RATINGS

S&P Global Ratings ("**S&P**") and Moody's Investors Service, Inc. ("**Moody's**") have assigned the Series 2020A Bonds ratings of "A" (negative) and "A2" (stable), respectively, based on the credit rating of the Authority.

Each rating reflects only the views of such rating agency. Any explanation of the significance of such rating may only be obtained from such rating agency. The Authority has furnished to the rating agencies certain information and materials relating to the Series 2020A Bonds and the E-470 Toll Road, including certain information and materials which have not been included in this Official Statement. There is no assurance that any of the ratings will continue for any given period of time, or that any of the ratings will not be revised downward or withdrawn entirely by any such rating agency if, in its judgment, circumstances so warrant. Any such downward revision or withdrawal of any such rating is likely to have an adverse effect on the market price and marketability of the Series 2020A Bonds. The Authority and the Underwriters have undertaken no responsibility to oppose any such revision or withdrawal.

CERTAIN RELATIONSHIPS OF PARTIES

Morgan Stanley & Co. LLC is an Underwriter of the Series 2020A Bonds and its affiliate, MSCS, is a party to a Swap Agreement with the Authority. J.P. Morgan Securities LLC, an Underwriter of the Series 2020A Bonds, is also an affiliate of JPMorgan which is a party to a Swap Agreement with the Authority. *See* "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Existing Swap Agreements."

UNDERWRITING

J.P. Morgan Securities LLC, Morgan Stanley & Co. LLC and Jefferies LLC (the "**Underwriters**") have agreed to purchase the Series 2020A Bonds from the Authority pursuant to a Bond Purchase Agreement entered into by and between the Authority and the Underwriters for the Series 2020A Bonds (the "**Bond Purchase Agreement**"), at a price equal to the principal amount of the Series 2020A Bonds plus an original issue premium of $39,035,271.90 less an Underwriters' discount of $754,943.88. The Bond Purchase Agreement provides that the Underwriters will purchase all of the Series 2020A Bonds if any are purchased. The obligation of the Underwriters to accept delivery of the Series 2020A Bonds is subject to various conditions of the Bond Purchase Agreement.

The Underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include sales and trading, commercial and investment banking, advisory, investment management, investment research, principal investment, hedging, market making, brokerage and other financial and non-financial activities and services. Certain of the Underwriters and their respective affiliates have provided, and may in the future provide, a variety of these services to the Authority and to persons and entities with relationships with the Authority, for which they received or will receive customary fees and expenses. Under certain circumstances, the Underwriters and their respective affiliates may have certain creditor and/or other rights against the Authority in connection with such activities and services. In the ordinary course of their various business activities, the Underwriters and their respective affiliates, officers, directors and employees may purchase, sell or hold a broad array of investments and actively traded securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments for their own account or for the accounts of their customers, and such investment and trading activities may involve or relate to assets, securities and/or instruments of the Authority (directly, as collateral securing other obligations or otherwise) and/or persons and entities with relationships with the Authority. The Underwriters and their respective affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such assets, securities or instruments and may at any time hold, or recommend to clients that they should acquire, long and/or short positions in such assets, securities and instruments. The Underwriters have provided the following sentence for inclusion in this Official Statement: "Each Underwriter has reviewed the information in this Official Statement in accordance with and as part of its respective responsibilities to investors under the federal securities laws as applied to the facts and circumstances of this transaction, but no Underwriter guarantees the accuracy or completeness of such information."

J.P. Morgan Securities LLC ("**JPMS**"), an Underwriter of the Series 2020A Bonds, has entered into negotiated dealer agreements (each, a "**Dealer Agreement**") with each of Charles Schwab & Co., Inc. ("**CS&Co.**") and LPL Financial LLC ("**LPL**") for the retail distribution of certain securities offerings at the original issue prices. Pursuant to each Dealer Agreement, each of CS&Co. and LPL may purchase Series 2020A Bonds from JPMS at the original issue price less a negotiated portion of the selling concession applicable to any Series 2020A Bonds that such firm sells.

Morgan Stanley & Co. LLC has entered into a retail distribution arrangement with its affiliate Morgan Stanley Smith Barney LLC. As part of the distribution arrangement, Morgan Stanley & Co. LLC may distribute municipal securities to retail investors through the financial advisor network of Morgan Stanley Smith Barney LLC. As part of this arrangement, Morgan Stanley & Co. LLC may compensate Morgan Stanley Smith Barney LLC for its selling efforts with respect to the Series 2020A Bonds.

VERIFICATION

Causey, Demgen & Moore P.C. (the "**Verification Agent**") will independently verify, and issue a report thereon, the arithmetical accuracy of the computations included in schedules provided to them by the Municipal Advisor indicating that the amount to be deposited under the 2020A Escrow Agreement, when invested in Federal Securities, will be sufficient to pay the redemption price of and interest on the Refunded Bonds on and to the Redemption Date. Such verification will be based solely on assumptions and information supplied by the Municipal Advisor. Furthermore, the Verification Agent will have restricted its procedures to verifying the arithmetical accuracy of such computations and will not have made any study or evaluation of the assumptions and information on which the computations were based and, accordingly, will not express an opinion on such assumptions and information, the reasonableness of such assumptions, or the achievability of future events. Such verification, information, and assumptions will be relied upon by Bond Counsel in rendering its opinion described herein.

CONTINUING DISCLOSURE UNDERTAKING

The Authority has covenanted, for the benefit of the owners of the Series 2020A Bonds, in a continuing disclosure undertaking executed in connection with the issuance of the Series 2020A Bonds, to provide (i) certain financial information and operating data related to the Authority not later than 210 days after the end of each fiscal year, commencing with the fiscal year ended December 31, 2020 (the "**Annual Financial Information**"), (ii) the annual budget of the Authority adopted by the Board, within 30 days after the end of each fiscal year commencing with the fiscal year ended December 31, 2021 ("**Annual Budget Information**"), and (iii) notices of the occurrence of certain enumerated events ("**Event Notices**"). The Annual Financial Information and Annual Budget Information and the notices of certain enumerated events will be filed by the Authority or its designee for such purpose with the MSRB through the EMMA system. *See* **Appendix E** hereto for the form of the Authority's Continuing Disclosure Undertaking.

The Authority believes that it has materially complied during the past five years with all of its outstanding continuing disclosure undertakings entered pursuant to Rule 15c2-12 adopted by the Securities and Exchange Commission under the Securities Exchange Act of 1934. The Authority believes that it has implemented appropriate procedures to ensure future compliance with such continuing disclosure undertakings.

TRUSTEE

The Authority appointed U.S. Bank National Association, a national banking association organized under the laws of the United States, to serve as Trustee, Registrar and Paying Agent for the Series 2020A Bonds. The Trustee carries out those duties assignable to it under the Resolutions. Except for the contents of this section, the Trustee has neither reviewed nor participated in the preparation of this Official Statement and does not assume any responsibility for the nature, completeness, contents, or accuracy of the Official Statement.

Furthermore, the Trustee has no oversight responsibility, and is not accountable, for the use or application by the Authority of any of the Series 2020A Bonds authenticated or delivered pursuant to the Resolutions or for the use or application of the proceeds of such Series 2020A Bonds by the Authority. The Trustee has not evaluated the risks, benefits, or propriety of any investment in the Series 2020A Bonds and makes no representation, and has reached no conclusions regarding the value or condition of any assets pledged or assigned as security for the Series 2020A Bonds or the investment quality of the Series 2020A Bonds, about all of which the Trustee expresses no opinion and expressly disclaims the expertise to evaluate.

Additional information about the Trustee and its services may be found at U.S. Bank National Association's website at usbank.com/corporatetrust. U.S. Bank National Association's website is not incorporated into this Official Statement by such reference and is not a part hereof.

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ADDITIONAL INFORMATION

The description and summaries in this Official Statement of the Series 2020A Bonds, the Continuing Disclosure Undertaking, various agreements, statutes and other reports, documents, and instruments do not purport to be complete, comprehensive, or definitive, and each such description or summary is qualified in its entirety by reference to each such agreement, document, report, certificate, statute, or instrument for a complete statement of its provisions. Copies of such agreements, documents, reports, certificates, and other instruments generally are available upon written request to the Authority's Director of Finance at the Authority's offices at 22470 East Stephen D. Hogan Parkway, Aurora, Colorado 80018, telephone (303) 537-3470.

The attached Appendices are integral parts of this Official Statement and should be read in their entirety.

E-470 PUBLIC HIGHWAY AUTHORITY

By: /s/ Tim Stewart
Executive Director

By: /s/ Jason Myers
Director of Finance

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APPENDIX A

FORM OF THE RESOLUTIONS

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FORM OF

E-470 PUBLIC HIGHWAY AUTHORITY

AMENDED AND RESTATED MASTER BOND RESOLUTION

authorizing

E-470 Public Highway Authority Revenue Bonds

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A RESOLUTION AMENDING AND RESTATING IN ITS ENTIRETY THE E-470 PUBLIC HIGHWAY AUTHORITY'S RESOLUTION NO. 97-13, AS PREVIOUSLY AMENDED AND SUPPLEMENTED, WHICH RESOLUTION 97-13 WAS ADOPTED FOR THE PURPOSE OF AUTHORIZING THE ISSUANCE OF E-470 PUBLIC HIGHWAY AUTHORITY REVENUE BONDS FOR THE FINANCING, CONSTRUCTING, OPERATING AND MAINTAINING A PUBLIC HIGHWAY, ESTABLISHING GENERAL PROVISIONS RELATING THERETO, THE MANNER AND TERMS OF THEIR ISSUANCE, AND THE SECURITY THEREFOR, PROVIDING FOR THE COLLECTION AND DISPOSITION OF REVENUES, PLEDGING SUCH REVENUES, ESTABLISHING FUNDS AND ACCOUNTS IN CONNECTION THEREWITH, AND PROVIDING VARIOUS COVENANTS, AGREEMENTS AND OTHER DETAILS RELATING TO THE BONDS AND THE PUBLIC HIGHWAY; RATIFYING ACTION PREVIOUSLY TAKEN RELATING TO THE FOREGOING; PROVIDING OTHER MATTERS RELATING THERETO; AND PROVIDING THE EFFECTIVE DATE HEREOF.

WHEREAS, the E-470 Public Highway Authority (the "Authority") is authorized by Sections 43-4-501 et seq., C.R.S., as amended (the " Public Highway Authority Law" or the "PHA Law"), to finance, operate, construct and maintain public highways, to issue revenue bonds for any of its corporate purposes, and to pledge all or a specified portion of its revenues to the payment of such bonds; and

WHEREAS, the Authority is the owner of, and is responsible for financing, constructing, operating and maintaining, the public highway known as E-470 and all other elements of a "Public Highway," as such term is defined the PHA Law (as more fully described in Section 1.01 hereof, the "Project"); and

WHEREAS, the Board of Directors of the Authority (the "Board") has, on August 14, 1997, adopted its Resolution No. 97-13, the Authority's original Master Bond Resolution (the "Original Master Resolution"); and

WHEREAS, the Original Master Resolution was adopted for the purpose of (a) authorizing the issuance of the E-470 Public Highway Authority Revenue Bonds in one or more series from time to time on the terms set forth therein (such bonds, collectively, are referred to as the "Authority Bonds"), for the purpose of financing, constructing, operating and maintaining the Project, (b) pledging all or a specified portion of the Authority's revenues, consisting of the Revenues (as defined herein), for the payment of the Authority Bonds and (c) making other covenants and agreements and providing other details with respect to the Authority Bonds, subject to and in accordance with the terms thereof; and

WHEREAS, pursuant to the authority of the Original Master Resolution, the Authority has previously adopted the following supplemental bond resolutions (collectively, the "Prior

Supplemental Resolutions") for the purpose of authorizing the issuance of the several series of Authority Bonds:

(a) the First Supplemental Bond Resolution (as amended, the "First Supplemental Resolution") adopted by the Board on August 14, 1997;

(b) the Second Supplemental Bond Resolution (as amended, the "Second Supplemental Resolution") adopted by the Board on April 27, 2000;

(c) the Third Supplemental Bond Resolution (as amended, the "Third Supplemental Resolution") adopted by the Board on May 10, 2001;

(d) the Fourth Supplemental Resolution (the "Fourth Supplemental Resolution") adopted by the Board on December 9, 2004;

(e) the Fifth Supplemental Resolution (the "Fifth Supplemental Resolution") adopted by the Board on August 24, 2006;

(f) the Amended and Restated Sixth Supplemental Bond Resolution (as amended, the "Sixth Supplemental Resolution") adopted by the Board on May 24, 2007;

(g) the Seventh Supplemental Bond Resolution (as amended, the "Seventh Supplemental Resolution") adopted by the Board on May 22, 2008;

(h) the Eighth Supplemental Bond Resolution (the "Eighth Supplemental Resolution") adopted by the Board on March 26, 2009;

(i) the Ninth Supplemental Bond Resolution (the "Ninth Supplemental Resolution") adopted by the Board on October 14, 2010;

(j) the Tenth Supplemental Bond Resolution (the "Tenth Supplemental Resolution") adopted by the Board on August 11, 2011;

(k) the Eleventh Supplemental Bond Resolution (the "Eleventh Supplemental Resolution") adopted by the Board on July 25, 2013;

(l) the Twelfth Supplemental Bond Resolution (the "Twelfth Supplemental Resolution") adopted by the Board on January 23, 2014;

(m) the Thirteenth Supplemental Bond Resolution adopted by the Board on October 23, 2014 (the "Thirteenth Supplemental Resolution");

(n) the Fourteenth Supplemental Bond Resolution adopted by the Board on May 28, 2015 (the "Fourteenth Supplemental Resolution");

(o) the Fifteenth Supplemental Bond Resolution adopted by the Board on February 9, 2017 (the "Fifteenth Supplemental Resolution"); and

(p) the Amended and Restated Sixteenth Supplemental Bond Resolution adopted by the Board on January 24, 2019 (the "Sixteenth Supplemental Resolution").

WHEREAS, additionally, prior to the adoption of the Original Master Resolution, there were issued the "E-470 Public Highway Authority, acting as assignee and delegatee of Arapahoe County, Colorado, Capital Improvement Trust Fund Highway Revenue Bonds (E-470 Project), Series 1986A-M" (the "1986 Bonds"); and

WHEREAS, the 1986 Bonds were issued for, and the Authority Bonds (collectively with the 1986 Bonds, the "Bonds") have been issued for, and may in the future be issued for, the purpose of financing, constructing, operating and maintaining the Project; and

WHEREAS, pursuant to Article XI of the Original Master Resolution, the Original Master Resolution may be amended upon satisfaction of the requirements set forth in such Article XI; and

WHEREAS, the Prior Supplemental Resolutions have made certain amendments to the Original Master Resolution as provided therein (the Original Master Resolution, as so amended, is referred to herein as the "Prior Master Resolution"); and

WHEREAS, the Board desires to incorporate such amendments, as well as certain additional amendments, into this Amended and Restated Master Resolution; and

WHEREAS, this Amended and Restated Master Resolution (this "Amended and Restated Master Resolution") is being adopted for the purpose of amending and restating the Prior Master Resolution; and

WHEREAS, this Amended and Restated Master Resolution only incorporates and restates actual amendments and deletions made to the Original Master Resolution by the Prior Supplemental Resolutions (as well as certain additional amendments not previously set forth in any Prior Supplemental Resolution); for all other terms and conditions of the Prior Supplemental Resolutions, specific reference is made to said Prior Supplemental Resolutions; and

WHEREAS, additional terms of each series of Authority Bonds issued hereafter will be specified in a Supplemental Resolution adopted as provided herein in connection with the issuance of such series; and

WHEREAS, MBIA Insurance Corporation (as further defined herein, "MBIA") insures the payment of the principal of and interest when due on certain of the Bonds pursuant to certain financial guaranty insurance policies constituting Credit Facilities (as defined herein); and

WHEREAS, National Public Finance Guarantee Corporation ("National") is the Administrator for MBIA pursuant to the Administrative Services Agreement dated as of February 17, 2009, between MBIA and MBIA Insurance Corp. of Illinois, now known as National; and

WHEREAS, pursuant to such agreement, all rights granted to MBIA by the Prior Master Resolution, this Amended and Restated Master Resolution, any Supplemental Resolution or any related document have been ceded by MBIA to National, including, without limitation, the right to be deemed the Owner of all Bonds secured by a Credit Facility issued by MBIA and all rights to consent to, approve or receive notice of any action taken or to be taken under or with respect to the Prior Master Resolution, this Amended and Restated Master Resolution, any Supplemental Resolution or any such related document, and therefore, all references to any exercise of rights by MBIA for all purposes hereof and thereof shall be deemed to refer to National; and

WHEREAS, pursuant to Article XI of the Prior Master Resolution, any modification or amendment of the Prior Master Resolution or any Supplemental Resolution and of the rights and obligations of the Authority and of the Owners (as defined in the Prior Master Resolution) of the Bonds, in any particular, may be made by the satisfaction of the following conditions:

(a) the filing with the Trustee of written consents to such modification or amendment (i) by the Owners of at least 66% of the Bond Obligation (as defined in the Prior Master Resolution) represented by the Bonds that will be Outstanding as of the effective date of such modification or amendment and (ii) in case less than all of the several Tiers (as defined in the Prior Master Resolution) of Bonds Outstanding are affected by the modification or amendment, by the Owners of at least 66% of the Bond Obligation represented by the Bonds of each Tier so affected and Outstanding as of the effective date of such modification or amendment;

(b) the filing with the Trustee of an opinion of Bond Counsel, in form and substance satisfactory to the Trustee and National, stating that such modification or amendment has been duly and lawfully adopted in accordance with the provisions of the Prior Master Resolution, is authorized or permitted by the Master Resolution, is valid and binding upon the Authority and will not adversely affect the exclusion from gross income for federal income tax purposes of any interest on the Bonds; and

(c) the commencement of the tenth day following the filing with the Trustee of proof that a notice has been delivered to a NRMSIR (as defined in the Prior Master Resolution) stating in substance that such modification or amendment has been consented to by the Owners of the required percentages of Bonds and will be effective upon the satisfaction of the conditions described in this recital; and

WHEREAS, it shall be a condition to the effectiveness of this Amended and Restated Master Resolution and the amendments made hereby to the Prior Master Resolution that the above-described conditions set forth in Article XI of the Prior Master Resolution have been satisfied; and

WHEREAS, Section 13.25 of the Prior Master Resolution provides that MBIA shall be deemed to be the Owner of all Bonds secured by a Credit Facility issued by MBIA; and

WHEREAS, as of the date of adoption hereof, MBIA will insure at least 66% of the Bond Obligation represented by the Outstanding Bonds pursuant to such Credit Facilities (the Senior Bonds being the only Tier of Bonds Outstanding as of the date of adoption hereof); and

WHEREAS, pursuant to Section 13.25(g) of the Prior Master Resolution, certain amendments to the Prior Master Resolution made by this Amended and Restated Master

Resolution are not effective without the prior written consent of National, in its individual capacity; and

WHEREAS, the Authority has previously entered into certain interest rate swap agreements with (a) JPMorgan Chase Bank, N.A. (as further defined herein, the "2007 JPM Swap"), and (b) Morgan Stanley Capital Services Inc. (as further defined herein, the "2007 MSCS Swap"); and

WHEREAS, pursuant to Part 4(g)(ii) of the Schedule included in the 2007 JPM Swap, certain amendments to the Prior Master Resolution made by this Amended and Restated Master Resolution are not effective without the prior written consent of JPMorgan Chase Bank, N.A.; and

WHEREAS, pursuant to Part 4(g)(ii) of the Schedule included in the 2007 MSCS Swap, certain amendments to the Prior Master Resolution made by this Amended and Restated Master Resolution are not effective without the prior written consent of Morgan Stanley Capital Services Inc.; and

WHEREAS, such amendments to the Prior Master Resolution made by this Amended and Restated Master Resolution will not be effective until the Trustee and the Authority have received the written consent of National, JPMorgan Chase Bank, N.A. and Morgan Stanley Capital Services Inc. to such amendments; and

WHEREAS, it is hereby determined that all conditions to the adoption of this Amended and Restated Master Bond Resolution by the Authority have been satisfied and that this Amended and Restated Master Bond Resolution shall be effective without further action by the Authority immediately upon its adoption by the Board;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE E-470 PUBLIC HIGHWAY AUTHORITY:

ARTICLE I

DEFINITIONS, STATUTORY AUTHORITY AND INTERPRETATION

Section 1.01. Definitions. For purposes of this Amended and Restated Master Bond Resolution (the "Amended and Restated Master Resolution"), except as otherwise expressly provided or unless the context otherwise requires:

"*Account*" or "*Accounts*" means any one or more of the accounts from time to time created in any of the Funds established by Section 5.02 of this Amended and Restated Master Resolution or by any Supplemental Resolution.

"*Accountant*" means any nationally recognized certified public accountant or firm of certified public accountants or accounting corporation of recognized experience and qualifications, selected by the Authority, and may be the accountant or firm of accountants that regularly audits the books of the Authority.

"*Accountant's Certificate*" means a certificate or opinion signed by the Accountant.

"*Accreted Value*" means the amount defined as such in a Supplemental Resolution for purposes of determining the Redemption Price of, rights of the Owner of or other matters with respect to a Capital Appreciation Bond.

"*Accretion Date*" means any date defined as such in a Supplemental Resolution for purposes of determining the Accreted Value or Maturity Value of any Capital Appreciation Bond.

"*Aggregate Debt Service*" means, for any Fiscal Year or other 12-month period, as of the date of calculation, the sum of the amounts of Debt Service for such Fiscal Year or other 12-month period.

"*Amended and Restated Master Resolution*" means this Resolution, amending and restating in its entirety the Prior Master Resolution, and as it may be amended or supplemented from time to time by any Supplemental Resolution.

"*Amortized Value*" means the value of an Investment Security calculated by adding the amount of the premium paid upon acquisition to the par value of the Investment Security or deducting the amount of the discount received upon acquisition from the par value of the Investment Security, as the case may be, after such premium or discount has been amortized according to Generally Accepted Accounting Principles for the number of days since the acquisition of the Investment Security.

"*Applicable Portion of the Project*" means, with respect to each Series of Bonds, the portion of the Project defined as the Applicable Portion of the Project for such Series of Bonds in the Supplemental Resolution authorizing such Series of Bonds.

"*Authenticating Agent*" means any bank or trust company or national or state banking association designated to authenticate the Bonds of any Series on behalf of the Authority or the Trustee, as provided by Supplemental Resolution, and its successor or successors.

"*Authority*" means the E-470 Public Highway Authority, a body corporate and political subdivision of the State created pursuant to the PHA Law, and any political subdivision or other entity succeeding to the rights and obligations thereof hereunder.

"*Authority Bond*" or "*Authority Bonds*" means any bond or bonds, as the case may be, authenticated and delivered under and pursuant to the Prior Master Resolution or this Amended and Restated Master Resolution.

"*Authorized Authority Representative*" means (a) the Executive Director of the Authority; (b) the Director of Finance of the Authority; or (c) any other officer or employee of the Authority authorized by law or by resolution of the Board to act as an Authorized Authority Representative under this Amended and Restated Master Resolution or any Supplemental Resolution or otherwise with respect to the Bonds or the Project.

"*Board*" means the board of directors of the Authority, or any successor in function.

"*Bond*" means any Authority Bond or 1986 Bond. "*Bonds*" means the Authority Bonds and the 1986 Bonds, collectively.

"*Bond Counsel*" means an attorney or firm of attorneys, selected by the Authority and acceptable to the Trustee and National, whose experience in matters relating to the issuance of obligations by states and their political subdivisions is nationally recognized.

"*Bond Obligation*" means (a) with respect to any Capital Appreciation Bond, the Accreted Value of such Capital Appreciation Bond as of the date on which the Bond Obligation is being determined; (b) with respect to any Bond that is not a Capital Appreciation Bond, the principal amount of such Bond; (c) with respect to all the Bonds together, the sum of the amounts determined pursuant to clauses (a) and (b) of this definition; and (d) the "*Bond Obligation*" of Parity Obligations for purposes of Article VIII hereof shall be determined in a manner consistent with clauses (a) through (c) above, adjusted as determined by the Authority, with the written consent of National (which consent shall not be unreasonably withheld), to be appropriate based on the characteristics of such Parity Obligations, which determination by the Authority shall be conclusive and binding on the Owners of all Bonds and the owners of all Parity Obligations; provided, however, that only Bonds or Parity Obligations that are Outstanding as of the date of determination shall be included in determining the Bond Obligation.

"*Bondowner*," "*Owner of Bonds*" or "*Owner*" means, when used with respect to Bonds, the registered owner of any Bond; and, when used with respect to Parity Obligations, the registered owner of such Parity Obligation.

"*Business Day*" means any day other than a Saturday, Sunday or other day on which The New York Stock Exchange or banks are authorized or required to close in New York, New York or Denver, Colorado.

"*Capital Appreciation Bond*" means any Authority Bond on which interest is not due prior to maturity.

"*Capitalized Interest Account*" means the account within the Construction Fund established and designated as such in Section 4.01 of the Second Supplemental Resolution.

"*Code*" means the Internal Revenue Code of 1986, as amended, and the United States Treasury Regulations proposed or in effect with respect thereto.

"*Completion Date*" means, when used with respect to any portion of the Project, the date of completion of the construction of such portion of the Project; and, when used with respect to the entire Project, the date of completion of construction of the entire Project, in either case as such date shall be certified in the manner provided in Section 5.03 hereof.

"*Construction Fund*" means the E-470 Public Highway Authority Revenue Bond Construction Fund established by Section 5.02 hereof, and includes any separate Accounts or Subaccounts established by the terms of any Supplemental Resolution or any agreement pursuant thereto.

"*Consultant*" means any Person at the time retained by or on behalf of the Authority (or, to the extent specifically provided herein or in any Supplemental Resolution, by or on behalf of the Trustee) to carry out the duties imposed by or pursuant to this Amended and Restated Master Resolution or a Supplemental Resolution, which Person is not an employee of the Authority and is experienced and has a national and favorable reputation in the matters for which such Person is so employed.

"*Consulting Engineer*" means any Consultant with expertise in engineering.

"*Costs*" or "*Costs of the Project*" means all costs of acquisition, construction and improvement of the Project, as determined by the Authority, including, without limitation, any of the following that are authorized by the PHA Law and determined by the Authority to be included within this definition:

(a) contractors' fees and charges, the cost of labor, services, materials and supplies used or furnished in site improvement and construction, training and testing costs, the cost of purchasing machinery, equipment, facilities, rolling stock and ancillary items, and the cost of utility services;

(b) the cost of acquiring by purchase, and the amount of any deposit in court or award or final judgment in, or any settlement or compromise of, any proceeding to acquire by eminent domain, such lands, property, property rights, rights of way, easements, franchises and other interests as may be deemed necessary or convenient, options and partial payments thereon, the cost of demolishing or removing or relocating any buildings or structures or land so acquired, including the cost of acquiring any lands to which such buildings or structures may be moved, and the amount of any incident or consequent damages;

(c) the costs of preparing surveys, cost estimates, appraisals, plans and specifications (including any preliminary study or planning or any aspect thereof), fees for architectural, engineering, supervisory and consulting services, planning and development costs, the costs of obtaining governmental or regulatory permits, licenses, franchises and approvals, and any other fees or expenses necessary to establishing feasibility or practicability;

(d) Operating Expenses and amounts required to be deposited to the Operating Reserve Fund;

(e) to the extent not paid by the contractor, premiums of all insurance and surety and payment bonds required to be maintained, all claims and expenses relating to injury and damage, and casualty and liability insurance premiums in connection with insurance against loss from such claims;

(f) all federal, state and local taxes and payments in lieu of taxes legally required, or deemed advisable by the Authority;

(g) interest to accrue on the Bonds;

(h) to the extent provided by Supplemental Resolution, any amount otherwise required to pay principal, Redemption Price of or interest on any Bonds;

(i) any amount required to fund or maintain the Debt Service Reserve Fund;

(j) repayment of all temporary borrowings incurred by or on behalf of, or advances made by or on behalf of, the Authority or the Member Governments in connection with the Project;

(k) Costs of Issuance, to the extent not otherwise described in this definition;

(l) amounts sufficient to purchase Bonds that are held by any contractor that is providing or has provided services with respect to the Project;

(m) all items of expense relating to any guarantee, letter of credit, line of credit, standby purchase agreement, bond insurance policy, financial guaranty insurance policy or Related Financial Transaction, to the extent not otherwise described in this definition;

(n) all amounts payable by the Authority under any contract, agreement or other arrangement relating to the acquisition, construction or improvement of the Project; and

(o) all other costs and expenses relating to the acquisition, construction or improvement of the Project, including, but not limited to, costs of environmental mitigation.

"*Costs of Issuance*" means the items of expense relating to the authorization, sale and issuance of Bonds, which items of expense may include, without limitation: travel expenses; printing costs; costs of reproducing documents; computer fees and expenses; filing and recording fees; initial fees and charges of the Trustee, Registrar, Paying Agent, and other Fiduciaries; initial fees and charges of banks, insurers or other parties pursuant to guarantees, letters of credit, lines of credit, standby purchase agreements, bond insurance policies, financial guaranty insurance policies and Related Financial Transactions; bond discounts; fees and expenses of underwriters; fees and expenses of financial advisors; legal fees and charges; consulting fees and charges; auditing fees and expense; financial advisor's fees and charges; costs of credit ratings; insurance premiums; fees and charges for the execution, transportation and safekeeping of Bonds; and any other administrative or other costs of issuing, carrying and repaying such Bonds and investing the Bond proceeds.

"*Costs of Issuance Account*" means the Account within the Construction Fund established pursuant to Section 5.03 of the Third Supplemental Resolution.

"*Credit Facility*" means any credit facility securing a Series of Bonds, including without limitation any letter of credit, committed line of credit, insurance policy (including the MBIA Insurance Policy), surety bond, standby bond purchase agreement or any other similar instrument, which provides for payment of (or provides liquidity for the payment of) all or any portion of the principal, Purchase Price and Redemption Price of and interest or premium on

Bonds as and when due and payable. References to "Credit Facility" with respect to any Series of Bonds shall be ineffective when such Bonds are not supported by a Credit Facility.

"*Debt Service*" means, with respect to any particular Fiscal Year or other 12-month period, and as of any calculation date, an amount equal to the sum of (a) all principal of and interest on all Outstanding Bonds that is payable during such period; (b) the Redemption Price of Outstanding Bonds payable during such period with respect to any Outstanding Bonds that are to be redeemed during such period pursuant to mandatory redemption provisions or pursuant to optional redemption provisions that have been exercised by the Authority as of the calculation date; and (c) the amount that is or would be due by the Authority under any Governmental Loan Agreement in such period if the Authority were to appropriate the full amount so due in such period.

For purposes of this definition:

(a) Debt Service shall not include (i) the principal and Redemption Price of and interest on Outstanding Bonds to the extent the same is to be paid from proceeds of Bonds or Parity Obligations or other funds held by the Trustee or an escrow agent for the benefit of the Owners of Outstanding Bonds and investment earnings on such proceeds or other funds or (ii) amounts due or that would be due under any Governmental Loan Agreement to the extent the same is to be paid from proceeds of Bonds or Parity Obligations or other funds held by the Trustee or an escrow agent for the purpose of paying such amounts and investment earnings on such proceeds or other funds.

(b) Future Debt Service for any Series of Bonds which bears interest at variable rates or which will at some future date be subject to conversion to an interest rate or interest rate mode such that future interest payments cannot, as of the calculation date, be definitely ascertained shall be equal to (i) if such Bonds (or, if not, if other Bonds of the same Tier) bore interest at an interest rate determined in the same manner during the 36-month period preceding the calculation date, the average interest rate borne by such Bonds (or such other Bonds) during such 36-month period; or (ii) if clause (i) does not apply, the lesser of (A) 8% per annum or (B) 110% of the rate as of the calculation date (or most recent preceding date if such rate is not published for such date) under the SIFMA Municipal Swap Index (produced by Bloomberg) applicable to comparable obligations. If there is no SIFMA Municipal Swap Index for comparable obligations, the calculation under clause (ii)(B) shall be based on an extrapolation from the SIFMA Municipal Swap Index or Indices for other obligations in the manner specified in a certificate of a Consultant. If the SIFMA Municipal Swap Index is no longer published, the calculations pursuant to clause (ii)(B) may be based on another index certified by a Consultant to be comparable to the SIFMA Municipal Swap Index.

(c) Interest paid and payable on Bonds with respect to which a Related Financial Transaction is in effect shall be determined by taking into account (in a manner that does not result in the duplication of payment requirements): (i) regularly scheduled payments due pursuant to such transaction so long as no failure to pay or event of default under such transaction has occurred and is continuing and (ii) upon termination of such transaction (by reason of an event of default or otherwise), amounts actually paid with respect to the termination of such transaction.

"*Debt Service Fund*" means the E-470 Public Highway Authority Revenue Bond Debt Service Fund established by Section 5.02 hereof.

"*Debt Service Reserve Fund*" means the E-470 Public Highway Authority Revenue Bond Debt Service Reserve Fund established by Section 5.02 hereof.

"*Debt Service Reserve Fund Requirement*" means the amount required to be maintained in the Debt Service Reserve Fund by any Supplemental Resolution, calculated in the manner and times as set forth herein and therein.

"*Defeasance Investment Securities*" means any one or more of the following:

(a) Cash;

(b) U.S. Treasury Certificates, Notes and Bonds (including State and Local Government Series --- "SLGs");

(c) Direct obligations of the United States Treasury which have been stripped by the Treasury itself, CATS, TIGRS and similar securities;

(d) The interest component of Resolution Funding Corp. (REFCORP) strips which have been stripped by request to the Federal Reserve Bank of New York in book entry form;

(e) Pre-refunded municipal bonds which, when acquired, are rated "Aaa" by Moody's and "AAA" by S&P, except that, if the bonds are only rated by S&P (i.e., there is no Moody's rating), then the pre-refunded bonds must have been pre-refunded with cash, direct U.S. or U.S. guaranteed obligations or pre-refunded municipals rated "AAA" by S&P to satisfy this condition;

(f) Obligations issued by the following agencies which are backed by the full faith and credit of the United States:

(i) U.S. Export-Import Bank (Eximbank): direct obligations or fully guaranteed certificates of beneficial ownership

(ii) Farmers Home Administration (FmHA): certificates of beneficial ownership

(iii) Federal Financing Bank

(iv) General Services Administration: participation certificates

(v) U.S. Maritime Administration: guaranteed Title XI financing

(vi) U.S. Department of Housing and Urban Development (HUD): Project Notes; Local Authority Bonds; New Communities Debentures – U.S. government guaranteed debentures; and U.S. Public Housing Notes and Bonds – U.S. government guaranteed public housing notes and bonds.

(g) Investment agreements that are (i) issued, guaranteed or insured by an entity the long-term obligations or claims paying ability of which, when the agreement is entered into, is rated "Aaa" by Moody's and "AAA" by S&P and (ii) approved in writing by National.

"*Depository*" means any bank, trust company, national banking association, savings and loan association, savings bank or other banking institution or association selected by the Authority as a depository (to the extent permitted by the laws of the State) of moneys and securities held under the provisions of this Amended and Restated Master Resolution and the PHA Law, and may include the Trustee.

"*DTC Bonds*" means bonds issued in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York in accordance with Section 3.13 hereof.

"*Eighth Supplemental Resolution*" means the Eighth Supplemental Bond Resolution adopted by the Board on *March* 26, 2009, authorizing a conversion of the interest rate modes on the 2001 Bonds, as it may be amended from time to time in accordance with its terms.

"*Electronic Means*" means facsimile transmission, email transmission or other similar electronic means of communication providing evidence of transmission, including a telephone communication confirmed by any other method set forth in this definition.

"*Eleventh Supplemental Resolution*" means the Eleventh Supplemental Bond Resolution adopted by the Board on July 25, 2013, authorizing the division of certain of the 2007 Bonds into subseries, the conversion of the interest rate modes on certain of the 2007 Bonds and the combination of the 2007 Bonds for which the interest rate modes were converted into a new Series 2007CD-2, as it may be amended from time to time in accordance with its terms.

"*EMMA*" means the Municipal Securities Rulemaking Board's Electronic Municipal Market Access System (EMMA), with a portal at http://emma.msrb.org, and any successor to such system that may be established by the Municipal Securities Rulemaking Board; provided that for dates prior to July 1, 2009, "EMMA" shall be deemed to refer to one or more nationally recognized municipal securities information repositories, as previously recognized from time to time by the Securities and Exchange Commission by no action letter for the purposes referred to in Securities and Exchange Commission Rule 15c2 12 under the Securities and Exchange Act of 1934, as amended.

"*Establishing Contract*" means the third amended and restated establishing contract dated December 4, 2018 amending and restating the establishing contract dated as of January 13, 1988 establishing the Authority, as amended.

"*Event of Default*" means an Event of Default as such term is defined in Section 8.02 hereof.

"*Fair Market Value*" means, as of any particular time: (a) as to Investment Securities the bid and asked prices of which are published on a regular basis in a financial journal or publication of general circulation in the United States of America, the bid price for such Investment Securities so published on or most recently prior to the date of valuation by the Trustee, or (b) as to Investment Securities the bid and asked prices of which are not published on a regular basis in a financial journal or publication of general circulation in the United States of America, the average bid price for such Investment Securities at the date of valuation by the Trustee, as reported to the Trustee by any two nationally recognized dealers in such Investment Securities. The "*Fair Market Value*" of Investment Securities that are subject to a put exercisable by the Authority or the Trustee shall be equal to the greater of the Fair Market Value of such Investment Securities as determined under clause (a) or (b) above and the price at which such Investment Securities may be put to a third party. The "*Fair Market Value*" of Investment Securities that are subject to a call exercisable by a third party shall be equal to the lesser of the Fair Market Value of such Investment Securities as determined under clause (a) or (b) above and the price at which such Investment Securities may be called by such third party.

"*Fiduciary*" or "*Fiduciaries*" means the Trustee, the Registrar, the Paying Agent, and any remarketing, tender, escrow, indexing, authenticating or other agent of the Authority or of any other Fiduciary, or any or all of them, as the context may require.

"*Fifteenth Supplemental Resolution*" means the Fifteenth Supplemental Bond Resolution adopted by the Board on February 9, 2017, authorizing the issuance of the 2017 Bonds, as it may be amended from time to time in accordance with its terms.

"*Fifth Supplemental Resolution*" means the Fifth Supplemental Bond Resolution adopted by the Board on August 24, 2006, authorizing the issuance of the 2006 Bonds, as it may be amended from time to time in accordance with its terms.

"*Financial Transaction*" means any interest rate swap transaction, basis swap, cap transaction, floor transaction, collar transaction; any other "Transaction" as defined in the 1992 U.S. Municipal Counterparty Definitions published by the International Swap Dealers Association, Inc. or any amendments to or subsequent editions of such Definitions or any similar transaction (regardless of how defined) permitted under any such amendments to or more recent editions of such Definitions or of any similar publications of such association or any similar organization; any transactions similar to any of the foregoing; or any combination of any of the transactions described in this definition.

"*First Supplemental Resolution*" means Resolution No. 97-14, adopted by the Board on August 14, 1997, authorizing the issuance of the 1997 Bonds, as amended by the Second Supplemental Resolution, the Fourth Supplemental Resolution, the Fifth Supplemental Resolution, the Sixth Supplemental Resolution, the Ninth Supplemental Resolution, the Tenth Supplemental Resolution, the Twelfth Supplemental Resolution, the Fourteenth Supplemental Resolution, the Fifteenth Supplemental Resolution and the Sixteenth Supplemental Resolution, and as it may be further amended from time to time in accordance with its terms.

"*First Tier Subordinate Bonds*" means any Bonds designated as "First Tier Subordinate Bonds" by Supplemental Resolution.

"*First Tier Subordinate Bonds Debt Service Account*" means the First Tier Subordinate Bonds Debt Service Account of the Debt Service Fund established by Section 5.02 hereof.

"*First Tier Subordinate Bonds Debt Service Reserve Account*" means the First Tier Subordinate Bonds Debt Service Reserve Account of the Debt Service Reserve Fund established by Section 5.02 hereof.

"*First Tier Subordinate Bonds Debt Service Reserve Account Requirement*" means the amount required to be maintained in the First Tier Subordinate Bonds Debt Service Reserve Account by any Supplemental Resolution, calculated in the manner and times as set forth herein and therein.

"*Fiscal Year*" means the fiscal year of the Authority, currently the 12-month period ending December 31.

"*Fitch*" means Fitch Ratings, Inc., its successors and assigns, and if Fitch Ratings, Inc. shall no longer perform the functions of a securities rating agency, "*Fitch*" shall be deemed to refer to any other nationally recognized securities rating agency designated by the Authority and approved in writing by National.

"*Fourteenth Supplemental Resolution*" means the Fourteenth Supplemental Bond Resolution adopted by the Board on May 28, 2015, authorizing the issuance of the 2015A Bonds, as it may be amended from time to time in accordance with its terms

"*Fourth Supplemental Resolution*" means Resolution No. 04-06, adopted by the Board on December 9, 2004, authorizing the issuance of the 2004 Bonds, as it may be amended from time to time in accordance with its terms.

"*Fund*" or "*Funds*" means any one or more, as the case may be, of the separate special funds established by Section 5.02 hereof or by any Supplemental Resolution.

"*General Surplus Account*" means the General Surplus Account of the Surplus Fund established by Section 5.02 hereof.

"*Generally Accepted Accounting Principles*" means such accepted accounting practice as, in the opinion of the Accountant, conforms at the time to a body of generally accepted accounting principles.

"*Governmental Lenders*" means the State, acting by and through the Department of Transportation, and the cities and counties that are parties to Governmental Loan Agreements.

"*Governmental Loan Agreements*" means the agreements between the Authority and each of the Governmental Lenders.

"*Governmental Loan Repayments*" means any amount paid to the Governmental Lenders by the Authority pursuant to the Governmental Loan Agreements.

"*Independent Certified Public Accounting Firm*" means a licensed certified public accounting firm that carries errors and omissions insurance, acting at arms-length of the transaction on behalf of the Owners that is not the underwriter, Bond Counsel or the financial adviser for a refunding issue.

"*Interest Payment Date*" means any date on which interest is due and payable on any of Bond.

"*Investment Security*" or "*Investment Securities*" means any one or more of the following:

(a) Direct obligations of the United States of America (including obligations issued or held in book-entry form on the books of the Department of the Treasury, and CATS and TIGRS) or obligations the principal of and interest on which are unconditionally guaranteed by the United States of America.

(b) Bonds, debentures, notes or other evidence of indebtedness issued or guaranteed by any of the following federal agencies and provided such obligations are backed by the full faith and credit of the United States of America (stripped securities are only permitted if they have been stripped by the agency itself):

(i) U.S. Export-Import Bank (Eximbank)
Direct obligations or fully guaranteed certificates of beneficial ownership

(ii) Farmers Home Administration (FmHA)
Certificates of beneficial ownership

(iii) Federal Financing Bank

(iv) Federal Housing Administration (FHA)
Debentures

(v) General Services Administration
Participation certificates

(vi) Government National Mortgage Association
(GNMA or "Ginnie Mae")
GNMA - guaranteed mortgage-backed bonds
GNMA - guaranteed pass-through obligations

(vii) U.S. Maritime Administration
Guaranteed Title XI financing

(viii) U.S. Department of Housing and Urban Development (HUD)
Project Notes
Local Authority Bonds

New Communities Debentures - U.S. government guaranteed debentures

U.S. Public Housing Notes and Bonds - U.S. government guaranteed public housing notes and bonds

(c) Bonds, debentures, notes or other evidence of indebtedness issued or guaranteed by any of the following non-full faith and credit U.S. government agencies (stripped securities are only permitted if they have been stripped by the agency itself):

(i) Federal Home Loan Bank System
Senior debt obligations

(ii) Federal Home Loan Mortgage Corporation
(FHLMC or "Freddie Mac")
Participation Certificates
Senior debt obligations

(iii) Federal National Mortgage Association (FNMA or "Fannie Mae")
Mortgage-backed securities and senior debt obligations

(iv) Resolution Funding Corp. (REFCORP) obligations

(v) Farm Credit System
Consolidated systemwide bonds and notes

(d) Money market funds registered under the Federal Investment Company Act of 1940, whose shares are registered under the Federal Securities Act of 1933, and having a rating by S&P of AAAm-G; AAA-m; or AA-m and if rated by Moody's rated Aaa, Aa1 or Aa2.

(e) Certificates of deposit secured at all times by collateral described in paragraph (a) and/or (b) of this definition. Such certificates must be issued by commercial banks, savings and loan associations or mutual savings banks. The collateral must be held by a third party and the bondholders must have a perfected first security interest in the collateral.

(f) Certificates of deposit, savings accounts, deposit accounts or money market deposits which are fully insured by FDIC, including BIF and SAIF.

(g) Investment Agreements, including GIC's, Forward Purchase Agreements and Reserve Fund Put Agreements acceptable to National.

(h) Commercial paper rated, at the time of purchase, "Prime - 1" by Moody's and "A-1" or better by S&P.

(i) Bonds or notes issued by any state or municipality which are rated by Moody's and S&P in one of the two highest rating categories assigned by such agencies.

(j) Federal funds or bankers acceptances with a maximum term of one year of any bank which has an unsecured, uninsured and unguaranteed obligation rating of "Prime - 1" or "A3" or better by Moody's and "A-1" or "A" or better by S&P.

(k) Repurchase Agreements ("repos") for 30 days or less must follow the following criteria. Repurchase Agreements which exceed 30 days must be acceptable to National. Repurchase agreements provide for the transfer of securities from a dealer bank or securities firm (seller/borrower) to the Authority (buyer/lender), and the transfer of cash from the Authority to the dealer bank or securities firm with an agreement that the dealer bank or securities firm will repay the cash plus a yield to the Authority in exchange for the securities at a specified date.

(i) *Repos must be between the Authority and a dealer bank or securities firm which are*:

(A) *Primary dealers* on the Federal Reserve reporting dealer list which are rated A or better by S&P and Moody's; or

(B) *Banks* rated "A" or above by S&P and Moody's.

(ii) *The written repo contract must include the following*:

(A) Securities which are acceptable for transfer are:

(1) Direct U.S. governments, or

(2) Federal agencies backed by the full faith and credit of the U.S. government (and FNMA & FHLMC).

(B) *The term of the repo may be up to 30 days*.

(C) The collateral must be delivered to the Authority, trustee (if trustee is not supplying the collateral) or third party acting as agent for the trustee (if the trustee is supplying the collateral) before/simultaneous with payment (perfection by possession of certificated securities).

(D) *Valuation of Collateral*.

(1) The securities must be valued weekly, marked-to-market at current market price plus accrued interest

a. The value of collateral must be equal to 104% of the amount of cash transferred by the Authority to the dealer bank or security firm under the repo plus accrued interest. If the value of securities held as collateral slips below 104% of the value of the cash transferred by municipality, then additional cash and/or acceptable securities must be transferred. If, however, the securities used as collateral are FNMA or FHLMC, then the value of collateral must equal 105%.

(iii) Legal opinion which must be delivered to the municipal entity:

(A) Repo meet guidelines under state law of legal investment of public funds.

(l) The securities held in the Senior Bonds Debt Service Reserve Account established under the 1986 Bond Documents as of the date of issuance of the 1997 Bonds.

(m) Bank and corporate securities (not including World Bank securities) with a maturity of three years or less from the date of purchase; provided that:

(i) Only Unrestricted General Surplus Account Moneys may be invested in securities described in this paragraph (m);

(ii) No more than 15% of Unrestricted General Surplus Account Moneys shall be invested in securities described in this paragraph (m), and no more than 3% of Unrestricted General Surplus Account Moneys shall be invested in any particular such security (such percentages to be measured by the valuation of such security at the time of purchase thereof);

(iii) Any security described in this paragraph (m) shall, at the time of purchase thereof: (A) be rated (1) at least AA- by S&P and at least Aa3 by Moody's if both S&P and Moody's shall at such time rate such security, or (2) at least AA- by S&P or at least Aa3 by Moody's if either S&P or Moody's does not at such time rate such security; and (B) have a stable or positive outlook with respect to each such rating on the security, and not be on negative watch.

(n) Any security or other investment approved by National in writing.

(o) Any State-administered pool investment fund in which the Authority is statutorily permitted or required to invest.

"*Letter of Instructions*" means a written directive and authorization executed by an Authorized Authority Representative.

"*Letter of Representations*" means the Letter of Representations between the Authority and The Depository Trust Company, New York, New York, regarding the 1997 Bonds, and any similar letter regarding any additional Bonds.

"*Liquidity Facility*" means any letter of credit, committed line of credit, standby bond purchase agreement or any other similar instrument acceptable to National which requires the Liquidity Provider to purchase the Bonds to which such Liquidity Facility applies upon any optional or mandatory tender of such Bonds made in accordance with the terms of the related

Supplemental Resolutions(s), but which does not guarantee the payment of the principal of or interest on such Bonds.

"*Liquidity Provider*" means the provider of any Liquidity Facility, and any successor thereto acceptable to National as provider thereof.

"*Maturity Value*" means the amount defined as such in a Supplemental Resolution for purposes of determining the amount payable to the Owner of a Capital Appreciation Bond at the maturity of such Capital Appreciation Bond. References herein and in any Supplemental Resolution to "principal" of Bonds shall include the Maturity Value of Capital Appreciation Bonds; provided, however, that (a) the Accreted Value shall be used instead of the principal amount of Capital Appreciation Bonds in determining the Redemption Price of Capital Appreciation Bonds and in determining the Bond Obligation and (b) for purposes of determining the percentage of the Senior Bonds (as defined in Resolution 95-10) that have consented to the amendments to the 1986 Bond Documents as provided in Section 1.04 of the First Supplemental Resolution, the "principal" amount of the 1997 Bonds that are Capital Appreciation Bonds shall be deemed to be the Original Principal Amount of such 1997 Bonds (as defined in the First Supplemental Resolution).

"*MBIA*" means MBIA Insurance Corporation and its successors and assigns. References to "MBIA" shall be ineffective when none of the Bonds are insured by the MBIA Insurance Policy and National has been reimbursed in full for any payments made under the MBIA Insurance Policy.

"*MBIA Insurance Policy*" means, with respect to each Series of MBIA Insured Bonds, the Financial Guaranty Insurance Policy or Policies by which MBIA insures the principal of and interest on the MBIA Insured Bonds when due. References to "MBIA Insurance Policy" with respect to any Series of Bonds shall be ineffective when such Bonds are not insured by the MBIA Insurance Policy.

"*MBIA Insured Bonds*" means, to the extent Outstanding, (a) the 1997 Bonds; (b) the Series 2000A Bonds; (c) the Series 2000B Bonds maturing in 2006, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2027, 2028, 2029, 2030, 2031, 2032 and 2033; (d) the 2001 Bonds; (e) the 2004 Bonds; (f) the 2006 Bonds; (g) the 2007 Bonds.

"*Member Governments*" means the members of the Authority.

"*Miscellaneous Swap Payments*" means amounts paid or received by the Authority pursuant to a Related Financial Transaction which do not represent Regularly Scheduled Swap Payments or Termination Payments.

"*Moody's*" means Moody's Investors Service, Inc., its successors and assigns, and, if Moody's Investors Service, Inc. shall for any reason no longer perform the functions of a securities rating agency, "Moody's" shall be deemed to refer to any other nationally recognized securities rating agency designated by the Authority and approved in writing by National.

“*National*” means National Public Finance Guarantee Corporation, as Administrator for MBIA pursuant to the Administrative Services Agreement dated as of February 17, 2009, between MBIA and MBIA Insurance Corp. of Illinois, now known as National, and its successors and assigns. References to “National” shall be ineffective when none of the Bonds are insured by the MBIA Insurance Policy and National has been reimbursed in full for any payments made under the MBIA Insurance Policy.

“*Net Revenues*” means, for any Fiscal Year or other period of time, the Revenues received in such Fiscal Year or other period of time less the Operating Expenses incurred in such Fiscal Year or other period of time.

“*1986 Bond Documents*” means Resolution No. 95-10 and Resolution No. 95-11, the Financing Agreement (as defined in Resolution No. 95-10) and all other documents referred to in Resolution No. 95-10, Resolution No. 95-11 or the Financing Agreement that govern the 1986 Bonds or the security therefor, as such Resolutions, Financing Agreement and other documents shall have been amended from time to time.

“*1986 Bonds*” means the E-470 Public Highway Authority, acting as assignee and delegatee of Arapahoe County, Colorado, Capital Improvement Trust Fund Revenue Bonds (E-470 Project), Series 1986A-M. The 1986 Bonds are no longer Outstanding.

“*1997 Bonds*” means the E-470 Public Highway Authority Senior Revenue Bonds, Series 1997A, the E-470 Public Highway Authority Senior Revenue Bonds, Series 1997B and the E-470 Public Highway Authority Senior Revenue Bonds, Series 1997C, collectively.

“*1997 Senior Bonds Capitalized Interest Subaccount*” means the subaccount within the Capitalized Interest Account established and designated as such in Section 4.01 of the First Supplemental Resolution.

“*1997 Senior Bonds Capitalized Interest Subaccount Requirement*” means the amount required to be deposited in the 1997 Senior Bonds Capitalized Interest Subaccount by the First Supplemental Resolution, calculated in the manner and times as set forth therein.

“*Ninth Supplemental Resolution*” means the Ninth Supplemental Bond Resolution adopted by the Board on October 14, 2010, authorizing the issuance of the 2010 Bonds, as it may be amended from time to time in accordance with its terms.

“*Operating Expenses*” means expenses for operation, maintenance, repairs, ordinary replacement and ordinary reconstruction of the Project, ordinary acquisition of equipment, and any other current expenses or obligations required to be paid by the Authority, the Member Governments or any other Person, under or pursuant to the provisions of this Amended and Restated Master Resolution, any Supplemental Resolution, the Establishing Contract or any other agreement between or among the Authority and any other Person or Persons, or by law, all to the extent properly and directly attributable to the operation of the Project, but not including: any costs or expenses for new construction, any allowance for depreciation, any payments or expenses relating to Related Financial Transactions or any taxes upon the property or revenues of the Authority. Operating Expenses may include, without limitation (but subject to the preceding sentence, including but not limited to the condition that such expenses are properly and directly attributable to the operation of the Project): (a) salaries, supplies, utilities, labor and rent; (b) fees and expenses for data processing, policing, insurance, legal, accounting, engineering, Fiduciaries, letters of credit and Credit Facilities, consulting and banking services, and Financial Transactions that are not Related Financial Transactions; (c) Costs of Issuance not paid as a Cost of the Project; (d) payments to pension, retirement, health and hospitalization funds for Authority employees; and (e) all obligations of the Authority as of the date of issuance of the 1997 Bonds that are classified as long-term debt in the Authority's audited financial statements for the fiscal year ended December 31, 1996. Such expenses do not include any amounts payable pursuant to a judgment, court order or settlement of any legal proceeding.

"*Operating Reserve Fund*" means the E-470 Public Highway Authority Revenue Bond Operating Reserve Fund established by Section 5.02 hereof.

"*Operating Reserve Fund Requirement*" means an amount equal to one-sixth of the budgeted Operating Expenses, as determined by the Authority, for the current Fiscal Year.

"*Original Master Resolution*" means Resolution 97-13 of the Authority, adopted August 14, 1997.

"*Outstanding*" or "*outstanding*" means, with respect to any Bonds or Parity Obligations as of any date, Bonds or Parity Obligations theretofore or thereupon being authenticated and delivered under this Amended and Restated Master Resolution or Parity Obligation Instruments except:

(a) Bonds or Parity Obligations canceled or delivered for cancellation at or prior to such date;

(b) Bonds or Parity Obligations in lieu of or in substitution for which other Bonds or Parity Obligations shall have been authenticated and delivered pursuant to this Amended and Restated Master Resolution or Parity Obligation Instruments;

(c) Bonds or Parity Obligations deemed to have been paid, redeemed, purchased or defeased as provided in this Amended and Restated Master Resolution, in any Supplemental Resolution or in any Parity Obligation Instrument, as applicable, or as provided by law; and

(d) Bonds held by the Authority.

"*Parity Obligation Instruments*" means the resolutions, indentures, contracts or other instruments pursuant to which Parity Obligations are issued or incurred.

"*Parity Obligations*" means any debt or financial obligations of the Authority (other than the Bonds) that have a lien on the Revenues on a parity with the lien of any Tier of Bonds hereunder as permitted by Section 12.01 hereof.

"*Paying Agent*" means any bank or trust company or national or state banking association (which may include the Trustee) designated to make payment of the principal and Redemption

Price of and interest on the Bonds of any Series, and its successor or successors, hereafter appointed by Supplemental Resolution and meeting the requirements of Article IX hereof.

"*Person*" means any individual, public or private corporation, county, district, authority, municipality, political subdivision or other entity of the State or the United States of America, and any partnership, association, firm, trust, estate, or any other entity whatsoever.

"*Principal Installment*" means as of any particular date of calculation and with respect to Bonds of a particular Series, an amount of money equal to the aggregate of (a) the principal amount of Outstanding Bonds of such Series which mature on a single future date, reduced by the aggregate principal amount of such Outstanding Bonds of such Series which would at or before said future date be retired as a result of Sinking Fund Installments applied in accordance with this Amended and Restated Master Resolution or a Supplemental Resolution plus (b) the amount of any Sinking Fund Installment payable on said future date for the retirement of any Outstanding Bonds of such Series.

"*Prior Master Resolution*" means the Original Master Resolution, as previously amended by the Prior Supplemental Resolutions.

"*Prior Supplemental Resolutions*" means, collectively, the First Supplemental Resolution, the Second Supplemental Resolution, the Third Supplemental Resolution, the Fourth Supplemental Resolution, the Fifth Supplemental Resolution, the Sixth Supplemental Resolution, the Seventh Supplemental Resolution, the Eighth Supplemental Resolution, the Ninth Supplemental Resolution, the Tenth Supplemental Resolution, the Eleventh Supplemental Resolution, the Twelfth Supplemental Resolution, the Thirteenth Supplemental Resolution, the Fourteenth Supplemental Resolution, the Fifteenth Supplemental Resolution and the Sixteenth Supplemental Resolution.

"*Project*" means all of the right, title and interest (whether such interest is fee, easement, leasehold, contractual or otherwise) of the Authority or any other Person in and to the public highway and other property and improvements that the Authority is authorized to finance, construct, operate and maintain under the Establishing Contract and the PHA Law; provided, however, that Special Projects shall not be deemed to be part of the Project.

"*Project Account*" means the account within the Construction Fund established and designated as such in Section 4.02 of the First Supplemental Resolution.

"*PHA Law*" means part 5 of article 4 of title 43, Colorado Revised Statutes, as amended, known and cited as the Public Highway Authority Law, as it may be amended from time to time.

"*Purchase Date*" means the date of an optional or mandatory tender of any Series of Bonds subject to such optional or mandatory tender, as appropriate, pursuant to the provisions of a Supplemental Resolution.

"*Purchase Price*" means an amount equal to 100% of the principal amount of Bonds to be purchased on a Purchase Date pursuant to a Supplemental Resolution, plus all accrued and unpaid interest thereon to the Purchase Date.

"*Rating Agency*" means any one or more, as the context may require, of the following that as of the date of applying this definition maintain a rating on the Bonds: Fitch, Moody's and S&P.

"*Rebate Fund*" means the E-470 Public Highway Authority Revenue Bond Rebate Fund established by Section 5.02 hereof, and includes any separate accounts or subaccounts established by the terms of any Supplemental Resolutions or any agreement pursuant thereto.

"*Record Date*" as used with respect to any Interest Payment Date for any Series of Bonds, means the date designated in any Supplemental Resolution as the record date for the payment of interest on such Series of Bonds, or if no Record Date is so designated (a) with respect to interest not in default, the fifteenth day next preceding such Interest Payment Date in respect of such Series; and (b) with respect to defaulted interest, the fifth day preceding payment thereof.

"*Redemption Date*" means the date upon which any Bonds are to be redeemed prior to their respective fixed maturities pursuant to the mandatory or optional redemption provisions of any Supplemental Resolution.

"*Redemption Price*" means, with respect to any Bond, the amount, including any applicable premium, payable upon the mandatory or optional redemption thereof, as provided in any Supplemental Resolution.

"*Refunding Bonds*" means all Authority Bonds, whether issued in one or more Series, issued for the purpose of refunding a like or different principal amount of Bonds, and hereafter authenticated and delivered pursuant to this Amended and Restated Master Resolution.

"*Register*" means the register maintained by the Registrar for each Series of Bonds which shows ownership of Bonds in accordance with Section 3.08 hereof.

"*Registrar*" means any bank or trust company or national or state banking association (which may include the Trustee), designated to keep a Register of the Owners of the Bonds of any Series and its successor or successors, hereafter appointed by Supplemental Resolution and meeting the requirements of Article IX hereof.

Regularly Scheduled Swap Payments" means (a) the payments scheduled to be paid or received on a monthly basis pursuant to the 2007 Swaps, and (b) the payments to be paid or received pursuant to any other Related Financial Transaction which are scheduled to generally correspond in time to the Interest Payment Dates on the related Series of Bonds.

"*Reimbursement Agreement*" means, collectively, (a) the Reimbursement Agreement between the Authority and MBIA relating to the financial guaranty insurance policy insuring the principal of and interest when due on the 2000 Bonds that are MBIA Insured Bonds, as such Reimbursement Agreement is amended and supplemented in accordance with its terms; (b) the Reimbursement Agreement among the Authority, the Trustee and MBIA relating to the financial guaranty insurance policy insuring the principal of and interest when due on the 2004 Bonds, as such Reimbursement Agreement is amended and supplemented in accordance with its terms; (c) the Reimbursement Agreement among the Authority, the Trustee and MBIA relating to the financial guaranty insurance policy insuring the principal of and interest when due on the 2006 Bonds, as such Reimbursement Agreement is amended and supplemented in accordance with its terms; and (d) the Amended and Restated Reimbursement Agreement among the Authority, the Trustee and MBIA relating to the financial guaranty insurance policy insuring the principal of and interest when due on the 2007 Bonds, as such Amended and Restated Reimbursement Agreement has previously been amended and supplemented by the Authority, the Trustee and National, and as it is further amended and supplemented in accordance with its terms.

"*Related Financial Transaction*" means, with respect to any Series of Bonds, including any Series of Bonds which has not yet been issued but which is proposed to be issued by the Authority, a Financial Transaction pursuant to which payments by the Authority are to be paid from or secured by revenues or funds pledged to the payment of or as security for such Series of Bonds and payments to the Authority are pledged to the payment of or as security for such Series of Bonds.

"*Resolution No. 95-10*" means Resolution No. 95-10, adopted by the Authority, acting as assignee and delegatee of Arapahoe County, Colorado, on August 24, 1995, as amended by the resolution removing the provisions requiring that notices be published, adopted by the Authority, acting as assignee and Delegatee of Arapahoe County, Colorado, on August 14, 1997, prior to the adoption of the Original Master Resolution and the First Supplemental Resolution.

"*Resolution No. 95-11*" means Resolution No. 95-11, adopted by the Authority, acting as assignee and delegatee of Arapahoe County, Colorado, on August 24, 1995, as amended by the resolution removing the provisions requiring that notices be published, adopted by the Authority, acting as assignee and Delegatee of Arapahoe County, Colorado, on August 14, 1997, prior to the adoption of the Master Resolution and the First Supplemental Resolution.

"*Revenue Fund*" means the E-470 Public Highway Authority Revenue Bond Revenue Fund established by Section 5.02 hereof.

"*Revenue Fund Retained Balance*" means, as of the last day of any calendar month, an amount equal to one-half of the aggregate amount required to be transferred to the Senior Bonds Debt Service Account of the Debt Service Fund during such month pursuant to Section 5.05(a) hereof.

"*Revenues*" means all amounts received by the Authority from (a) fees, tolls, rates and charges for the privilege of traveling on the Project imposed by the Authority pursuant to the PHA Law; (b) highway expansion fees imposed by the Authority pursuant to the PHA Law, but only to the extent such highway expansion fees are received in connection with property located within the boundaries of the Authority; (c) proceeds of special assessments paid by owners of property included within local improvement districts established by the Authority pursuant to the PHA Law, but only to the extent such special assessments are received in connection with property located within the boundaries of the Authority; (d) property or sales taxes received pursuant to Section 43-4-508 of the PHA Law, but only to the extent such taxes are received in connection with property located or taxable transactions occurring within the boundaries of the Authority; (e) proceeds from insurance, condemnation awards and liquidated damages under contracts, in each case, to the extent the same relate to the Project; (f) all amounts payable to the

Authority as liquidated damages pursuant to any contract or agreement for the provision of services or property with respect to the Project; (g) all amounts derived from time to time from the Member Governments, or otherwise, in accordance with the Establishing Contract; (h) all amounts derived from the sale or other disposition of land (or any interest therein) or other property included in the Project; (i) amounts derived as grants, loans or otherwise from the United States of America, the State or any other Person which may be available for, and which the Authority determines to, deposit in the Revenue Fund; (j) all investment earnings that are transferred to or deposited into the Revenue Fund; (k) all moneys released from another Fund or Account and transferred to the Revenue Fund pursuant to Section 5.05(c) hereof; (l) any net amounts of Regularly Scheduled Swap Payments received by the Authority; and (m) all other amounts derived from or in respect of the ownership or operation of the Project which constitute revenues in accordance with Generally Accepted Accounting Principles, including without limitation tolls and any interest income earned on any Funds and Accounts which is required to be transferred to or maintained in any Fund, Account or Subaccount hereunder; provided, however, that revenues from Special Projects shall not be included in Revenues.

"*S&P*" means S&P Global Ratings, a division of Standard & Poor's Financial Services LLC, its successors and assigns, and, if S&P Global Ratings, a division of Standard & Poor's Financial Services LLC shall for any reason no longer perform the functions of a securities rating agency, "S&P" shall be deemed to refer to any other nationally recognized securities rating agency designated by the Authority and approved in writing by National.

"*Second Supplemental Resolution*" means Resolution No. 00-04, adopted by the Board on April 27, 2000, authorizing the issuance of the 2000 Bonds, as amended by the Third Supplemental Resolution, the Fourth Supplemental Resolution, and as it may be further amended from time to time in accordance with its terms.

"*Second Tier Subordinate Bonds*" means any Bonds designated as "Second Tier Subordinate Bonds" by Supplemental Resolution.

"*Second Tier Subordinate Bonds Debt Service Account*" means the Second Tier Subordinate Bonds Debt Service Account of the Debt Service Fund established by Section 5.02 hereof.

"*Senior Bonds*" means the 1997 Bonds, the 2000 Bonds, the 2004 Bonds, the 2006 Bonds, the 2010 Bonds, the 2015A Bonds, the 2017B Bonds, the 2019A Bonds, and any other Authority Bonds designated as "Senior Bonds" by Supplemental Resolution.

"*Senior Bonds Debt Service Account*" means the Senior Bonds Debt Service Account of the Debt Service Fund established by Section 5.02 hereof.

"*Senior Bonds Debt Service Reserve Account*" means the Senior Bonds Debt Service Reserve Account of the Debt Service Reserve Fund established by Section 5.02 hereof.

"*Senior Bonds Debt Service Reserve Account Requirement*" means the amount required to be maintained in the Senior Bonds Debt Service Reserve Account of the Debt Service Reserve Fund by any Supplemental Resolution, calculated in the manner and times as set forth herein and therein. So long as any Senior Bonds that are MBIA Insured Bonds are Outstanding, the Senior

Bonds Debt Service Reserve Requirement shall be calculated in the manner and at the times provided herein and in Section 4.03(a)(ii) of the First Supplemental Resolution.

"*Senior Bonds Redemption Account*" means the Senior Bonds Redemption Account of the Debt Service Fund established by Section 5.07(e) of the Master Resolution.

"*Series*" means Bonds identified as a separate series which are authenticated and delivered on original issuance or in connection with a remarketing, and any Bonds thereafter authenticated and delivered in lieu of or in substitution for such Bonds pursuant to this Amended and Restated Master Resolution, any Supplemental Resolution or the 1986 Bond Documents. When used with respect to the 1986 Bonds, the term "*Series*" also includes any Subseries established under Resolution No. 95-11.

"*Series 2000A Bonds*" means the 2000 Bonds designated as such in the Second Supplemental Resolution.

"*Series 2000B Bonds*" means the 2000 Bonds designated as such in the Second Supplemental Resolution.

"*Seventh Supplemental Resolution*" means the Seventh Supplemental Bond Resolution adopted by the Board on May 22, 2008, authorizing a conversion of the interest rate modes on the 2007 Bonds and creating subseries thereof, as amended by the Eighth Supplemental Resolution, the Ninth Supplemental Resolution and the Eleventh Supplemental Resolution, and as it may be further amended from time to time in accordance with its terms.

"*Sinking Fund Installment*" means, as of any particular date of calculation and with respect to any Series of Bonds, the amount of money to be applied as the Redemption Price of Bonds subject to mandatory sinking fund redemption in any Fiscal Year prior to maturity pursuant to the Supplemental Resolution for such Series, as such Sinking Fund Installment shall have been previously reduced by the principal amount of any Bonds of such Series of the maturity in respect of which such Sinking Fund Installment is payable which are purchased or redeemed by the Trustee in accordance with the provisions of Section 5.07 hereof or of any Supplemental Resolution, other than by the prior payment of a Sinking Fund Installment.

"*Sixteenth Supplemental Resolution*" means the Amended and Restated Sixteenth Supplemental Bond Resolution adopted by the Board on January 24, 2019, authorizing the issuance of the 2019A Bonds, as it may be amended from time to time in accordance with its terms.

"*Sixth Supplemental Resolution*" means the Amended and Restated Sixth Supplemental Bond Resolution adopted by the Board on May 24, 2007, authorizing the issuance of the 2007 Bonds, as amended by the Seventh Supplemental Resolution, the Eighth Supplemental Resolution, the Ninth Supplemental Resolution and the Eleventh Supplemental Resolution, and as it may be further amended from time to time in accordance with its terms.

"*Special Project*" means a special project that meets the conditions for a Special Project set forth in Section 12.03 hereof.

"*State*" means the State of Colorado.

"*Subaccount*" means any one or more of the subaccounts from time to time created in any of the Accounts established by Section 5.02 of this Amended and Restated Master Resolution or by any Supplemental Resolution.

"*Subordinate*" means, when used with respect to a particular Tier of Senior Bonds, First Tier Subordinate Bonds, Second Tier Subordinate Bonds, Third Tier Subordinate Bonds or bonds or other obligations subordinate thereto, all Bonds with respect to which amounts in the Revenue Fund are to be applied to the Debt Service Account for such Bonds pursuant to Section 5.05(a) hereof at a priority following the priority at which such amounts are to be applied to the Debt Service Account for the particular Tier of Bonds.

"*Supplemental Resolution*" means any Resolution supplemental to or amendatory of the Original Master Resolution or this Amended and Restated Master Resolution, adopted by the Authority in accordance with Article X or XI hereof.

"*Surplus Fund*" means the E-470 Public Highway Authority Revenue Bond Surplus Fund established by Section 5.02 hereof.

"*Tenth Supplemental Resolution*" means the Tenth Supplemental Bond Resolution adopted by the Board on August 11, 2011, authorizing the issuance of the 2011 Bonds, as it may be amended from time to time in accordance with its terms.

"*Termination Payment*" means amounts paid or received by the Authority upon the termination or cancellation of a Related Financial Transaction.

"*Termination Payment Account*" means the Termination Payment Account of the Surplus Fund established by Section 5.02 hereof.

"*Third Supplemental Resolution*" means Resolution No. 01-03, as adopted by the Board on May 10, 2001, authorizing the issuance of the 2001 Bonds, as amended by the Fourth Supplemental Resolution, the Fifth Supplemental Resolution, the Sixth Supplemental Resolution and the Eighth Supplemental Resolution, and as it may be further amended from time to time in accordance with its terms.

"*Third Tier Subordinate Bonds*" means any Bonds designated as "Third Tier Subordinate Bonds" by Supplemental Resolution.

"*Third Tier Subordinate Bonds Debt Service Account*" means the Third Tier Subordinate Bonds Debt Service Account of the Debt Service Fund established by Section 5.02 hereof.

"*Thirteenth Supplemental Resolution*" means the Thirteenth Supplemental Bond Resolution adopted by the Board on October 23, 2014, making certain amendments to the Prior Master Resolution, as it may be amended from time to time in accordance with its terms.

"*Tier*" means all Bonds of one or more Series the principal and Redemption Price of and interest on which are payable from the same Debt Service Account.

"*Toll Road Consultant*" means a Consultant with expertise and experience regarding the operation, management and financing of, and the collection of revenues from, toll roads.

"*Trustee*" means the commercial bank appointed in Article IX hereof to act in such capacity, its legal successor, or any other commercial bank or trust company duly organized and existing under the laws of the State or the United States of America, which is authorized under such laws to exercise corporate trust powers and is subject to examination by federal authority, appointed pursuant to Article IX hereof as its successor or its successors.

"*Trust Estate*" means:

(a) all right, title and interest of the Authority in and to the Revenues as the same are collected;

(b) all right, title and interest of the Authority now owned or hereafter acquired in and to all moneys deposited or required to be deposited in any Fund, Account or Subaccount pursuant to this Amended and Restated Master Resolution or any Supplemental Resolution, except the Rebate Fund, and all right, title and interest in and to the Investment Securities (and interest and investment income derived therefrom) held in any such Fund, Account or Subaccount pursuant to this Amended and Restated Master Resolution or any Supplemental Resolution; provided, however, that (i) the Authority may establish one or more separate Accounts or Subaccounts in any such Fund, Account or Subaccount, which separate Accounts or Subaccounts and the moneys deposited therein (together with all investments thereof and investment income earned thereon) may be pledged exclusively to the payment of one or more designated Series of Bonds or portions thereof for any designated period, or otherwise, all as shall be provided herein or in any Supplemental Resolution; and (ii) the Authority shall transfer any or all interest and investment income derived from Investment Securities held in any such Fund, Account or Subaccount to the other Funds, Accounts and Subaccounts in accordance with the provisions hereof or any Supplemental Resolution; provided, however, that no transfer pursuant to this clause (ii) that is not specifically provided for or specifically permitted herein or in the First Supplemental Resolution of any Investment Securities or any moneys in any Fund, Account or Subaccount, other than the General Surplus Account, the First Tier Subordinate Bonds Debt Service Account, the Second Tier Subordinate Bonds Debt Service Account, the Third Tier Subordinate Bonds Debt Service Account or the First Tier Subordinate Bonds Debt Service Reserve Account, shall be made without National's written consent;

(c) all right, title and interest of the Authority in and to any contract, agreement or other arrangement relating to the acquisition, construction or improvement of the Project but only if the Authority's obligations thereunder are to be paid from a Fund, Account or Subaccount other than the General Surplus Account; and

(d) any and all property of every kind and nature (including, without limitation, cash, obligations or securities) which may from time to time hereafter be assigned, hypothecated, endorsed, pledged, granted, or delivered to or deposited with the Trustee as additional security hereunder by the Authority or anyone on its behalf, or which pursuant to any of the provisions hereof may come into the possession or control of the Trustee as security hereunder, or of a receiver lawfully appointed hereunder, including, but not limited to, any Related Financial Transaction (provided, however, that a Related Financial Transaction and the amounts payable to the Authority or the Trustee thereunder shall be part of the Trust Estate only in respect of the Series of Bonds to which such Related Financial Transaction relates),

all of which the Trustee is authorized to receive, hold and apply according to the terms hereof.

"*Twelfth Supplemental Resolution*" means the Twelfth Supplemental Bond Resolution adopted by the Board on January 23, 2014, authorizing the issuance of the 2014A Bonds, as it may be amended from time to time in accordance with its terms.

"*2000 Bonds*" means the Series 2000A Bonds and the Series 2000B Bonds, collectively.

"*2000 Senior Bonds Capitalized Interest Subaccount*" has the meaning set forth in the Second Supplemental Resolution.

"*2000 Senior Bonds Capitalized Interest Subaccount Requirement*" means the amount required to be deposited into the 2000 Senior Bonds Capitalized Interest Subaccount by the Second Supplemental Resolution, calculated in the manner and times as set forth therein.

"*2001 Bonds*" means the E-470 Public Highway Vehicle Registration Fee Bonds, Series 2001.

"*2004 Bonds*" means the E-470 Public Highway Senior Revenue Bonds, Series 2004A (Noncallable Capital Appreciation Bonds), the E 470 Public Highway Authority Senior Revenue Bonds, Series 2004B (Callable Capital Appreciation Bonds) and the E-470 Public Highway Authority Senior Revenue Bonds, Series 2004C (Noncallable Convertible Capital Appreciation Bonds), collectively.

"*2006 Bonds*" means the E-470 Public Highway Authority Senior Revenue Bonds, Series 2006A (Current Interest Bonds) and the E-470 Public Highway Authority Senior Revenue Bonds, Series 2006B (Capital Appreciation Bonds), collectively.

"*2007 Bonds*" means, collectively, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2007A, and includes the Subseries 2007A-1 Bonds and the Subseries 2007A-2 Bonds, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2007B, and includes the Subseries 2007B-1 Bonds and the Subseries 2007B-2 Bonds, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2007C, and includes the Subseries 2007C-1 Bonds, and the E-470 Public Highway Authority Senior Revenue Bonds, Series 2007D, and includes the Subseries 2007D-1 Bonds, and the E-470 Public Highway Authority Senior Revenue Bonds, Series 2007CD-2.

"*2007 JPM Swap*" means the ISDA Master Agreement and the Schedule and Confirmation relating thereto, each dated as of June 5, 2007, originally between the Authority and Bear Stearns Financial Products Inc. and assigned thereby to JPMorgan Chase Bank, N.A. pursuant to the Assignment Agreement relating thereto dated as of April 1, 2009, each by and among the Authority, JPMorgan Chase Bank and Bear Stearns Financial Products Inc., as so assigned and as amended.

"*2007 MSCS Swap*" means the ISDA Master Agreement, Schedule and Confirmation AUG5Q, each dated as of June 5, 2007 between Morgan Stanley Capital Services Inc. and the Authority, as amended.

"*2007 Swaps*" means, collectively, the 2007 JPM Swap and the 2007 MSCS Swap.

"*2008 Surety Bond*" means the Debt Service Reserve Surety Bond issued by MBIA for deposit into the Senior Bonds Debt Service Reserve Account in May 2008.

"*2010 Bonds*" means, collectively, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2010A (Capital Appreciation Bonds), the E-470 Public Highway Authority Senior Revenue Bonds, Series 2010B (Convertible Capital Appreciation Bonds), and the E-470 Public Highway Authority Senior Revenue Bonds, Series 2010C (Current Interest Bonds), to the extent the same are issued by the Authority.

"*2011 Bonds*" means, collectively, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2011A, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2011B, and the E-470 Public Highway Authority Senior Revenue Bonds, Series 2011C, collectively.

"*2014A Bonds*" means the E-470 Public Highway Authority Senior Revenue Bonds, Series 2014A.

"*2015A Bonds*" means the E-470 Public Highway Authority Senior Revenue Bonds, Series 2015A.

"*2017 Bonds*" means, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2017A and the 2017B Bonds, collectively.

"*2017B Bonds*" means, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2017B.

"*2019A Bonds*" means, the E-470 Public Highway Authority Senior Revenue Bonds, Series 2019A.

"*Unrestricted General Surplus Account Moneys*" means moneys held in the General Surplus Account or any sub-account of fund in excess of the $20,000,000 balance required to be maintained therein by Section 6.10(b) hereof.

Section 1.02. Authority. This Amended and Restated Master Resolution is adopted pursuant to the PHA Law.

Section 1.03. Table of Contents, Titles and Headings. The table of contents, titles and headings of the articles and sections of this Amended and Restated Master Resolution have been inserted for convenience of reference only and are not to be considered a part hereof and shall not in any way modify or restrict any of the terms or provisions hereof and shall never be considered or given any effect in construing this Amended and Restated Master Resolution or any provision hereof or in ascertaining intent, if any question of intent should arise.

Section 1.04. Interpretation and Construction. For purposes of this Amended and Restated Master Resolution, except as otherwise expressly provided or unless the context otherwise requires:

(a) All references in this Amended and Restated Master Resolution to designated "Articles," "Sections," "subsections," "paragraphs," "clauses" and other subdivisions are to the designated Articles, Sections, subsections, paragraphs, clauses and other subdivisions of this Amended and Restated Master Resolution. The words "herein," "hereof," "hereto," "hereby," "hereunder" and other words of similar import refer to this Amended and Restated Master Resolution as a whole and not to any particular Article, Section or other subdivision.

(b) The terms defined in Section 1.01 hereof have the meanings assigned to them in that Section and include the plural as well as the singular.

(c) All accounting terms not otherwise defined herein have the meanings assigned to them in accordance with generally accepted accounting principles as in effect from time to time.

(d) The term "money" includes any cash, check, deposit, investment security or other form in which any of the foregoing are held hereunder.

(e) Every "request," "order," "demand," "application," "appointment," "notice," "statement," "certificate," "consent" or similar action hereunder by the Authority, the Trustee, or any other Fiduciary shall, unless otherwise specifically provided, be in writing signed by an officer or other agent of such party authorized to sign the same.

(f) In the computation of a period of time from a specified date to a later specified date, the word "from" means "from and including" and each of the words "to" and "until" means "to but excluding."

This Amended and Restated Master Resolution and all terms and provisions hereof shall be liberally construed to effectuate the purposes set forth herein to sustain the validity of this Amended and Restated Master Resolution.

ARTICLE II

SECURITY FOR THE BONDS AND PARITY OBLIGATIONS

Section 2.01. Pledge of Trust Estate.

(a) In order to secure the payment of the principal, Maturity Value and Redemption Price of and interest on the Bonds and the comparable amounts with respect to Parity Obligations as the same become due and payable (whether at maturity, by prior redemption, or otherwise) and the performance and observance of all of the covenants and conditions herein contained, and in consideration of the premises, the purchase and acceptance of the Bonds by the Owners thereof and of the Parity Obligations by the owners thereof, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Authority does hereby grant to the Trustee and its successors in trust hereunder a pledge of and first lien on the Trust Estate, with all rights and privileges appurtenant thereto, subject, however, to the terms and provisions hereof.

(b) Such pledge and lien shall be for the equal and proportionate benefit and security of the Owners from time to time of the Bonds issued and to be issued hereunder and the owners from time to time of the Parity Obligations issued and to be issued under the Parity Obligation Instruments, or any of them, without preference, priority or distinction as to lien or otherwise of any Bond or Parity Obligation over any other Bond or Parity Obligation, except that, as further provided herein and subject to the further terms hereof, (i) the Owners of the Bonds of each Tier shall have an exclusive lien on the Debt Service Account and the Debt Service Reserve Account with the same designation as such Tier of Bonds, (ii) the Owners of the Bonds of each Series have an exclusive lien on any subaccount of the Capitalized Interest Account dedicated to payment of interest on such Series, (iii) the lien on the Trust Estate of the Owners of Bonds of Tiers is subordinate or superior to the lien of the Owners of such Bonds of other Tiers, and (iv) there are various differences in the rights of, and priorities for the benefit of, the Owners of the Bonds of different Tiers with respect to various other matters, including but not limited to remedies following Events of Default.

(c) If the Authority, its successors or assigns, shall well and truly pay, or cause to be paid, all of the principal and Redemption Price of and interest on the Bonds, at the times and in the manner provided in the Bonds according to the true intent and meaning thereof, and shall cause the payments to be made into the Funds and Accounts established hereunder and in the amounts required hereby, or shall provide, as permitted hereby, for the payment thereof by depositing with or for the account of the Trustee or an escrow agent an amount sufficient to provide for payment of the entire amount due or to become due thereon, and shall well and truly keep, perform and observe all the covenants and conditions pursuant to the terms of this Amended and Restated Master Resolution to be kept, performed and observed by it, and shall pay or cause to be paid to the Trustee all sums of money due or to become due to it in accordance with the terms and provisions hereof, and shall pay or cause to be paid all amounts due to MBIA and National, and if the Authority, its successors or assigns, shall well and truly pay, or cause to be paid, all of the principal and redemption price of and interest on the Parity Obligations, at the times and in the manner provided in the Parity Obligations according to the true intent and meaning thereof, and shall cause the payments to be made into the funds and accounts established under the Parity Obligation Instruments and in the amounts required thereby, or shall provide, as provided herein, for the payment thereof by depositing with or for the account of the Trustee or an escrow agent an amount sufficient to provide for payment of the entire amount due or to become due thereon, and shall well and truly keep, perform and observe all the covenants and conditions pursuant to the terms of the Parity Obligation Instruments to be kept, performed and observed by it, and shall pay or cause to be paid to the Trustee all sums of money due or to become due to it in accordance with the terms and provisions of the Parity Obligation Instruments, and shall pay or cause to be paid all amounts due to MBIA and National, then, upon such payment and performance, this Amended and Restated Master Resolution and the rights and liens hereby granted shall cease, determine and be void; otherwise, this Amended and Restated Master Resolution is to be and shall remain in full force and effect.

Section 2.02. Time of Pledge; Delivery of Trust Estate. The pledge of the Trust Estate pursuant to the provisions of this Amended and Restated Master Resolution shall be effective from and after the payment for and delivery of any Bonds. Nothing in this Amended and Restated Master Resolution shall create an obligation on the part of the Authority to physically deliver the Trust Estate to the Trustee except as expressly provided in this Amended and Restated Master Resolution.

Section 2.03. Declaration. It is hereby expressly declared that the Trust Estate hereby pledged is to be applied, disbursed, dealt with and disposed of under, upon and subject to the terms, conditions, covenants, agreements, uses and purposes set forth in this Amended and Restated Master Resolution.

Section 2.04. Special, Limited Obligations. The Bonds shall be special, limited obligations of the Authority payable solely from the Trust Estate in accordance with this Amended and Restated Master Resolution and any applicable Supplemental Resolution; and shall not constitute or be construed to be a debt or multiple fiscal year direct or indirect debt or other financial obligation, or a pledge of the taxing powers, faith or credit, of the State or any political subdivision of the State other than the Authority.

ARTICLE III

AUTHORIZATION AND ISSUANCE OF BONDS, GENERAL TERMS AND PROVISIONS OF THE BONDS

Section 3.01. Authorization of Authority Bonds.

(a) The Authority hereby authorizes the issuance of Authority Bonds, to be designated as its "E-470 Public Highway Authority Revenue Bonds," for the purpose of financing, constructing, operating and maintaining the Project. The aggregate principal amount of the Authority Bonds which may be executed, authenticated and delivered under this Amended and Restated Master Resolution is not limited except as may be provided herein or in any Supplemental Resolution.

(b) The Authority Bonds may, as provided in one or more Supplemental Resolutions, be issued in one or more Series, and the designation thereof, in addition to the name "E-470 Public Highway Authority Revenue Bonds" and an identification of the Tier in which such Series is included, shall include such further appropriate particular designation added to or incorporated in such title for the Bonds of any particular Series, as the Authority may determine. Each Authority Bond shall bear upon its face the designation so determined for the Series and Tier to which it belongs.

(c) The Authority Bonds shall be issued in such form as may be provided by Supplemental Resolution, and each Authority Bond issued hereunder shall contain on its face a statement to the effect set forth in Section 2.04 hereof.

Section 3.02. Provisions for Issuance of Authority Bonds.

(a) All (but not less than all) the Authority Bonds of each Series shall be executed by the Authority for issuance under this Amended and Restated Master Resolution and delivered to the Trustee and thereupon shall be authenticated by the Trustee or Authenticating Agent and by it delivered upon the order of the Authority, but only upon the receipt by the Trustee of:

(i) an opinion of Bond Counsel in customary form to the effect that, as of its date (A) this Amended and Restated Master Resolution and the Supplemental Resolution authorizing the Bonds of such Series have been duly authorized, executed and delivered by the Authority, are in full force and effect and constitute legal, valid and binding special, limited obligations of the Authority; (B) this Amended and Restated Master Resolution and such Supplemental Resolution create the valid pledge of and lien on the Trust Estate which they purport to create, subject only to the provisions of this Amended and Restated Master Resolution and such Supplemental Resolution permitting the application thereof for the purposes and on the terms and conditions set forth in this Amended and Restated Master Resolution and such Supplemental Resolution; and (C) the Bonds of such Series are valid and binding special, limited obligations of the Authority, payable solely from the sources provided therefor in this Amended and Restated Master Resolution and such Supplemental Resolution; provided, however, that such opinion may include exceptions for limitations imposed by or resulting from bankruptcy, insolvency, moratorium, reorganization, or other laws affecting creditors' rights generally, matters relating to equitable or governmental principles and other exceptions or qualifications appropriate in the circumstances;

(ii) a letter, signed by an Authorized Authority Representative, instructing the Trustee as to the delivery of such Bonds;

(iii) in the case of each Series of Authority Bonds, a copy of the Supplemental Resolution authorizing such Bonds, certified by an officer of the Authority, which shall specify:

(A) the authorized principal amount, designation, Tier and Series of such Bonds;

(B) the maturity date or dates of the Bonds of such Series;

(C) the interest rate or rates, if any, or the manner of determining such interest rate or rates, on the Bonds of such Series, which may be fixed, variable or otherwise, and the Interest Payment Date or Dates thereof, or, with respect to Capital Appreciation Bonds, the Maturity

Value, Accreted Value and Accretion Dates, or the manner of determining the same, for the Bonds of such Series;

(D) the denominations of and the manner of dating, numbering and lettering the Bonds of such Series;

(E) the Debt Service Reserve Fund Requirement (or the method of determining the same) and any capitalized interest requirement (or the method of determining the same) for the Bonds of such Series;

(F) any Paying Agent, Registrar, or other Fiduciary required in respect of the Bonds of such Series;

(G) the Redemption Prices and redemption terms, if any, for the Bonds of such Series;

(H) the amount and due date of each Sinking Fund Installment, if any, for Bonds of like maturity of such Series;

(I) the form of the Bonds of such Series; and

(J) any other provisions deemed advisable by the Authority and not in conflict with the provisions of this Amended and Restated Master Resolution; and

(iv) such further opinions and instruments as are required by or pursuant to the provisions of this Amended and Restated Master Resolution or any Supplemental Resolution.

(b) Except for the 1997 Bonds, all Refunding Bonds of each Series shall be executed by the Authority for issuance under this Amended and Restated Master Resolution and delivered to the Trustee and thereupon shall be authenticated by the Trustee or any Authenticating Agent and by it delivered upon the order of the Authority, but only upon the receipt by the Trustee of:

(i) the opinions and instruments referred to in subsection (a) of this Section;

(ii) if any Bonds or portions thereof to be refunded are to be called for redemption, a Letter of Instructions containing irrevocable instructions to the Trustee, satisfactory to it, requiring that due notice be given of the redemption of the Bonds or portions thereof to be refunded on a Redemption Date specified in such instructions;

(iii) a Letter of Instructions containing irrevocable instructions to the Trustee, satisfactory to it, requiring that such other notice be given with respect to the Bonds being refunded as may be required by this Amended and Restated Master Resolution;

(iv) evidence satisfactory to the Trustee that the deposit of moneys or Defeasance Investment Securities required by Section 13.01(b) hereof has been made;

(v) such further opinions and instruments as are required by the provisions of Articles X or XI hereof or by the provisions of any Supplemental Resolution; and

(vi) all requirements under Section 13.25(f) hereof have been met.

(c) Except for the 1997 Bonds, no additional Series of Authority Bonds shall be issued unless the following additional requirements are satisfied by delivering to the Trustee:

(i) If such Series of Bonds is being issued to complete the portion of the Project between 120th Avenue and Interstate 25 North, including the interchanges at 120th Avenue and Interstate 25 North, to complete the interchange at Interstate 70 or to make major repairs to the Project, and the sum of the principal amount of such Series and the principal amount of all other Series issued pursuant to this paragraph (i) does not exceed $50 million, a certificate from a Toll Road Consultant to the effect that such Series of Bonds is required to finance Costs of the Project for which there are not funds otherwise available and such Costs of the Project must be incurred in order to complete the portion of the Project between 120th Avenue and Interstate 25 North, to complete the interchange at Interstate 70 or to make major repairs to the Project;

(ii) For all additional Series of Bonds not permitted pursuant to paragraph (i) above or paragraph (iii) below, the following conditions below are met, provided that none of such conditions need be met if the written consent of National is obtained for the issuance of such additional Series of Bonds:

(A) a certificate or report of a Toll Road Consultant to the effect that for each 12-month period beginning on the first day of the first calendar month following the date of issuance of the Series of Bonds to be issued, Net Revenues (based upon such assumptions as shall be set forth in such certificate or report and subject to the adjustment provided in this paragraph) are estimated to be in an amount not less than (1) if the Series of Bonds to be issued is Senior Bonds, 1.30 times the Aggregate Debt Service for each such 12-month period, and (2) if the Series of Bonds to be issued is First, Second or Third Tier Subordinate Bonds (or bonds or other obligations subordinate thereto), 1.20 times the Aggregate Debt Service for each such 12-month period. For purposes of this paragraph, (w) Aggregate Debt Service for each such 12-month period shall not include Aggregate Debt Service due during such 12-month period on any Bonds that are Subordinate to the Series of Bonds to be issued; (x) Aggregate Debt Service for each such 12-month period shall include Aggregate Debt Service due during such 12-month period on the Series of

Bonds to be issued and Aggregate Debt Service due during such 12-month period on any other Series of Bonds, other than Bonds that are Subordinate to the Series of Bonds to be issued, that, in the opinion of the Toll Road Consultant, will have to be issued in order to complete the Applicable Portion of the Project defined in the Supplemental Resolution authorizing the Series of Bonds to be issued; and (y) Aggregate Debt Service and Net Revenues for each such 12-month period shall include the interest due during such 12-month period on the Series of Bonds to be issued and on all Outstanding Bonds that are not Bonds that are Subordinate to the Series of Bonds to be issued to the extent such interest is to be paid from proceeds of Bonds or other funds held or to be held in the Capitalized Interest Account of the Construction Fund and investment earnings on such proceeds and other funds; and

(B) a certificate satisfactory to National of an Authorized Authority Representative dated as of the date of issuance of such additional Series of Bonds, stating that Segments II and III are open and operating and toll revenues have been collected from Persons traveling on such portion of the Project for at least 12 calendar months, provided that this clause (B) shall not apply when there are no Senior Bonds that are MBIA Insured Bonds Outstanding; and

(C) a certificate of an Authorized Authority Representative dated as of the date of issuance of such additional Series of Bonds, stating that there exists no Event of Default hereunder; and

(D) the Trustee and National shall have received written evidence (or other evidence satisfactory to the Trustee and National) from each Rating Agency that the issuance of such additional Series of Bonds will not, by itself, result in a withdrawal of or reduction of its rating of any Bonds or Parity Obligations;

(iii) Without regard to the limitations of (ii)(A), (B) and (C) above, but subject to satisfaction of (ii)(D) above and Section 13.25(f) hereof:

(A) for any Refunding Bonds that are Senior Bonds and that are issued to refund Senior Bonds, (1) a Toll Road Consultant's certificate or opinion that the revenue covenant of Section 7.18(a) hereof will be met through the final maturity date of such Refunding Bonds and (2) a certificate or opinion of a Consultant with expertise in investment banking that the issuance of the Refunding Bonds and the defeasance of the Bonds refunded by the Refunding Bonds will result in present value savings, provided that none of the conditions of this paragraph (iii) need be met if the written consent of National is obtained for the issuance of such Refunding Bonds; or

(B) for any Refunding Bonds that are not Senior Bonds, a Toll Road Consultant's certificate or opinion that the revenue covenant of Section 7.18(a) hereof will be met through the final maturity date of such Refunding Bonds, provided that none of the conditions of this paragraph (iii) need be met if the written consent of National is obtained for the issuance of such Refunding Bonds;

(iv) For all Series of Senior Bonds that are not permitted by (i) or (iii) above, the written consent of National is obtained, which National may give or withhold in its sole discretion.

Section 3.03. Application of Authority Bond Proceeds. The proceeds, including accrued interest, if any, of the Authority Bonds of each Series together with any other moneys provided by the Authority, shall be applied simultaneously with the delivery of such Bonds in the manner provided in the Supplemental Resolution authorizing such Series of Bonds.

Section 3.04. Medium of Payment; Form and Date; Letters and Numbers.

(a) The Bonds shall be payable, as to principal, Redemption Price and interest in any coin or currency of the United States of America which at the time of payment is legal tender for the payment of public and private debts. Interest on any Series of Bonds shall be computed as provided in the Supplemental Resolution authorizing such Series of Bonds.

(b) The Bonds of each Series may be issued in such form or forms as shall be provided in the Supplemental Resolution authorizing such Series of Bonds.

(c) Each Bond shall be lettered and numbered as provided in this Amended and Restated Master Resolution or the Supplemental Resolution authorizing the Series of which such Bond is a part and so as to be distinguished from every other Bond.

(d) Bonds of each Series shall be dated as of, and bear interest from, such date or dates as shall be provided in the Supplemental Resolution authorizing such Series of Bonds.

(e) Unless a Supplemental Resolution provides otherwise:

(i) Interest on Bonds of any Series other than interest payable at maturity or on a Redemption Date shall be paid to the Person in whose name such Bond is registered on the Register at the close of business on the Record Date for such Interest Payment Date. Payment of interest on Bonds other than interest payable at maturity or on a Redemption Date shall be made by check or draft of the Paying Agent mailed to the Owners thereof at their addresses set forth in the Register as of the Record Date;

(ii) Payment of interest on Bonds at maturity or on a Redemption Date shall be paid upon presentation and surrender of such Bonds at the Paying Agent's principal operations office; and

(iii) Payment of the principal, Maturity Value or Redemption Price of Bonds shall be paid upon presentation and surrender of such Bonds at the Paying Agent's principal office.

Section 3.05. Legends. The Bonds of each Series may contain or have endorsed thereon such provisions, specifications and descriptive words not inconsistent with the provisions of this Amended and Restated Master Resolution as may be necessary or desirable to comply with custom, the rules of any securities exchange or commission, brokerage board, municipal securities rulemaking board or otherwise.

Section 3.06. Execution, Authentication and Registration. The Authority Bonds shall be signed in the name of the Authority by the Chairman of the Board by his or her manual or facsimile signature, and the Authority's corporate seal (or a facsimile thereof) shall be impressed, imprinted, engraved or otherwise reproduced thereon. In case the Chairman of the Board shall have signed any of the Authority Bonds shall cease to hold such office before the Bonds so signed shall have been authenticated and delivered by the Trustee or a duly authorized Authenticating Agent, such Bonds may, nevertheless, be authenticated and delivered as herein provided, and may be issued as if the persons who signed such Bonds had not ceased to hold such offices. Any Authority Bond of a Series may be signed on behalf of the Authority by such persons who at the time of the execution of such Bonds shall be duly authorized or holds the designated office of the Authority, although at the date borne by the Bonds of such Series such persons may not have been so authorized or have held such office.

The Authority Bonds of each Series shall bear thereon a certificate of authentication, in the form set forth in the Supplemental Resolution authorizing such Bonds, dated as of the date of authentication, executed manually by an authorized signatory of the Trustee or by a duly authorized Authenticating Agent. Only such Authority Bonds as shall bear thereon such certificate of authentication shall be entitled to any right or benefit under the Master Resolution and no Authority Bond shall be valid or obligatory for any purpose until such certificate of authentication shall have been duly executed. Such certificate of authentication upon any Authority Bond shall be conclusive evidence that the Bond so authenticated has been duly authenticated and delivered under this Amended and Restated Master Resolution and that the Owner thereof is entitled to the benefits of this Amended and Restated Master Resolution.

Section 3.07. Exchange of Bonds. Unless otherwise provided in any Supplemental Resolution, Bonds, upon surrender thereof at the principal operations center of the Registrar, when surrendered with a written request satisfactory to the Registrar duly executed by the Owner or the Owner's duly authorized attorney, may, at the option of the registered Owner thereof, and upon payment by such registered Owner of any charges which the Registrar or the Authority may make as provided in Section 3.09 hereof, be exchanged for an equal aggregate principal amount of Bonds of the same Series and maturity and in any authorized denomination.

Section 3.08. Negotiability, Transfer and Registry. Unless otherwise provided in any Supplemental Resolution, Bonds shall be transferable only upon the Register, which shall be kept for that purpose at the principal operations center of the Registrar for such Series of Bonds, by the Owner thereof in person or by the Owner's attorney duly authorized in writing, upon surrender thereof together with a written instrument of transfer satisfactory to the Registrar duly executed by the Owner or the Owner's duly authorized attorney.

The Registrar shall keep, or cause to be kept, on behalf of the Authority at the principal operations center of the Registrar or such other location or locations as shall be provided in any Supplemental Resolution, the Register, in which, subject to such reasonable regulations as the Authority, the Trustee, and the Registrar may prescribe, the Registrar shall cause Bonds to be registered and shall transfer Bonds as in this Article provided. Upon the transfer of any such Bond and payment of any required fees, the Registrar shall issue in the name of the transferee a new fully registered Bond or Bonds of the same Series, aggregate principal amount or Maturity Value and maturity as the surrendered Bond.

The Authority, National, the Trustee, and any other Fiduciary may deem and treat the person in whose name any Bond shall be registered in the Register as the absolute Owner of such Bond, whether such Bond shall be overdue or not, for the purpose of receiving payment of, or on account of, the principal or Maturity Value and Redemption Price and interest on such Bond and for all other purposes, and all such payments so made to any such Owner or upon the Owner's order shall be valid and effectual to satisfy and discharge the liability upon such Bond to the extent of the sum or sums so paid, and the Authority, National, the Trustee, and any other Fiduciary shall not be affected by any notice to the contrary.

Subject only to the provisions contained in this Amended and Restated Master Resolution or any Supplemental Resolution in respect of registration, all Bonds issued hereunder shall constitute negotiable instruments within the meaning of and for all purposes of title 4, Colorado Revised Statutes, as amended, cited as the "Uniform Commercial Code."

Section 3.09. Regulations with Respect to Exchanges and Transfers. Except as otherwise provided in any Supplemental Resolution, in all cases in which the privilege of exchanging or transferring Bonds is exercised, the Authority shall execute and the Trustee or the duly authorized Authenticating Agent shall authenticate and deliver Bonds in accordance with the provisions of this Amended and Restated Master Resolution. All registered Bonds surrendered in any exchange or transfer shall forthwith be canceled by the Trustee or the duly authorized Authentication Agent. For every such transfer of Bonds pursuant to Section 3.08 hereof, whether temporary or definitive, the Authority, the Trustee, the Registrar, and any Authenticating Agent may make a charge sufficient to reimburse it or them for any expense, tax, fee or other governmental charge required to be paid with respect to such transfer. In addition, for every exchange of Bonds (other than the exchange of temporary Bonds for definitive Bonds), the Authority, the Trustee, the Registrar, and any Authenticating Agent may make reasonable charges to cover the costs of printing Bonds including any Trustee's, Registrar's, or Authenticating Agent's charges in connection therewith. The payment of the sum or sums provided in this Section shall be made by the Owner requesting such exchange or transfer as a condition precedent to the exercise of the privilege of making such exchange or transfer. The Registrar shall not be required to transfer or exchange Bonds (other than at the request of National with respect to Bonds for which MBIA or National has paid the principal and interest) for a period of 15 days next preceding the selection of Bonds for redemption or to transfer or exchange any Bonds called for redemption (other than at the request of National with respect to Bonds for which MBIA or National has paid the principal and interest).

Section 3.10. Bonds Mutilated, Destroyed, Stolen or Lost. In case any Bonds shall become mutilated or be destroyed, stolen or lost, the Authority shall execute, and thereupon the Trustee or duly authorized Authenticating Agent shall authenticate and deliver, a new Bond of like Series, maturity date, principal amount and interest rate as the Bond so mutilated, lost, stolen or destroyed, provided that (a) in the case of any mutilated Bond, such Bond is first surrendered to the Trustee or duly authorized Authenticating Agent, (b) in the case of any lost, stolen or destroyed Bond, there is first furnished evidence of such loss, theft or destruction satisfactory to the Authority and the Trustee or duly authorized Authenticating Agent together with indemnity satisfactory to the Authority and the Trustee or duly authorized Authenticating Agent (and, in the case of MBIA Insured Bonds, National), (c) all other reasonable requirements of the Authority and the Trustee or duly authorized Authenticating Agent are complied with, and (d) expenses in connection with such transaction are paid by the Owner. Except as provided in Section 3.09 hereof, all Bonds so surrendered to the Trustee shall be canceled by it. Any such new Bonds issued pursuant to this Section in substitution for Bonds alleged to be destroyed, stolen or lost shall constitute original additional contractual obligations on the part of the Authority, whether or not the Bonds alleged to be destroyed, stolen or lost be at any time enforceable by anyone, and shall be equally secured by and entitled to equal and proportionate benefits in the Trust Estate with all other Bonds issued under this Amended and Restated Master Resolution, to the same extent provided herein.

Section 3.11. Temporary Bonds. Until the definitive Bonds of any Series are prepared, the Authority may execute, in the same manner as is provided in Section 3.06 hereof, and, upon the request of the Authority, the Trustee or any Authenticating Agent shall authenticate and deliver, in lieu of definitive Bonds, but subject to the same provisions, limitations and conditions as the definitive Bonds except as to denomination, one or more temporary Bonds substantially of the tenor of the definitive Bonds in lieu of which such temporary Bond or Bonds are issued, in authorized denominations as provided in a Supplemental Resolution authorized by the Authority, and with such omissions, insertions and variations as may be appropriate to temporary Bonds. The Authority at its own expense shall prepare and execute and, upon the surrender of such temporary Bonds, the Trustee or any Authenticating Agent shall authenticate and, without charge to the Owner thereof, deliver in exchange therefor, definitive Bonds, of the same aggregate principal amount and Series and maturity as the temporary Bonds surrendered. Until so exchanged, the temporary Bonds shall in all respects be entitled to the same benefits and security as definitive Bonds authenticated and issued pursuant to this Amended and Restated Master Resolution.

If the Authority shall authorize the issuance of temporary Bonds in more than one denomination, the Owner of any temporary Bond or Bonds may, at said Owner’s option, surrender the same to the Trustee in exchange for another temporary Bond or Bonds of like aggregate principal amount and Series and maturity of any other authorized denomination or denominations, and thereupon the Authority shall execute and the Trustee or Authenticating Agent shall authenticate and, in exchange for the temporary Bond or Bonds so surrendered and upon payment of the taxes, fees and charges as provided for in Section 3.09 hereof, shall deliver a temporary Bond or Bonds of like aggregate principal amount, Series and maturity in such other authorized denomination or denominations as shall be requested by such Owner.

All temporary Bonds surrendered in exchange either for another temporary Bond or Bonds or for a definitive Bond or Bonds shall be forthwith cancelled by the Trustee.

Section 3.12. Cancellation and Destruction of Bonds. Except as otherwise provided in this Amended and Restated Master Resolution or any Supplemental Resolution, all Bonds paid in full, either at or before maturity, or purchased pursuant to Section 5.07 hereof, shall be delivered to the Trustee when such payment or purchase is made, and such Bonds shall thereupon be promptly cancelled. Bonds so cancelled may at any time be destroyed by the Trustee, who shall execute a certificate of destruction in duplicate by the signature of one of its authorized signatories describing the Bonds so destroyed, and one executed certificate shall be filed with the Authority and the other executed certificate shall be retained by the Trustee.

Section 3.13. Book Entry. Notwithstanding any other provision hereof, all or certain Series of the Bonds may, at the option of the Authority, be issued in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York ("DTC"), as registered owner thereof, and immobilized in the custody of DTC (the "DTC Bonds"). A single certificate for each maturity date of the DTC Bonds will be issued and delivered to DTC for the total principal amount due on each maturity date of the DTC Bonds. Beneficial owners of DTC Bonds will not receive physical delivery of Bond certificates except in the event that replacements are issued therefor as provided herein. All subsequent transfers of ownership interests, after immobilization of the original DTC Bond certificates as provided above, will be made by book-entry-only, and no investor or other party purchasing, selling or otherwise transferring DTC Bonds is to receive, hold or deliver any DTC Bond certificate as long as DTC or any successor depository holds the immobilized DTC Bond certificates. The Chairman of the Board or any other officer of the Authority is hereby authorized and directed to take any and all actions as may be necessary and not inconsistent with this resolution in order to qualify the DTC Bonds for DTC's book-entry system, including the execution of the Letter of Representations, and payments to DTC by the Paying Agent shall be made in accordance with such Letter of Representations.

ARTICLE IV

REDEMPTION OF AUTHORITY BONDS

Section 4.01. Privilege of Redemption and Redemption Price. Authority Bonds subject to redemption prior to maturity pursuant to a Supplemental Resolution shall be redeemable, upon notice as provided in this Article unless a different notice provision is provided for in a Supplemental Resolution, at such Redemption Dates, at such Redemption Prices and upon such terms in addition to the terms contained in this Article, as may be specified in the Supplemental Resolution authorizing such Series of Bonds.

Section 4.02. Redemption at the Option of the Authority. In the case of any redemption of Authority Bonds at the option of the Authority, an Authorized Authority Representative shall give written notice to the Trustee and any Paying Agent of its election or direction so to redeem, of the Redemption Date, of the Series, and of the principal amounts of the Bonds of each maturity of such Series to be redeemed (which Series, maturities, and principal amounts thereof to be redeemed shall be determined by the Authority in its sole discretion, subject to any limitations with respect thereto as are contained in Section 4.04 of this Amended and Restated Master Resolution). Such notice shall be given at least 10 days prior to the date on which notice of redemption is required to be given to the Owners of the Bonds to be redeemed or within such shorter period as shall be provided by Supplemental Resolution or as shall be approved by the Trustee. In the event notice of redemption shall have been given as provided in Section 4.05 hereof, and provided that any conditions to redemption stated in such notice have been satisfied, there shall be paid on or before the Redemption Date to the Trustee for transfer to the Paying Agent an amount which, in addition to other moneys, if any, available therefor held by the Trustee or Paying Agent, will be sufficient to redeem on the Redemption Date at the Redemption Price, plus interest accrued and unpaid to the Redemption Date, all of the Bonds to be redeemed.

Section 4.03. Redemption Otherwise Than at the Option of the Authority. Whenever by the terms of this Amended and Restated Master Resolution or any Supplemental Resolution the Trustee is required or authorized to redeem Authority Bonds otherwise than at the option of the Authority, the Trustee shall select the Bonds to be redeemed, give the notice of redemption and transfer, out of moneys available therefor, the Redemption Price thereof, plus interest accrued and unpaid to the Redemption Date, to the Paying Agent in accordance with the terms of this Amended and Restated Master Resolution and any Supplemental Resolution.

Section 4.04. Selection of Authority Bonds to be Redeemed. If less than all of the Authority Bonds of like maturity of any Series shall be called for prior redemption, the particular Bonds or portions of Bonds to be redeemed shall be selected by lot or other random method by the Trustee in such a manner as the Trustee may determine unless otherwise provided by the Supplemental Resolution authorizing that Series of Bonds; provided that the portion of any Authority Bond to be redeemed shall be in an authorized denomination and, in selecting Authority Bonds for redemption, the Trustee shall treat each Authority Bond as representing that number of Authority Bonds as is obtained by dividing the principal amount or Maturity Value of such Bonds by the minimum denomination for such Series of Bonds.

Section 4.05. Notice of Redemption. Notice of redemption of Authority Bonds shall be given in accordance with this Section. When the Trustee shall receive notice from the Authority of its election or direction to redeem Bonds pursuant to Section 4.02 hereof, and when redemption of Bonds is authorized or required pursuant to Section 4.03 hereof, the Trustee shall give notice, in the name of the Authority, of the redemption of such Bonds, which notice shall specify the Series and maturities of the Bonds to be redeemed, the Redemption Date and the place or places where amounts due upon such Redemption Date will be payable and, if less than all of the Bonds of any like Series and maturity are to be redeemed, the letters and numbers or other distinguishing marks of such Bonds so to be redeemed, and, in the case of Bonds to be redeemed in part only, such notices shall also specify the respective portions thereof to be redeemed. Such notice shall further state that on such Redemption Date there shall become due and payable upon each Bond to be redeemed the Redemption Price thereof, or the Redemption Price of the specified portions thereof, in the case of Bonds to be redeemed in part only, together with interest accrued and Accreted Value accreted to the Redemption Date, and that from and after such date interest thereon and the Accreted Value thereof shall cease to accrue or accrete and be payable. The Trustee shall transmit such notice by Electronic Means, or shall mail a copy of such notice, first class mail postage prepaid, not less than 30 nor more than 60 days before the Redemption Date (or such shorter period as shall be provided by Supplemental Resolution), to the Owners of any Bonds or portions of Bonds which are to be redeemed, at their last addresses, if any, appearing upon the Register. The Trustee's obligation to give notice required by this Section shall not be conditioned upon the prior payment to the Trustee of funds sufficient to pay the Redemption Price of the Bonds to which such notice relates or interest thereon or Accreted Value thereof to the Redemption Date and may be given in conditional form, specifying that the redemption is subject to receipt by the Trustee of moneys sufficient to pay the Redemption Price of and accrued interest on or Accreted Value of the Bonds to be redeemed or to other conditions. The failure to give notice required by this Section to any Owner of any Bond or portion thereof to be redeemed shall not affect the validity of any proceedings for the redemption of any other Bond for which such notice has been duly given.

Section 4.06. Payment of Redeemed Authority Bonds. Notice having been given in the manner provided in Section 4.05 hereof, the Bonds or portions thereof so called for redemption shall, provided that any conditions specified in such notice are satisfied, become due and payable on the Redemption Date so designated at the Redemption Price, plus interest accrued and unpaid to the Redemption Date, and upon presentation and surrender thereof at the office specified in such notice. If there shall be called for redemption less than all of the principal of any Authority Bond, the Authority shall execute and the Trustee or the Authenticating Agent shall authenticate, upon the surrender of such Bond, without charge to the Owner thereof, for the unredeemed balance of the principal amount of the Bond so surrendered, Bonds of like Series and maturity in any authorized denomination. If, on the Redemption Date, moneys for the redemption of all the Authority Bonds or portions thereof of any like Series and maturity to be redeemed, together with interest to the Redemption Date, shall be held by the Trustee or Paying Agent so as to be available therefor on said date and if notice of redemption shall have been given as aforesaid, then, from and after the Redemption Date interest on the Bonds or portions thereof of such Series and maturity so called for redemption shall cease to accrue and become payable. If said moneys shall not be so available on the Redemption Date, such Bonds or portions thereof shall continue to bear interest until paid at the same rate as they would have borne had they not been called for redemption.

Section 4.07. Modification by Supplemental Resolution. Subject to Section 13.25(g) hereof, the provisions of this Article may be modified by any Supplemental Resolution in respect of any Series of Authority Bonds authorized thereby, including, without limitation, any modification for the purpose of providing for the privilege of purchase by the Authority of the Bonds of such Series in lieu of redemption, and in the event of any conflict with the provisions hereof the provisions of such Supplemental Resolution shall control in respect of any Series of Bonds authorized thereby.

ARTICLE V

ESTABLISHMENT OF FUNDS AND APPLICATION THEREOF

Section 5.01. Security for Bonds. The Bonds are payable from and secured by the Trust Estate in accordance with the terms hereof. The lien on and the pledge of the Trust Estate pursuant to this Amended and Restated Master Resolution shall be effective without any physical delivery thereof or further act, and the lien on and the pledge of the Trust Estate pursuant to this Amended and Restated Master Resolution shall be valid and enforceable as against all persons having claims of any kind in tort, contract or otherwise against the Authority regardless whether such persons have notice thereof.

Section 5.02. Establishment of Funds and Accounts. The following Funds and Accounts are hereby reaffirmed as established in the Prior Master Resolution, with such changes as set forth below. All of such Funds shall be held by the Trustee and shall constitute a part of the Trust Estate:

(a) "E-470 Public Highway Authority Revenue Bond Construction Fund" (which may include special Accounts and Subaccounts therein to be held by the Trustee or any other designated Fiduciary pursuant to Section 5.03 hereof);

(b) "E-470 Public Highway Authority Revenue Bond Revenue Fund";

(c) "E-470 Public Highway Authority Revenue Bond Debt Service Fund," and within such Fund the "Senior Bonds Debt Service Account," the "First Tier Subordinate Bonds Debt Service Account," the "Second Tier Subordinate Bonds Debt Service Account" and the "Third Tier Subordinate Bonds Debt Service Account";

(d) "E-470 Public Highway Authority Revenue Bond Debt Service Reserve Fund," and within such Fund the "Senior Bonds Debt Service Reserve Account" and the "First Tier Subordinate Bonds Debt Service Reserve Account";

(e) "E-470 Public Highway Authority Revenue Bond Surplus Fund," and within such Fund the "General Surplus Account" and the "Termination Payment Account";

(f) "E-470 Public Highway Authority Revenue Bond Rebate Fund"; and

(g) "E-470 Public Highway Authority Revenue Bond Operating Reserve Fund."

Notwithstanding any other provision hereof or of any Supplemental Resolution, the Trustee shall establish and maintain accounts, subaccounts or sub-subaccounts within any Fund, Account or subaccount established under this Amended and Restated Master Resolution or any Supplemental Resolution as directed by the Authority in writing, provided that the establishment of any such account, subaccount or sub-subaccount pursuant to this paragraph shall not affect the rights of the Owners or any other Person in the Fund, Account or Subaccount in which such account, subaccount or sub-subaccount is established.

Section 5.03. Construction Fund.

(a) There shall be paid into the Construction Fund the amounts required to be so paid by the provisions of this Amended and Restated Master Resolution and any Supplemental Resolution. There may also be paid into the Construction Fund, at the option of the Authority, any moneys received by the Authority from any source unless otherwise required to be applied by this Amended and Restated Master Resolution or any Supplemental Resolution.

(b) Separate, segregated accounts and subaccounts may be created within the Construction Fund and held by the Trustee or any other Fiduciary in the manner provided in any Supplemental Resolution. Money held in such accounts and subaccounts shall be held separately from other moneys in the Construction Fund and shall be disposed of only in the manner provided in the Supplemental Resolution pursuant to which such accounts and subaccounts are created. Without limiting the generality of the foregoing, such separate, segregated accounts and subaccounts, and all funds, investments thereof and investment income earned thereon, may be exclusively pledged (and a lien and security interest therein may be exclusively granted) to secure for any period of time the payment of principal and Redemption Price of any or all of any such Series of Bonds, and interest thereon to any date, all as may be more fully provided in such Supplemental Resolution, in which case such pledge, lien and security interest will be prior and superior to the lien and pledge on the Construction Fund granted by this Amended and Restated Master Resolution securing the Bonds generally.

(c) Except as otherwise provided by Supplemental Resolution, amounts in the Construction Fund shall be used to pay Costs of the Project, and shall be distributed to, or to the order of, the Authority, acting on its own behalf, for such purpose at the written request of an Authorized Authority Representative.

(d) Except as otherwise provided by Supplemental Resolution, amounts in the Construction Fund may, at the written direction of the Authority be transferred to the Debt Service Fund for the Bonds and applied to the payment of principal and Redemption Price of and interest on the Bonds when due, to the extent that other funds established for such purposes are insufficient.

(e) When the Project shall have been substantially completed in accordance with the relevant plans and specifications, and when all Costs of the Project shall have been paid or reasonable provision therefor shall have been made, an Authorized Authority Representative, upon receipt from the Consulting Engineer of a notice so stating, shall certify the Project to be complete as of the date therein set forth. Upon such certification, any surplus moneys remaining in the Construction Fund and not otherwise required to be maintained therein by any Supplemental Resolution shall be transferred to the Debt Service Reserve Fund, to the extent of any deficiency in the Debt Service Reserve Fund Requirement thereof, and thereupon to the Debt Service Fund.

Section 5.04. Revenue Fund. Except as otherwise provided herein or by Supplemental Resolution and except that Governmental Loan Proceeds received prior to the Completion Date shall be deposited, as determined by the Authority, in the Revenue Fund, the Project Account, the Capitalized Interest Account or any Subaccount of the Capitalized Interest Account or the Debt Service Fund, all Revenues shall be delivered to the Trustee immediately upon receipt by the Authority and shall be deposited by the Trustee in the Revenue Fund immediately upon receipt by the Trustee and amounts in the Revenue Fund shall be used for the purposes and in the order of priority set forth in Section 5.05 hereof.

Section 5.05. Flow of Funds.

(a) Except as otherwise provided in subsection (b) of this Section (relating to Parity Obligations) and Section 7.21(b) hereof (relating to Related Financial Transactions), otherwise in this Amended and Restated Master Resolution or by Supplemental Resolution, amounts in the Revenue Fund shall be applied for the following purposes in the priority in which listed:

First, on or before the last day of each month, to the extent not paid from other sources, Operating Expenses budgeted by the Authority for the next succeeding month shall be distributed to, or to the order of, the Authority.

Second, unless provision for such payments from the Construction Fund or otherwise has been made as contemplated by Section 5.03 hereof or otherwise, on or before the last day of each month, or at such other times as shall be set forth in any Supplemental Resolution, there shall be transferred to the Senior Bonds Debt Service Account of the Debt Service Fund amounts which, when added to other amounts in the Senior Bonds Debt Service Account of the Debt Service Fund and available for such purposes, will provide for the accumulation, in substantially equal monthly installments, or otherwise as may be provided in any Supplemental Resolution, of the amounts required to pay the sum of:

(i) any interest to become due and payable on each Series of Outstanding Senior Bonds on each Interest Payment Date for such Series occurring within the next six months, with interest on variable rate Senior Bonds determined as provided in subsection (e) of this Section; and

(ii) any Principal Installments to become due and payable on any Series of Outstanding Senior Bonds on or before the next date (within the next 12 months) on which such Principal Installment is payable.

Third, there shall be transferred to the Rebate Fund amounts which, when added to other amounts in the Rebate Fund, shall equal the amount required to be on deposit therein pursuant to Section 5.10 hereof.

Fourth, if the Senior Bonds Debt Service Reserve Account of the Debt Service Reserve Fund contains less than the Senior Bonds Debt Service Reserve Account Requirement, on or before the last day of each month there shall be transferred into the Senior Bonds Debt Service Reserve Account of the Debt Service Reserve Fund, an amount equal to 1/12 of the Senior Bonds Debt Service Reserve Account Requirement or the amount needed to attain the Senior Bonds Debt Service Reserve Account Requirement, whichever is lesser, which transfers shall continue until the Senior Bonds Debt Service Account of the Debt Service Reserve Fund contains the Senior Bonds Debt Service Reserve Account Requirement.

Fifth, unless provision for such payments from the Construction Fund or otherwise has been made as contemplated by Section 5.03 hereof or otherwise, on or before the last day of each month, or at such other times as shall be set forth in any Supplemental Resolution, there shall be transferred to the First Tier Subordinate Bonds Debt Service Account of the Debt Service Fund amounts which, when added to other amounts in the First Tier Subordinate Bonds Debt Service Account of the Debt Service Fund and available for such purposes, will provide for the accumulation, in substantially equal monthly installments, or otherwise as may be provided in any Supplemental Resolution, of the amounts required to pay the sum of:

(i) any interest to become due and payable on each Series of Outstanding First Tier Subordinate Bonds on each Interest Payment Date for such Series occurring within the next six months, with interest on variable rate First Tier Subordinate Bonds determined as provided in subsection (e) of this Section; and

(ii) any Principal Installments to become due and payable on any Series of Outstanding First Tier Subordinate Bonds on or before the next date (within the next 12 months) on which such Principal Installment is payable.

Sixth, if the First Tier Subordinate Bonds Debt Service Reserve Account contains less than the First Tier Subordinate Bonds Debt Service Reserve Account Requirement, there shall be transferred into the First Tier Subordinate Bonds Debt Service Reserve Account, an amount equal to 1/60 of the First Tier Subordinate Bonds Debt Service Reserve Account Requirement or the amount needed to attain the First Tier Subordinate Bonds Debt Service Reserve Account Requirement, whichever is lesser, which transfers shall continue until the First Tier Subordinate Bonds Debt Service Reserve Account contains the First Tier Subordinate Bonds Debt Service Reserve Account Requirement.

Seventh, on or before the last day of each month there shall be delivered to the Authority, acting on its own behalf, any amount payable to Governmental Lenders for Governmental Loan Repayments in the succeeding calendar month, but only to the extent such Governmental Loan Repayments have been appropriated by the Authority, acting on its own behalf, in the fiscal year of the Authority, acting on its own behalf, in which such Governmental Loan Repayments are to be paid.

Eighth, unless provision for such payments from the Construction Fund or otherwise has been made as contemplated by Section 5.03 hereof or otherwise, on or before the last day of each month, or at such other times as shall be set forth in any Supplemental Resolution, there shall be transferred to the Second Tier Subordinate Bonds Debt Service Account of the Debt Service Fund amounts which, when added to other amounts in the Second Tier Subordinate Bonds Debt Service Account of the Debt Service Fund and available for such purposes, will provide for the accumulation, in substantially equal monthly installments, or otherwise as may be provided in any Supplemental Resolution, of the amounts required to pay the sum of:

(i) any interest to become due and payable on each Series of Outstanding Second Tier Subordinate Bonds on each Interest Payment Date for such Series occurring within the next six months, with interest on variable rate Second Tier Subordinate Bonds determined as provided in subsection (e) of this Section; and

(ii) any Principal Installments to become due and payable on any Series of Outstanding Second Tier Subordinate Bonds on or before the next date (within the next 12 months) on which such Principal Installment is payable.

Ninth, unless provision for such payments from the Construction Fund or otherwise has been made as contemplated by Section 5.03 hereof or otherwise, on or before the last day of each month, or at such other times as shall be set forth in any Supplemental Resolution, there shall be transferred to the Third Tier Subordinate Bonds Debt Service Account of the Debt Service Fund amounts which, when added to other amounts in the Third Tier Subordinate Bonds Debt Service Account of the Debt Service Fund and available for such purposes, will provide for the accumulation, in substantially equal monthly installments, or otherwise as may be provided in any Supplemental Resolution, of the amounts required to pay the sum of:

(i) any interest to become due and payable on each Series of Outstanding Third Tier Subordinate Bonds on each Interest Payment Date for such Series occurring within the next six months, with interest on variable rate Third Tier Subordinate Bonds determined as provided in subsection (e) of this Section; and

(ii) any Principal Installments to become due and payable on any Series of Outstanding Third Tier Subordinate Bonds on or before the next date (within the next 12 months) on which such Principal Installment is payable.

Tenth, if the Operating Reserve Fund contains less than the Operating Reserve Fund Requirement, on or before the last day of each month there shall be transferred to the Operating Reserve Fund, the amount needed to attain to the Operating Reserve Fund Requirement.

Eleventh, money remaining in the Revenue Fund shall be used to make or provide for all deposits, payments or transfers required by any Supplemental Resolution.

Twelfth, any money remaining in the Revenue Fund in excess of the Revenue Fund Retained Balance may, in the discretion of the Authority, be transferred on or before the last day of each month to the Surplus Fund. The Revenue Fund Retained Balance shall be available for application as provided in this Section according to the priority set forth in this Section; provided that, notwithstanding the foregoing provisions of this paragraph, the Revenue Fund Retained Balance or any portion thereof may be transferred to the Surplus Fund on any date with the prior written consent of National.

(b) Notwithstanding any other provision hereof, whenever any Parity Obligation is outstanding and moneys are to be applied pursuant to this Section to any Fund, Account or Subaccount relating to any Bonds, moneys shall also be applied to the comparable fund, account or subaccount established with respect to any Parity Obligation that is on a parity with such Bonds, and if the amount required to be so applied is insufficient for both such purposes the amount deposited to each such fund, account or subaccount shall be reduced in equal proportions based on the total amount required to be applied to both such funds, accounts or subaccounts.

(c) Whenever the amount on deposit in the Operating Reserve Fund is in excess of the Operating Reserve Fund Requirement, the excess on deposit in such Account or Fund shall be transferred to the Revenue Fund and applied as provided in subsection (a) of this Section. Whenever the amount on deposit in the Senior Bonds Debt Service Reserve Account is in excess of the Senior Bonds Debt Service Reserve Account Requirement and the other conditions set forth in Section 6.03(b)(ii) hereof have been complied with, the excess on deposit in such Account shall be transferred to the Revenue Fund and applied as provided in subsection (a) of this Section.

(d) Notwithstanding subsection (a) of this Section or any other provision hereof, (i) any Termination Payments and Miscellaneous Swap Payments due from the Authority shall be paid solely from amounts on deposit in the General Surplus Account of the Surplus Fund and (ii) any Termination Payments received by the Authority shall be deposited directly to the Termination Payment Account of the Surplus Fund.

(e) The amount transferred to the applicable account of the Debt Service Fund pursuant to subsection (a) of this Section with respect to Senior Bonds, First Tier Subordinate Bonds, Second Tier Subordinate Bonds or Third Tier Subordinate Bonds that bear interest at an adjustable or variable interest rate such that the interest to become due on or before the first Business Day of September immediately following the date on which amounts are received by the Trustee cannot be determined with certainty shall be determined based on the greater of (i) the actual interest rate borne by such Bonds on the date the transfer is made or (ii) the interest rate determined on the date the transfer is made pursuant to clause (b)(ii)(B) of the definition of Debt Service in Section 1.01 hereof.

Section 5.06. Other Transfers to Debt Service Fund.

(a) Notwithstanding anything in this Article or elsewhere in this Amended and Restated Master Resolution to the contrary, if on any date there are not sufficient moneys in the Revenue Fund to make the transfers required by Section 5.05 hereof to the

Senior Bonds Debt Service Account on such date, moneys shall be transferred to the Senior Bonds Debt Service Account from the following sources in an amount which, together with the amount to be transferred thereto from the Revenue Fund on such date, will result in the Senior Bonds Debt Service Account having the balance required to be on deposit therein pursuant to Section 5.05 hereof:

(i) If no Event of Default with respect to the Senior Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, from the 1997 Senior Bonds Capitalized Interest Subaccount to the extent moneys are required to be on deposit in the Senior Bonds Debt Service Account to pay interest on the 1997 Bonds and from the 2000 Senior Bonds Capitalized Interest Subaccount to the extent moneys are required to be on deposit in the Senior Bonds Debt Service Account to pay interest on the 2000 Bonds;

Second, subject to subsection (e) of this Section, from the Surplus Fund or any Account thereof;

Third, from the Senior Bonds Debt Service Reserve Account; and

Fourth, subject to subsection (e) of this Section, from the Project Account.

(ii) If an Event of Default with respect to the Senior Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, from the 1997 Senior Bonds Capitalized Interest Subaccount to the extent moneys are required to be on deposit in the Senior Bonds Debt Service Account to pay interest on the 1997 Bonds and from the 2000 Senior Bonds Capitalized Interest Subaccount to the extent moneys are required to be on deposit in the Senior Bonds Debt Service Account to pay interest on the 2000 Bonds;

Second, subject to subsection (e) of this Section, from the Surplus Fund or any Account thereof;

Third, from the Senior Bonds Debt Service Reserve Account;

Fourth, subject to subsection (e) of this Section, from the Project Account; and

Fifth, subject to subsection (e) of this Section, from the Operating Reserve Fund.

(b) Notwithstanding anything in this Article or elsewhere in this Amended and Restated Master Resolution to the contrary, if on any date there are not sufficient moneys in the Revenue Fund to make the transfers required by Section 5.05 hereof to the First Tier Subordinate Bonds Debt Service Account on such date (for purposes of this subsection, the "subject transfer date"), moneys shall be transferred to the First Tier Subordinate Bonds Debt Service Account from the following sources in an amount which, together with the amount to be transferred thereto from the Revenue Fund on such date, will result in the First Tier Subordinate Bonds Debt Service Account having the balance required to be on deposit therein pursuant to Section 5.05 hereof:

(i) If no Event of Default with respect to the First Tier Subordinate Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, subject to subsection (e) of this Section, from the General Surplus Account;

Second, from the First Tier Subordinate Bonds Debt Service Reserve Account;

Third, subject to subsection (e) of this Section, from the Project Account; and

Fourth, if and only if an Event of Default with respect to the Senior Bonds has occurred and is continuing and subject to subsection (e) of this Section, from the Operating Reserve Fund.

(ii) If an Event of Default with respect to the First Tier Subordinate Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, subject to subsection (e) of this Section, from the General Surplus Account;

Second, from the First Tier Subordinate Bonds Debt Service Reserve Account;

Third, subject to subsection (e) of this Section, from the Project Account; and

Fourth, if and only if an Event of Default with respect to the Senior Bonds has occurred and is continuing and, subject to subsection (e) of this Section, from the Operating Reserve Fund.

(c) Notwithstanding anything in this Article or elsewhere in this Amended and Restated Master Resolution to the contrary, if on any date there are not sufficient moneys in the Revenue Fund to make the transfers required by Section 5.05 hereof to the Second Tier Subordinate Bonds Debt Service Account on such date (for purposes of this subsection, the "subject transfer date"), moneys shall be transferred to the Second Tier Subordinate Bonds Debt Service Account from the following sources in an amount which, together with the amount to be transferred thereto from the Revenue Fund on such date, will result in the Second Tier Subordinate Bonds Debt Service Account having the balance required to be on deposit therein pursuant to Section 5.05 hereof:

(i) If no Event of Default with respect to the Second Tier Subordinate Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, subject to subsection (e) of this Section, from the General Surplus Account; and

Second, subject to subsection (e) of this Section, from the Project Account.

(ii) If an Event of Default with respect to the Second Tier Subordinate Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, subject to subsection (e) of this Section, from the General Surplus Account;

Second, subject to subsection (e) of this Section, from the Project Account; and

Third, if and only if an Event of Default with respect to the Senior Bonds has occurred and is continuing and, subject to subsection (e) of this Section, from the Operating Reserve Fund.

(d) Notwithstanding anything in this Article or elsewhere in this Amended and Restated Master Resolution to the contrary, if on any date there are not sufficient moneys in the Revenue Fund to make the transfers required by Section 5.05 hereof to the Third Tier Subordinate Bonds Debt Service Account on such date (for purposes of this subsection, the "subject transfer date"), moneys shall be transferred to the Third Tier Subordinate Bonds Debt Service Account from the following sources in an amount which, together with the amount to be transferred thereto from the Revenue Fund on such date, will result in the Third Tier Subordinate Bonds Debt Service Account having the balance required to be on deposit therein pursuant to Section 5.05 hereof:

(i) If no Event of Default with respect to the Third Tier Subordinate Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, subject to subsection (e) of this Section, from the General Surplus Account; and

Second, subject to subsection (e) of this Section, from the Project Account.

(ii) If an Event of Default with respect to the Third Tier Subordinate Bonds has occurred and is continuing, from the following sources in the priority in which listed:

First, subject to subsection (e) of this Section, from the General Surplus Account;

Second, subject to subsection (e) of this Section, from the Project Account; and

Third, if and only if an Event of Default with respect to the Senior Bonds has occurred and is continuing and, subject to subsection (e) of this Section, from the Operating Reserve Fund.

(e) If the amount to be transferred pursuant to this Section to a Debt Service Account for more than one Tier of Bonds from any Fund, Account or Subaccount other than the Project Account exceeds the balance then on deposit in the Fund, Account or Subaccount from which moneys are to be transferred, the moneys available in such Fund, Account or Subaccount shall be transferred to such Debt Service Accounts in the order in which such Debt Service Accounts are to be funded pursuant to Section 5.05 hereof. Any moneys transferred to a Debt Service Account for the First Tier Subordinate Bonds, the Second Tier Subordinate Bonds or the Third Tier Subordinate Bonds from the Project Account pursuant to this Section shall be transferred only to the extent of the proportionate share of the moneys on deposit in the Project Account on the first date on which moneys are transferred from the Project Account to the Debt Service Account for such Tier of Bonds that bears the same ratio to the total amount of moneys then on deposit in the Project Account on such date as the ratio of (i) the Outstanding principal amount on such date of such Tier of Bonds bears to (ii) the Outstanding principal amount on such date of all Bonds.

Section 5.07. Debt Service Fund.

(a) There shall be paid out of the Debt Service Fund on or before each Interest Payment Date for any of the Bonds, the amount required for the interest payment on such date, and there shall be paid out of the Debt Service Fund on or before each Principal Installment due date, the amount required for the Principal Installment payable on such due date; provided, however, that if any special fund, account or subaccount has been created for the payment of capitalized interest on the Bonds or any Series thereof, any amounts transferred to the Debt Service Fund from such special fund, account or subaccount shall be used to pay such interest prior to the use of any other amounts in the Debt Service Fund for such purpose. On or before any Redemption Date for Bonds to be redeemed, there shall also be paid out of the Debt Service Fund, from available amounts deposited therein from time to time, the Redemption Price of and interest on the Bonds then to be redeemed.

(b) Amounts in the Debt Service Fund with respect to any Sinking Fund Installment (together with amounts in the Debt Service Fund with respect to interest on the Bonds for which such Sinking Fund Installment was established) shall be applied to the redemption of Bonds of the Series and maturity for which such Sinking Fund Installment was established in an amount not exceeding that necessary to complete the retirement of such Sinking Fund Installment in accordance with the provisions of the Supplemental Resolution governing the redemption of such Bonds and the applicable provisions of Article IV hereof.

(c) The Trustee shall, at any time at the direction of the Authority, apply amounts available in the Debt Service Fund for the payment of any Sinking Fund Installments to pay the Redemption Price of Bonds of any Series and maturity for which such Sinking Fund Installment has been established, which Bonds may be purchased on the open market at a price (excluding accrued interest to the purchase date but including any brokerage or other charges) no greater than the applicable Redemption Price of such Bonds.

(d) Notwithstanding any other provision of this Section or any other provision of this Amended and Restated Master Resolution, amounts in the Senior Bonds Account, the First Tier Subordinate Bonds Account, the Second Tier Subordinate Bonds Account and the Third Tier Subordinate Bonds Account of the Debt Service Fund shall be applied only to the payment of Debt Service on the Bonds of the same designation, in each case in the manner and at the times provided in subsections (a), (b) and (c) of this Section.

(e) A new Account of the Debt Service Fund designated the "Senior Bonds Redemption Account" is hereby established. The Senior Bonds Redemption Account shall be held by the Trustee and shall constitute a part of the Trust Estate. There shall be paid into the Senior Bonds Redemption Account, moneys transferred from the Debt Service Reserve Fund pursuant to Section 5.08(e) hereof, any other amounts required to be paid into the Senior Bonds Redemption Account by the provisions of this Amended and Restated Master Resolution or any Supplemental Resolution and any other amounts that the Authority directs be paid into the Senior Bonds Redemption Account. Moneys in the Senior Bonds Redemption Account shall be used to pay the principal or Redemption Price of and interest on Senior Bonds that are redeemed at the option of the Authority or defeased pursuant to Section 13.01 hereof.

Section 5.08. Debt Service Reserve Fund.

(a) If on any date, after giving effect to all transfers pursuant to Sections 5.05 and 5.06 hereof, the amount in the Debt Service Fund shall be less than the amount required to make all payments of principal and Redemption Price of and interest on the Bonds then due and payable, the Trustee shall transfer amounts from the Debt Service Reserve Fund to the extent necessary to make such payments.

(b) When the amount in the Debt Service Reserve Fund, together with the amounts in the Debt Service Fund, is sufficient to fully pay all Outstanding Bonds in accordance with their terms (including principal or Redemption Price and interest), the funds on deposit in the Debt Service Reserve Fund may, at the direction of the Authority, be applied to pay the principal and Redemption Price of and interest on all Outstanding Bonds.

(c) Except as otherwise provided herein, whenever the amount in the Debt Service Reserve Fund exceeds the Debt Service Reserve Fund Requirement, the Trustee shall transfer such excess to the Debt Service Fund.

(d) Notwithstanding any other provision of this Section or any other provision of this Amended and Restated Master Resolution, (i) the Senior Bonds Debt Service Reserve Account and the First Tier Subordinate Bonds Debt Service Reserve Account of the Debt Service Reserve Fund shall be maintained and administered as separate accounts for the purposes of securing, and shall be applied only to the payment of, the principal and Redemption Price of and interest on Bonds of the same designation and (ii) to the extent required to make such payments, moneys from each such Account shall be transferred to the Account of the Debt Service Fund of the same designation.

(e) Notwithstanding any other provision hereof or of any Supplemental Resolution, the Trustee at the written direction of the Authority at any time shall substitute for all or any portion of the cash deposit in the Debt Service Reserve Fund or any Account or Subaccount thereof, a letter of credit, surety bond, insurance policy, agreement guaranteeing payment or other undertaking by a financial institution to insure that cash in the amount otherwise required to be maintained therein will be available to the Trustee as needed, provided that (i) the Trustee receives written evidence (or other evidence satisfactory to the Trustee) from each Rating Agency that such substitution will not, by itself, result in a withdrawal of or reduction in its rating of any Bonds and (ii) if such substitution is to occur with respect to the Senior Bonds Debt Service Reserve Account, National consents in writing (which consent may be given or withheld at the sole discretion of National). Upon any such substitution that occurs in May 2008, the cash deposit or portion of the cash deposit for which a letter of credit, surety bond, insurance policy, agreement guaranteeing payment or other undertaking by a financial institution was substituted shall be transferred to the Senior Bonds Redemption Account of the Debt Service Fund. Upon any such substitution that occurs at any time other than in May 2008, the cash deposit or portion of the cash deposit for which a letter of credit, surety bond, insurance policy, agreement guaranteeing payment or other undertaking by a financial institution was substituted shall be transferred to the Senior Bonds Redemption Account of the Debt Service Fund, the Construction Fund or the Revenue Fund, as directed by the Authority.

(f) Notwithstanding any other provision hereof or of any Supplemental Resolution, if a letter of credit, surety bond, insurance policy, agreement guaranteeing payment or other undertaking by a financial institution (referred to in this subsection as "such instrument") is substituted for all or any portion of the cash deposit in the Debt Service Reserve Fund or Account or Subaccount thereof pursuant to subsection (g) of this Section, (i) all the cash and Investment Securities on deposit in such Fund, Account or Subaccount shall be spent before any drawing on such instrument, (ii) following a drawing on such instrument, moneys transferred to such Fund, Account or Subaccount shall be used, first, to reimburse the provider for amounts drawn under such instrument and, second, to replenish the cash balance in such Fund, Account or Subaccount and (iii) if more than one such instrument is on deposit in such Fund, Account or Subaccount, (A) each such instrument shall be drawn pro rata, in proportion to the maximum amount available to be drawn on each such instrument, and (B) reimbursements to the providers of such instruments shall be pro rata, in proportion to the amount drawn on but not yet reimbursed to the provider of each such instrument.

(g) To the extent there is a draw on the 2008 Surety Bond in accordance with its terms, the Trustee shall draw on the 2008 Surety Bond by delivering a Demand for Payment in the form attached to such Surety Bond at least three days prior to the date on which funds are required.

Section 5.09. Surplus Fund.

(a) Moneys transferred to the Surplus Fund pursuant to Section 5.05 hereof and, except for any Termination Payment received by the Authority, any other moneys deposited in or transferred to the Surplus Fund shall be deposited in the General Surplus Account. Any Termination Payments received by the Authority shall be deposited directly to the Termination Payment Account.

(b) Moneys held in the General Surplus Account shall be transferred to the Debt Service Fund or one or more of the Accounts thereof to the extent required by Section 5.06 hereof and otherwise shall be distributed to, or to the order of, the Authority at the written request of an Authorized Authority Representative to be applied: (i) prior to the Completion Date, for the purpose of paying Costs of the Project relating to portions of the Project that have been constructed, are under construction or are contiguous to portions of the Project that have been constructed or are under construction; and (ii) following the Completion Date: (A) for the redemption of Bonds, (B) as may be required by the Establishing Contract and (C) for any other purpose now or hereafter authorized or permitted by law; provided, however, that no moneys shall be distributed from the General Surplus Account for any purpose described in clause (i) or (ii) if such distribution would reduce the balance in the General Surplus Account below $20,000,000 unless National has consented to such distribution in writing. Notwithstanding the foregoing (including, but not limited to, the proviso in the immediately preceding sentence), amounts on deposit in the General Surplus Account shall be used at any time (I) to pay any Termination Payments or Miscellaneous Swap Payments payable by the Authority, (II) to make any payments due and owing to MBIA or National, and (III) to make any payments required upon the execution and delivery of a Related Financial Transaction or any Credit Facility.

(c) Moneys held in the Termination Payment Account shall be used to make any payments required to be made by the Authority upon the execution and delivery of a Related Financial Transaction, unless National consents in writing to the release of such moneys from the Termination Payment Account. Moneys held in the Termination Payment Account shall be retained therein until National has consented in writing to the execution and delivery of the Related Financial Transaction or to the release of such moneys to the General Surplus Account as specified below. Any Termination Payments released from the Termination Payment Account and not used to make a payment upon the execution and delivery of a Related Financial Transaction shall be deposited to the General Surplus Account.

(d) Nothing herein shall prohibit the Authority from depositing directly into the Surplus Fund or any of the Accounts thereof moneys that, prior to such deposit, are not part of the Trust Estate.

Section 5.10. Rebate Fund. Moneys shall be deposited into the Rebate Fund pursuant to Section 5.05 hereof in the amount required pursuant to the tax compliance certificate delivered by the Authority in connection with the issuance of the Bonds issued pursuant to the First Supplemental Resolution and pursuant to any similar instrument or certificate delivered by the Authority in connection with the issuance of any additional Bonds (collectively, the "Tax Compliance Certificates"). Notwithstanding any other provision hereof or of any other instrument, moneys on deposit in the Rebate Fund shall not be part of the Trust Estate and, except as otherwise provided in this Section, the Rebate Fund shall be used solely for the purpose of paying amounts due to the United States of America with respect to the Bonds pursuant to Section 148(f) of the Code. Moneys on deposit in the Rebate Fund shall be forwarded to the United States Treasury (at the address provided in the Tax Compliance Certificates) at the times and in the amounts set forth in the Tax Compliance Certificates. If the moneys on deposit in the Rebate Fund are insufficient for the purpose thereof, the Authority shall transfer moneys in the amount of the insufficiency to the Rebate Fund from any and all sources available to it other than draws on the MBIA Insurance Policy. Upon receipt by the Authority of an opinion of Bond Counsel to the effect that the amount in the Rebate Fund is in excess of the amount required to be contained therein, such excess shall be transferred to the Authority.

Section 5.11. Operating Reserve Fund. Moneys held in the Operating Reserve Fund shall be transferred to the Debt Service Fund to the extent required by Section 5.06 hereof and otherwise shall be distributed to, or to the order of, the Authority at the written request of an Authorized Authority Representative to be applied to Operating Expenses not paid from other sources.

Section 5.12. Modification by Supplemental Resolution. The provisions of this Article may be modified by any Supplemental Resolution in respect of any Series of Bonds authorized thereby, and in the event of any conflict with the provisions hereof the provisions of such Supplemental Resolution shall control in respect of any Series of Bonds authorized thereby; provided, however, that no such modification may have the effect of creating a priority for payment of one Series of Bonds over any other Series of Bonds, subject to the terms and provisions hereof.

ARTICLE VI

DEPOSITORIES OF MONEYS, SECURITY FOR DEPOSITS AND INVESTMENT OF FUNDS

Section 6.01. Depositories. All moneys held by the Trustee under the provisions of this Amended and Restated Master Resolution shall be deposited with the Trustee, and held in the name of the Trustee, in such capacity hereunder. All moneys held by the Authority hereunder shall be deposited with one or more Depositories and held in the name of the Authority. All moneys deposited under the provisions of this Amended and Restated Master Resolution with the Trustee or any Depository shall be held in trust and applied only in accordance with the provisions of this Amended and Restated Master Resolution, and each of the Funds and Accounts established by this Amended and Restated Master Resolution shall be a trust fund for the purpose of this Amended and Restated Master Resolution.

Section 6.02. Deposits and Transfers.

(a) All moneys held by the Trustee or any Depository under this Amended and Restated Master Resolution may be placed on demand or time deposit, if and as directed by the Authority, provided that such deposits shall permit the moneys so held to be available for use at the time when needed.

(b) All moneys held under this Amended and Restated Master Resolution by the Trustee or any Depository shall be continuously and fully secured for the benefit of the Authority and the Owners of the Bonds, either (i) by lodging with a Federal Reserve Bank, the Trustee, or other Fiduciary as custodian, as collateral security, direct obligations of or obligations guaranteed by the United States of America having a Fair Market Value (exclusive of accrued interest) not less than the amount of such moneys, which securities may be substituted for one another from time to time, or (ii) in such other manner as may then be required by applicable federal or State laws and regulations regarding security for, or granting a preference in the case of, the deposit of public moneys or trust funds; provided, however, that to the extent permitted by the laws of the State it shall not be necessary for the Trustee or any Depository to give security for any moneys (A) to the extent that such moneys are insured by the Federal Deposit Insurance Corporation or the Federal Savings and Loan Insurance Corporation or (B) which are represented by Investment Securities purchased as an investment of such moneys.

(c) All moneys deposited with the Trustee and any Depository shall be credited to the particular Fund or Account to which such moneys belong.

(d) Except as otherwise provided by Supplemental Resolution, any transfer required to be made from one Fund or Account to another Fund or Account held by the same Person may be made by book transfer of any moneys or investments or portions of investments without liquidating any investments in order to make such transfer unless the funds required to be transferred are needed to make payments out of the Fund or Account to which such funds were transferred at the time of transfer. Investments may also be exchanged between Funds and Accounts if the Authority and the Trustee determine such transfer to be the best way to preserve the Trust Estate.

Section 6.03. Investment of Funds.

(a) Moneys held in any Fund or Account to be held by the Trustee or any Depository shall be invested and reinvested by the Trustee as promptly as practicable, in accordance with a Letter of Instructions, except that moneys drawn on the MBIA Insurance Policy shall not be invested, and moneys in any Funds or Account held by the Authority shall be invested and reinvested by the Authority, in each case to the fullest extent practicable and permitted by laws of the State, in Investment Securities; provided, however, that moneys held in the Senior Bonds Debt Service Reserve Account shall only be invested in (i) Defeasance Investment Securities, (ii) Investment Securities held in the Senior Bonds Debt Service Reserve Account established under the 1986 Bond Documents, as of the date of issuance of the 1997 Bonds, and (iii) other Investment Securities approved by National in writing. Except as otherwise provided in Section 6.04(c) hereof, Investment Securities in all Funds and Accounts shall mature, or the principal of and accrued interest on such Investment Securities shall be available for withdrawal without penalty, not later than such times as shall be necessary to provide moneys when needed for payment to be made from such Funds and Accounts; provided, however, that (A) in the case of the Senior Bonds Debt Service Reserve Account, if the Net Revenues are not in the amount required by Section 7.18(a) hereof at any time after September 1, 2001, until such time as the Net Revenues are in the amount required by Section 7.18(a) hereof, the Investment Securities therein shall be limited to (1) Defeasance Investment Securities that mature, or the principal of and accrued interest on such Investment Securities shall be available for withdrawal without penalty, within two years of the date of deposit therein, (2) Investment Securities held in the Senior Bonds Debt Service Reserve Account established under the 1986 Bond Documents as of the date of issuance of the 1997 Bonds and (3) Investment Securities approved by National in writing; and (B) in the case of the First Tier Subordinate Bonds Debt Service Reserve Account, no less than 20% of the Amortized Value of the Investment Securities therein shall at all times mature, or the principal of and accrued interest on such Investment Securities shall be available for withdrawal without penalty, within three years of the date of deposit therein.

(b) Except as otherwise provided in this subsection, elsewhere in this Amended and Restated Master Resolution or in any Supplemental Resolution, interest earned or profits realized from investing any moneys deposited in the Funds and Accounts or any Subaccount thereof shall be transferred to the Revenue Fund and applied pursuant to Section 5.05(a) hereof. Notwithstanding the foregoing:

(i) interest and profits from the Rebate Fund, the Project Account, the Capitalized Interest Account and any Account or Subaccount of any of such Funds, Accounts or Subaccounts shall be retained in such Fund, Account or Subaccount;

(ii) interest and profits from the Senior Bonds Debt Service Reserve Account shall be applied as follows:

(A) regardless of when such interest and profits are received, such interest and profits shall be retained in the Senior Bonds Debt Service Reserve Account if and to the extent the amount on deposit in the Senior Bonds Debt Service Reserve Account is not equal to the Senior Bonds Debt Service Reserve Account Requirement; and

(B) to the extent such interest and profits are not required to be applied pursuant to clause (A):

(1) any interest and profits received on or before September 1, 2001, shall be transferred to the 1997 Senior Bonds Capitalized Interest Subaccount; and

(2) any interest and profits received after September 1, 2001, (y) shall be retained in the Senior Bonds Debt Service Reserve Account if the Net Revenues are not in the amount required by Section 7.18(a) hereof and (z) to the extent not required to be applied pursuant to clause (y), shall be transferred to the Revenue Fund;

(iii) interest and profits from the Operating Reserve Fund shall be retained therein to the extent required to attain the Operating Reserve Fund Requirement.

Section 6.04. Valuation and Sale of Investments.

(a) Investment Securities acquired as an investment of moneys in any Fund or Account created under the provisions of this Amended and Restated Master Resolution shall be and remain a part of such Fund or Account except to the extent that, following the transfer or withdrawal of such security or an interest therein or the transfer or withdrawal of the proceeds from the liquidation of such security or an interest therein out of such Fund or Account, the amount remaining on deposit in such Fund or Account is equal to or in excess of the amount required to be on deposit therein hereunder.

(b) In computing the amount in the Operating Reserve Fund, Investment Securities shall be valued on the date of deposit therein and not less than every six months thereafter at their Amortized Value plus accrued interest; provided that time deposits shall be valued at cost plus accrued interest.

(c) Investment Securities held in the Senior Bonds Debt Service Reserve Account must mature within five years of the date of deposit therein unless a longer maturity is approved by National in writing. In computing the amount in the Debt Service Reserve Fund, Investment Securities shall be valued at Fair Market Value on the date of deposit therein and not less than once each year thereafter. Notwithstanding the foregoing provisions of this subsection, the securities held, as of the date of issuance of the 1997 Bonds, in the Senior Bonds Debt Service Reserve Account established under the 1986 Bond Documents may continue to be held in the Senior Bonds Debt Service Reserve Account created under the 1986 Bond Documents or may be transferred to the Senior Bonds Debt Service Reserve Account created under the First Supplemental Resolution.

(d) Except as otherwise provided in this Amended and Restated Master Resolution, the Trustee shall sell, or present for redemption, any Investment Security so purchased as an investment whenever it shall be requested in writing by an Authorized Authority Representative to do so or whenever it shall be necessary in order to provide moneys to meet any payment or transfer from any Fund or Account held by it. The Trustee shall not be liable or responsible for any loss resulting from any such investment.

Section 6.05. Modification by Supplemental Resolution. Subject to Section 13.25(g) hereof, the provisions of this Article may be modified by any Supplemental Resolution in respect of any Series of Bonds authorized thereby, and in the event of any conflict with the provisions hereof the provisions of such Supplemental Resolution shall control in respect of any Series of Bonds authorized thereby.

Section 6.06. Certain Investments. The Board hereby determines that the Investment Securities and Defeasance Investment Securities that are not specified in title 24, article 75, part 6, Colorado Revised Statutes, as amended, meet the standard established in Section 15-1-304, Colorado Revised Statutes, as amended, the income is at least comparable to income available on investments specified in said part 6 and such investments will assist the Authority in the financing, constructing, maintenance or operation of public highways.

ARTICLE VII

PARTICULAR COVENANTS OF THE AUTHORITY

The Authority represents, covenants and agrees with the Bondowners as follows:

Section 7.01. Payment of Bonds. The Authority shall duly and punctually pay or cause to be paid, but solely from the Trust Estate pledged therefor by this Amended and Restated Master Resolution, the principal and Redemption Price of and interest on the Bonds, at the date and places and in the manner mentioned in the Bonds, according to the true intent and meaning thereof.

Section 7.02. Establishing Contract. The Authority shall use its best efforts to implement the terms and provisions of the Establishing Contract in accordance with the true intent and meaning thereof.

Section 7.03. Money for Bond Payments to be Held in Trust.

(a) Except as otherwise provided by Supplemental Resolution, on or before each payment date of the principal and Redemption Price of or interest on any Bonds, the Authority shall deposit with or cause the Trustee to make available to each Paying Agent a sum sufficient to pay the principal and Redemption Price of or interest on the Bonds so becoming due, such sum to be held in trust for the benefit of the Owners of the Bonds entitled to such principal, Redemption Price or interest.

(b) The Authority will cause each Paying Agent other than the Trustee to execute and deliver an instrument in which such Paying Agent shall agree with the Authority, subject to the provisions of this Section, that such Paying Agent will:

(i) hold all sums held by it for the payment of principal and Redemption Price, or interest on, Bonds in trust for the benefit of the Owners of the Bonds entitled thereto until such sums shall be paid to such Owners of the Bonds or otherwise disposed of as herein provided;

(ii) give the Trustee notice of any default in the making of any such payment of principal, Redemption Price, or interest; and

(iii) at any time during the continuance of any such default, upon the written request of the Trustee, forthwith pay to the Trustee all sums so held in trust by such Paying Agent.

(c) The Authority may at any time, for the purpose of obtaining the satisfaction and discharge of this Amended and Restated Master Resolution or for any other purpose, pay, or direct any Paying Agent to pay, to the Trustee or an escrow agent all sums held in trust by the Authority or such Paying Agent, such sums to be held by the Trustee or an escrow agent upon the same trusts as those upon which such sums were held by the Authority or such Paying Agent; and upon such payment by any Paying Agent to the Trustee or an escrow agent, such Paying Agent shall be released from all further liabilities with respect to such money.

Section 7.04. Power to Adopt Master Resolution, Issue Bonds and Pledge Trust Estate. The Authority is duly authorized under all applicable laws to create and issue the Bonds, to adopt this Amended and Restated Master Resolution, to amend and restate the Prior Master Resolution hereby, and to pledge the Trust Estate pledged by this Amended and Restated Master Resolution in the manner and to the extent provided in this Amended and Restated Master Resolution, and no other authorization or consent is required thereof. The Trust Estate so pledged is and will be free and clear of any pledge, lien, charge or encumbrance thereon or with respect thereto except the pledge granted by this Amended and Restated Master Resolution to the extent provided in this Amended and Restated Master Resolution and all action on the part of the Authority to that end has been and will be duly and validly taken. This Amended and Restated Master Resolution has been duly and lawfully adopted by the Authority, is in full force and effect and is valid and binding upon the Authority and enforceable in accordance with its terms. The Bonds and the provisions of this Amended and Restated Master Resolution are and will be the valid and legally enforceable obligations of the Authority in accordance with their terms and the terms of this Amended and Restated Master Resolution subject only to the laws relating to bankruptcy, creditors' rights and principles of governmental law and equity. The Authority shall at all times, to the extent permitted by law, defend, preserve and protect its title to the Trustee Estate, the pledge of the Trust Estate under this Amended and Restated Master Resolution and all the rights of the Bondowners under this Amended and Restated Master Resolution against all claims and demands of all persons whomsoever.

Section 7.05. Construction Contracts. The Authority covenants and agrees that before entering into any construction contract it will, to the extent required by law, require each person, firm or corporation with whom it may contract for labor or materials in connection with the construction of the Project or any part thereof to furnish a performance bond and a payment bond, and to carry workmen's compensation or employer's liability insurance as may be required by law. The Authority further covenants and agrees that the proceeds of any such performance bond with respect to any construction contract under which the Authority's obligations are to be paid from a Fund, Account or Subaccount other than the General Surplus Account will forthwith, upon receipt of such proceeds, be deposited in the Construction Fund and applied toward the completion of the contract in connection with which such performance bond and a payment shall have been furnished.

All contracts of the Authority for the Project shall be made and awarded in accordance with law.

Section 7.06. Tax Covenant. The Authority covenants for the benefit of the Owners of the Bonds that it will not take any action or omit to take any action with respect to the Bonds, the proceeds thereof, any other funds of the Authority or any facilities financed or refinanced with the proceeds of the Bonds if such action or omission (a) would cause the interest on the Bonds to lose its exclusion from gross income for federal income tax purposes under Section 103 of the Code; or (b) would cause interest on the Bonds to lose its exclusion from alternative minimum taxable income as defined in Section 55(b)(2) of the Code, except to the extent such interest is required to be included in the adjusted current earnings adjustment applicable to corporations under Section 56 of the Code in calculating corporate alternative minimum taxable income. In furtherance of this covenant, the Authority agrees to comply with the procedures set forth in the Tax Compliance Certificate delivered by the Authority in connection with the issuance of the 1997 Bonds and the provisions of any similar certificate or instrument delivered by the Authority in connection with the issuance of any additional Bonds. The foregoing covenant shall remain in full force and effect notwithstanding the payment in full or defeasance of the Bonds until the date on which all obligations of the Authority in fulfilling the above covenants under the Code have been met. The covenants set forth in this Section shall not apply to any Series of Bonds if, at the time of issuance, the Authority intends the interest on such Series of Bonds to be subject to federal income tax.

Section 7.07. Maintenance of Existence; Performance of Obligations; Enterprise Status.

(a) The Authority will at all times maintain its corporate existence and will use its best efforts to maintain, preserve and renew all the rights and powers provided to it by the PHA Law or otherwise; provided, however, that this covenant shall not prevent the assumption, by operation of law or otherwise, by any political subdivision or other entity of the rights and obligations of the Authority hereunder, but only if and to the extent such assumption does not materially impair the rights of the Owners of any Outstanding Bonds or National.

(b) The Authority shall do and perform or cause to be done and performed all acts and things required to be done or performed by or on behalf of the Authority under the provisions of this Amended and Restated Master Resolution, any Supplemental Resolution, any other instrument or other arrangement to which it is a party that benefits the Owners of any Outstanding Bonds, the PHA Law and any other law, regulation, rule, order or judgment applicable to the Authority.

(c) The Authority hereby covenants and agrees that it is an enterprise as defined in Article X, Section 20 of the State Constitution. The Authority further covenants and agrees to continue to maintain its enterprise status under Article X, Section 20 of the Colorado Constitution unless and until it receives an opinion of Bond Counsel that termination of such status will not adversely affect the security, rights, privileges or powers of the Owners of any Outstanding Bonds or National and will not adversely affect the Authority's ability to finance, construct, operate or maintain the Project in a manner that will produce Revenues sufficient to meet its obligations hereunder and under any Supplemental Resolution.

Section 7.08. Further Assurances. At any and all times the Authority shall, so far as it may be authorized by law, pass, make, do execute, acknowledge and deliver, all and every such further resolutions, acts, deeds, conveyances, assignments, transfers and assurances as may be necessary or desirable for the better assuring, granting, pledging, assigning and confirming the Trust Estate, Revenues, Funds, Accounts, Investment Securities held in any Fund or Account hereunder, and the Authority's right, title and interest in and to the foregoing, and all other moneys, securities and funds hereby pledged or assigned, or intended so to be, or which the Authority may become bound to pledge or assign.

Section 7.09. Sale or Encumbrance of Project. The Authority covenants that, as long as there are any Outstanding Bonds, and except as in this Amended and Restated Master Resolution otherwise permits, it will not sell or otherwise dispose of the Project or any part thereof unless: (a) the Authority determines that such sale or other disposal is in the best interest of the Project and not materially adverse to the rights of the Owners of the Bonds or National; or (b) title to the Project, or elements or components of title to the Project, or part thereof, are transferred to (i) the governmental units who are presently parties to the Establishing Contract for the Authority or (ii) entities owned, controlled or governed by the governmental entities who are presently parties to the Establishing Contract for the Authority, pursuant to an arrangement that permits the Authority to continue to operate the Project and to receive Revenues in an amount that is not less than the Revenues received prior to such transfer. Nothing in this Section, however, shall limit the ability of the Authority to dispose of surplus property or to enter into contracts with respect to the lease or operation of all or any part of the Project.

Section 7.10. Annual Reports of Consulting Engineer and Risk Management Consultant. After each portion of the Project is completed and operational and after the entire Project is completed and operational, the Authority will cause the Consulting Engineer and a consultant with expertise in risk management (the "Risk Management Consultant") to inspect the portions of the Project that have been completed and to submit written reports not less than annually. The report of the Consulting Engineer shall include (a) the Consulting Engineer's findings as to whether the completed portions of the Project have been maintained in good repair, working order and condition; and (b) the Consulting Engineer's advice and recommendations as to the proper maintenance and repair of the completed portions of the Project during the ensuing Fiscal Year and an estimate of the amount of money necessary for such purposes. The report of the Risk Management Consultant shall include the Risk Management Consultant's advice and recommendation as to the insurance to be carried under the provisions of this Amended and Restated Master Resolution. Copies of the reports delivered pursuant to this Section shall be filed with the Trustee and National.

Section 7.11. Annual Budget. After the Project or any part thereof is completed and operational, the Authority shall file with the Trustee and National an annual budget for the Project for each Fiscal Year. Each such annual budget shall include the estimated Operating Expenses for such Fiscal Year, in addition to any amount required to be deposited during such Fiscal Year into any Fund or Account pursuant to Section 5.05 hereof. Each such annual budget may set forth such additional material as the Authority may determine. The Authority may, at any time, adopt an amended annual budget for the remainder of the then current Fiscal Year. Until a new annual budget is adopted, the prior Fiscal Year's annual budget shall be deemed to be the annual budget for that Fiscal Year.

Section 7.12. Limitation on Operating Expenses. All payments for Operating Expenses in any Fiscal Year will not exceed the reasonable amount required therefor, and the Authority will not expend any amount or incur any obligations for Operating Expenses in excess of the amounts provided for Operating Expenses in the Authority's annual budget, or amended or supplemental annual budget, unless the Authority determines that such expenditure is necessary and there is not time to amend or supplement the budget. Nothing in this Section contained shall limit the amount which the Authority may expend for Operating Expenses in any Fiscal Year.

Section 7.13. Accounts and Reports.

(a) The Authority shall keep proper books of records and account in which complete and correct entries shall be made of its transactions in accordance with Generally Accepted Accounting Principles. The Funds and Accounts established by this Amended and Restated Master Resolution, such books, and all other books and papers relating to the Project, shall, to the extent permitted by law, at all times be subject to the inspection of the Trustee and National. The Authority will permit the Trustee and National, at all reasonable times, to take copies and extracts from the books of record and account, and will from time to time furnish, or cause to be furnished, to the Trustee or National, such information and statements as the Trustee or National may reasonably request, all as may be reasonably necessary for the purpose of determining performance or observance by the Authority of the covenants, conditions and obligations contained in this Amended and Restated Master Resolution.

(b) The Trustee shall advise the Authority within 15 days after the end of each month of its transactions during such month relating to the Funds and Accounts held by it under this Amended and Restated Master Resolution.

(c) The Authority shall create accounts within any Fund or Account created by this Amended and Restated Master Resolution or any Supplemental Resolution when in the judgment of the Authority the creation of such account will enable the Authority to administer the Project or regulate investments or limit returns on such investments.

(d) The Authority shall annually cause a Consultant to deliver a report to the Trustee and National which specifies the amount of Revenues which need to be received in the Revenue Fund pursuant to Section 5.05 hereof for the future payment of Debt Service.

Section 7.14. Rules and Regulations; Maintenance of Project. The Authority covenants that, subject to the terms of the Establishing Contract: (a) it will establish and enforce reasonable rules and regulations governing the use of the Project and the operation thereof; (b) it will maintain and operate the Project in an efficient and economical manner; (c) from the Revenues of the Project or other moneys legally available therefor, it will at all times maintain the same in good repair and in sound operating condition and will make all necessary repairs, renewals and replacements; and (d) it will comply with all valid acts, rules, regulations, orders and directions of any legislative, executive, administrative or judicial body applicable to the Project.

Section 7.15. Payment of Lawful Claims. The Authority covenants that, from the Trust Estate, it will pay or cause to be discharged, or will make adequate provision to satisfy and discharge, all lawful claims and demands for labor, materials, supplies or other object which, if unpaid, might by law become a lien upon the Trust Estate; provided, however, that nothing in this Section contained shall require the Authority to pay or cause to be discharged, or make provision for, any such lien or charge so long as the validity thereof shall be contested in good faith and by appropriate legal proceedings.

Section 7.16. Consulting Engineers. The Authority covenants that, as long as there are any Outstanding Bonds, one or more Consulting Engineers selected by the Authority shall be employed as necessary to comply with this Amended and Restated Master Resolution.

Section 7.17. Insurance. The Authority covenants that it will insure the Project or cause the Project to be insured in such manner, in such amounts and against such loss, damage and liability as is customary for projects similar to the Project that are operated by Persons similar to the Person operating the Project.

Section 7.18. Revenue Covenant.

(a) There shall be fixed, charged and collected pursuant to the PHA Law, the Establishing Contract or otherwise such fees, assessments, tolls or other charges in respect of the Project as shall be required to produce Revenues which, beginning on the first day of the second full Fiscal Year immediately following the Completion Date of the portion of the Project between Parker Road and 120^{th} Avenue, including the interchanges at Parker Road and 120^{th} Avenue, and for each Fiscal Year thereafter, shall equal at least 1.30 times the Aggregate Debt Service due in such Fiscal Year, after provision for the payment of Operating Expenses and any transfers of Revenues to any other Fund or Account required hereunder or under any Parity Obligation Instrument.

(b) Before the beginning of each such Fiscal Year, the Authority will review the financial status of the Project in order to estimate and determine whether Revenues for the current Fiscal Year and for the following Fiscal Year will be sufficient to comply with the covenant set forth in subsection (a) of this Section. In connection with the preparation of the annual budget for each Fiscal Year, the Authority will prepare and file with the Trustee and National a copy of its estimate of Revenues, Operating Expenses, Debt Service and any transfers of Revenues required to be made to any other Fund or Account hereunder or under any Supplemental Resolution or Parity Bond Instrument, together with a statement of the pertinent estimates and assumptions, which must take into consideration the cost of completing any uncompleted portion of all Applicable Portions of the Project defined in Supplemental Resolutions and the issuance of future Series of Bonds or series of Parity Obligations, if necessary, to finance the completion. If the Authority in adopting any annual budget determines that Revenues may be inadequate to meet such covenant, or if the audited financial reports regarding the Project prepared by the Authority show that the Authority did not satisfy such covenant for the prior Fiscal Year, the Authority shall, within 60 days of such determination or the date such audit is final but subject to the rights of National stated below in this subsection, engage a Toll Road Consultant who shall conduct a study and, within 60 days of such engagement, recommend such actions as will provide sufficient Revenues in the following Fiscal Year to comply with the covenant in subsection (a) of this Section and that will provide additional Revenues in such following Fiscal Year and later years to eliminate any deficiency at the earliest practicable time. A copy of such study and recommendations shall be filed with the Trustee and National. The Authority will take such recommended action no later than 60 days after the receipt of such recommendations from the Toll Road Consultant.

Prior to engaging a Toll Road Consultant for purposes of complying with this subsection, the Authority shall provide written notice to National stating that it intends to do so and nominating a Toll Road Consultant by name, address and telephone number. If National approves the Toll Road Consultant nominated by the Authority in writing or does not, within 15 days of National's receipt of the notice in which the Authority nominates a Toll Road Consultant, deliver to the Authority the notice of nonapproval described in the next sentence, the Authority shall be entitled to engage the Toll Road Consultant nominated in its notice. If, within 15 days of National's receipt of the notice in which the Authority nominates a Toll Road Consultant, National delivers a written notice to the Authority (i) stating that National does not approve the Toll Road Consultant nominated by the Authority and (ii) nominating at least two Toll Road Consultants (by name, address and telephone number) that National would approve, the Authority shall use its best efforts to engage one of the Toll Road Consultants nominated by National. If the Authority is unable to engage a Toll Road Consultant nominated by National, it shall notify National in writing, specifying in detail the reasons why it is unable to engage such a Toll Road Consultant. In such event, National shall be entitled to nominate additional Toll Road Consultants until the Authority engages one of them. The 60-day period for engaging a Toll Road Consultant set forth in the preceding paragraph shall be extended as required to comply with this paragraph.

(c) Failure to comply with the covenant described in subsection (a) above will not constitute an Event of Default if either (i) the Authority complies with the covenant described in subsection (b) above or (ii) the Toll Road Consultant provides a written opinion to the Trustee and National that any action that will comply with such covenant is impracticable at that time; provided, however, that failure to comply with the covenant described in subsection (a) above for a period of 36 consecutive months will in all events constitute an Event of Default regardless of whether an event described in clause (i) or (ii) has occurred. For purposes of the preceding sentence, "impracticable" means (A) such action would not result in compliance with the covenant described in subsection (a) above, (B) the economic cost of taking such action exceeds the economic benefit resulting from such action or (C) the Authority does not have sufficient available funds to pay the cost of taking such action.

Section 7.19. Contracts With Other Persons. The Authority reserves the right to enter into contracts with any Person providing for the joint construction, acquisition, improvement, operation, repair, maintenance or replacement of the Project or any part thereof. Any contract entered into by the Authority pursuant to the provisions of this Section may contain such provisions and be upon such terms and conditions as the Authority deems advisable.

Section 7.20. No Competing Transportation Facilities. The Authority shall not acquire, construct or operate any transportation facility that will compete with the Project in a manner that will reduce the amount of Revenues.

Section 7.21. Related Financial Transactions.

(a) Except for any Related Financial Transaction entered into before the date on which 1997 Bonds are issued, the Authority shall not enter into any Related Financial Transaction unless: (i) on the date the Related Financial Transaction is entered into, the long term debt of the counterparty (or, where applicable, any guarantor or Credit Support Provider (as such term is used in the 1992 ISDA Master Agreement (Multicurrency—Cross Border or Local Currency—Single Jurisdiction)) of such counterparty) is rated at least either A- by S&P or A3 by Moody's; (ii) the conditions set forth in Section 3.02(c)(iii) hereof for the issuance of additional Bonds are met with respect to the Series of Bonds to which such transaction relates as determined as of the effective date of such transaction and taking into account the Related Financial Transaction (or, with respect to a Related Financial Transaction relating to a proposed Series of Bonds, such conditions are reasonably expected by the Authority to be met with respect to such Series of Bonds); (iii) the Authority has received the prior written consent of National to such Related Financial Transaction pursuant to Section 13.25(d)(ii) hereof; and (iv) the Trustee and National have received an opinion of Bond Counsel, in form and substance satisfactory to the Trustee and National, that such transaction is permitted under this Amended and Restated Master Resolution and any applicable Supplemental Resolution, is authorized under the laws of the State and will not adversely affect the exclusion from gross income for federal income tax purposes of interest on any of the Bonds.

(b) Notwithstanding anything to the contrary contained herein:

(i) Amounts paid or received by the Authority in connection with a Related Financial Transaction (other than any Termination Payments) shall be taken into account in the manner provided in clause (c) of the definition of Debt

Service in Section 1.01 hereof in determining the amount of interest due on the related Series of Bonds for purposes of payments pursuant to Article V and Section 7.18 hereof; where such amounts received by the Authority are based on a formula derived from a variable or adjustable index, the Trustee shall, for purposes of making the monthly transfers required by Section 5.05(a) hereof, assume that the amount that will be received by the Authority on any date scheduled for such receipt during the following month will be the amount that would be produced by such formula if such amount were received on such monthly calculation date (giving effect to any change in the notional amount of such Related Financial Transaction that would occur between such monthly calculation date and the date such amount is to be received); and

(ii) For purposes of Sections 2.01(c), 5.05(b), 5.07(a), 5.08(d), 7.01, 8.05(c) and 13.01(a) hereof, Regularly Scheduled Swap Payments payable by the Authority pursuant to any Related Financial Transaction shall be deemed to be interest on Bonds of the same Tier as the Bonds the Debt Service on which is payable from the Account of the Debt Service Fund from which such Regularly Scheduled Swap Payments are payable.

ARTICLE VIII

DEFAULT AND REMEDIES

Section 8.01. Rights and Remedies, Generally. Subject to the provisions of this Amended and Restated Master Resolution, the Owners of the Bonds and Parity Obligations and the Trustee acting for all of the Owners of the Bonds and Parity Obligations shall be entitled to all of the rights and remedies provided in the PHA Law and to all of the rights and remedies otherwise provided or permitted by law.

Section 8.02. Events of Default. Each of the following events is hereby declared an "Event of Default" under this Amended and Restated Master Resolution:

(a) failure to make due and punctual payment of the principal or Redemption Price of any Bond when and as the same shall become due and payable, whether at maturity or by call for redemption, or otherwise;

(b) failure to make due and punctual payment of any installment of interest on any Bond or the unsatisfied balance of any Sinking Fund Installment therefor (except when such Sinking Fund Installment is due on the maturity date of such Bond), when and as such interest installment or Sinking Fund Installment shall become due and payable;

(c) failure by the Authority in the performance or observance of any other of the covenants, agreements or conditions on its part contained in this Amended and Restated Master Resolution or any Supplemental Resolution or in the Bonds, and such failure shall continue for a period of 30 days after written notice thereof to the Authority by the Trustee or to the Authority and to the Trustee by the Owners of not less than 25% in Bond Obligation represented by the Bonds and Parity Obligations Outstanding;

(d) if the Authority shall: (i) file a voluntary petition in bankruptcy or a voluntary petition or an answer seeking reorganization, arrangement, readjustment or composition of its debts or for any other relief under the federal bankruptcy laws or under any other insolvency act or law, State or federal, now or hereafter existing; (ii) take any action indicating its consent to, approval of, or acquiescence in, any such petition or proceeding; (iii) apply for, or consent or acquiesce in the appointment of, a receiver or a trustee of the Authority or for all or a substantial part of its property; (iv) make an assignment for the benefit of creditors; or (v) be unable, or admit in writing its inability, to pay its debts as they mature;

(e) if proceedings shall be commenced against the Authority, without its authorization, consent or application, in bankruptcy or seeking reorganization, arrangement, readjustment or composition of its debts or for any other relief under the federal bankruptcy laws or under any other insolvency act or law, State or federal, now or hereafter existing, or seeking the involuntary appointment of a receiver or trustee of the Authority or for all or a substantial part of its property, and the same shall continue for 90 days undismissed or undischarged or shall result in the adjudication of bankruptcy or insolvency; or

(f) failure to make any payment comparable to a payment described in paragraph (a) or (b) above with respect to any Parity Obligation in the manner described in the applicable paragraph.

Notwithstanding any provision herein to the contrary, no Event of Default described in paragraph (a) or (b) above with respect to any Series of Bonds and no Event of Default described in paragraph (f) above with respect to any Parity Obligation shall be an Event of Default with respect to any other Series of Bonds or series or subseries of Parity Obligations except those that are of the same Tier or otherwise have a parity lien on Revenues.

Section 8.03. Notice of Default. The Trustee shall not be required to give notice to the Authority of any Event of Default hereunder; provided, however, that upon written request of the Owners of not less than 25% of the aggregate Bond Obligation represented by the affected Bonds and Parity Obligations Outstanding, the Trustee shall give written notice to the Authority of any default or breach constituting an Event of Default under Section 8.02(c) hereof.

Section 8.04. Specific Remedies.

(a) If an Event of Default with respect to the Senior Bonds shall occur and be continuing, then, subject to subsections (c) and (d) of this Section, the Trustee may, with the written consent of the Owners of not less than a majority of the aggregate Bond Obligation represented by the Senior Bonds and any Parity Obligations that have a lien on Revenues that is on a parity with the lien of such Bonds (for purposes of this Section, the "Senior Obligations"), and shall, at the written direction of the Owners of not less than a majority of the aggregate Bond Obligation represented by the Senior Obligations and having been indemnified to its satisfaction:

(i) by mandamus or other suit, action or proceeding at law or in equity require the Authority to perform its covenants, representations and duties with respect to the Senior Obligations under this Amended and Restated Master Resolution;

(ii) by action or suit in equity require the Authority to account as if it were the trustee of an express trust for the Owners of the Senior Obligations;

(iii) by action or suit in equity enjoin any acts or things which may be unlawful or in violation of the rights of the Owners of the Senior Obligations;

(iv) take possession, administration and management of all Funds and Accounts (with respect to Bonds) and comparable funds, accounts and subaccounts (with respect to Parity Obligations) securing such Senior Obligations and prohibit the Authority from withdrawing moneys therefrom without the Trustee's consent;

(v) request that a court of competent jurisdiction appoint, to the extent permitted by law, a receiver or receivers of the Trust Estate, and the income, revenues, profits and use thereof, it being the intent hereof that, to the extent permitted by law, the Trustee shall be entitled to appointment of such a receiver as a matter of right; and/or

(vi) take such other steps to protect and enforce its rights and the rights of the Owners of the Senior Obligations, whether by action, suit or proceeding in aid of the execution of any power herein granted or for the enforcement of any other appropriate legal or equitable remedy, including, but not limited to, proceeding by suit or suits, at law or in equity or by any other appropriate legal or equitable remedy, to enforce payment of the principal and Redemption Price of and interest on the Senior Obligations.

(b) If an Event of Default with respect to the First Tier Subordinate Bonds, the Second Tier Subordinate Bonds or the Third Tier Subordinate Bonds shall occur and be continuing, then, subject to subsection (c) of this Section, the Trustee may, with the written consent of the Owners of not less than a majority of the aggregate Bond Obligation represented by the First Tier Subordinate Bonds, the Second Tier Subordinate Bonds and the Third Tier Subordinate Bonds with respect to which such Event of Default has occurred and is continuing and any Parity Obligations with a lien on Revenues that is on a parity with such Bonds (for purposes of this Section, the "Affected Subordinate Obligations"), and shall, at the written direction of the Bond Obligation represented by the Affected Subordinate Obligations and having been indemnified to its satisfaction:

(i) by mandamus or other suit, action or proceeding at law or in equity require the Authority to perform its covenants, representations and duties with respect to the Affected Subordinate Bonds and Subordinate Parity Obligations under this Amended and Restated Master Resolution; and/or

(ii) take possession, administration and management of the Debt Service Accounts and Debt Service Reserve Accounts (with respect to Bonds) and the comparable funds, accounts or subaccounts (with respect to Parity Obligations) that secure such Affected Subordinate Obligations but that are not available for payment of the Senior Bonds and prohibit the Authority from withdrawing moneys therefrom without the Trustee's consent.

(c) Notwithstanding any other provision hereof, if an Event of Default has occurred and is continuing with respect to any Bonds (or Parity Obligations), no such remedy may be exercised by any Person on behalf of the Owners of any Subordinate Obligation (as defined below), in a manner that materially adversely affects the lien on the Trust Estate of any Superior Obligation (as defined below), the collection or payment of Revenues for the benefit of any such Superior Obligation or the other rights of the Owners of any such Superior Obligation. For purposes of this subsection, any Tier of Bonds (or Parity Obligations with a lien on Revenues that is on a parity with the lien on Revenues of such Tier of Bonds) shall be deemed to be a "Superior Obligation" to each other Tier of Bonds (or Parity Obligations with a lien on Revenues that is on a parity with the lien on Revenues of such other Tier of Bonds) (each such other Tier of Bonds or Parity Obligations is referred to herein as a "Subordinate Obligation") if amounts in the Revenue Fund are to be applied to the Debt Service Account for such Superior Obligation pursuant to Section 5.05 hereof at a priority earlier than the priority at which such amounts are to be applied to the Debt Service Account for such Subordinate Obligation.

(d) Notwithstanding any other provision hereof, (i) no Bonds or Parity Obligations may be accelerated without the written consent of National; and (ii) if MBIA Insured Bonds do not constitute a majority of the Bond Obligation represented by the Senior Obligations, no remedy described in subsection (a) of this Section may be implemented without the written consent of National.

Section 8.05. Application of Proceeds. The proceeds received by the Trustee pursuant to the exercise of any right or remedy under this Article shall, together with all securities and other moneys which may then be held by the Trustee as a part of the Trust Estate, subject to Section 8.04(c) hereof, be applied in order, as follows:

(a) to the payment of the reasonable and proper charges, expenses and liabilities of the Trustee;

(b) to the payment of the amounts certified by a Consultant to be required for reasonable and necessary Operating Expenses allocable to the Bonds, this Amended and Restated Master Resolution or the Project;

(c) subject to the limitations set forth in Section 5.06 hereof, to the payment of the interest and principal or Redemption Price then due on the Bonds with respect to which such remedy was exercised (and interest for such purpose shall include payments due under a Related Financial Transaction as provided in Section 7.21(b) hereof), as follows:

First, to the payment to the Persons entitled thereto of all installments of interest (including interest, compounded semiannually) then due in the order of the maturity of such installment, and, if the amount available shall not be sufficient to pay in full any installment or installments maturing on the same date, then to the payment thereof ratably, according to the amounts due thereon, to the persons entitled thereto, without any discrimination or preference; and

Second, to the payment to the Person entitled thereto of the unpaid principal or Redemption Price of the Bonds with respect to which such remedy was exercised which shall have become due, whether at maturity or by call for redemption, in the order of their due dates, and, if the amount available shall not be sufficient to pay in full all the Bonds due on any date, then to the payment thereof ratably, according to the amounts of principal or Redemption Price due on such date, to the persons entitled thereto, without any discrimination or preference; and

(d) to the payment of any obligations then due and owing that, absent an Event of Default, are payable from the Surplus Fund, and, if the amount available shall not be sufficient to pay in full all such obligations then due and owing, then to the payment thereof, ratably, subject to the priorities set forth in Sections 5.05(d) and 5.09 hereof, according to the amounts due with respect to each such obligation.

Section 8.06. Trustee May Act Without Possession of Bonds. All rights of action under this Amended and Restated Master Resolution or under any Bonds may be enforced by the Trustee without possession of any of the Bonds or the production thereof in any trial or other proceedings relative thereto, and any such suit or proceedings instituted by the Trustee shall be brought in its name, as Trustee for the ratable benefit of the Owners of the Bonds, subject to the provisions of this Amended and Restated Master Resolution.

Section 8.07. Trustee as Attorney-in-Fact. The Trustee is hereby appointed (and the Owners of the Bonds, by taking and holding same from time to time, shall be deemed to have so appointed the Trustee) the true and lawful attorney in fact of the Owners of the Bonds, or on behalf of all Owners of the Bonds as a class, with respect to any proof of debt, amendment to proof of debt, petition or other document, and to do and perform any and all acts and things for and in the name of the Owners of the Bonds against the Authority allowed in any equity receivership, insolvency, liquidation, bankruptcy, reorganization or other proceedings to which the Authority shall be a party and to receive payment of or on account of such claims. Any such receiver, assignee, liquidator or trustee is hereby authorized by each of the Owners of the Bonds to make such payments to the Trustee, and, in the event that the Trustee shall consent to the making of such payments directly to the Owners of the Bonds, to pay to the Trustee any amount due for compensation and expenses of the Trustee, including counsel fees, incurred up to the date of such distribution, and the Trustee shall have full power of substitution and delegation in respect of any such powers.

Section 8.08. Remedies Not Exclusive. No remedy herein conferred upon or reserved to the Trustee is intended to be exclusive of any other available remedy or remedies, but each and every such remedy shall be cumulative and shall be in addition to every other remedy given hereunder or under the Bonds or now or hereafter existing at law or in equity or by statute subject, however, to the limitations on remedies for the benefit of the Owners of First Tier Subordinate Bonds, Second Tier Subordinate Bonds and Third Tier Subordinate Bonds and other Subordinate Obligations set forth in Section 8.04(c) hereof.

Section 8.09. Limitation on Suits. All rights of action in respect of this Amended and Restated Master Resolution shall be exercised only by the Trustee with the consent of or at the direction of the Owners of Bonds as provided in Section 8.04(a) and (b), and no Owner of any Bond shall have any right to institute any suit, action or proceedings at law or in equity for the appointment of a receiver or for any other remedy hereunder or by reason hereof, unless and until the Trustee shall have received a written request of the Owners of not less than a majority of the aggregate Bond Obligation represented by the Bonds Outstanding and shall have been furnished reasonable indemnity and shall have refused or neglected for 10 days thereafter to institute such suit, action or proceedings. The making of such request and the furnishing of such indemnity shall in each and every case be conditions precedent to the execution and enforcement by any Owner of any Bond of the powers and remedies given to the Trustee hereunder and to the institution and maintenance by any such Owner of any action or cause of action for the appointment of a receiver or for any other remedy hereunder, but the Trustee may, with the consent of or at the direction of the Owners of Bonds as provided in Section 8.04(a) and (b), and when thereunto duly requested in writing by the Owners of not less than a majority of the aggregate Bond Obligation represented by the Bonds Outstanding and when furnished indemnity satisfactory to protect it against expenses, charges and liability shall, forthwith, subject to Section 8.04(c) hereof take such appropriate action by judicial proceedings otherwise in respect of any existing default on the part of the Authority as so directed. The rights of the Owners under this Section are in all events subject to the provisions of Section 8.04(c) hereof.

Nothing contained in this Article, however, shall affect or impair the right of any Owner of Bonds, which, subject to Section 8.04(c) hereof, shall be absolute and unconditional, to enforce the payment of the principal of, premium, if any, and interest on the Bonds of such Owner, but only out of the moneys for such payment as herein provided, or the obligation of the Authority, which shall also be absolute and unconditional, to make payment of the principal of, premium, if any, and interest on the Bonds and Parity Obligations, but only out of the funds provided herein for such payment, to the respective Owners thereof at the time and place stated herein.

Section 8.10. Right of Owners of the Bonds to Direct Proceedings. Notwithstanding any provision of this Amended and Restated Master Resolution to the contrary, the Owner or Owners of more than 50% of the aggregate Bond Obligation represented by the Bonds Outstanding with respect to which an Event of Default shall have occurred and be continuing shall have the right, at any time, by an instrument or instruments in writing executed and delivered to the Trustee, to direct the time, method and place of conducting all proceedings to be taken in connection with the enforcement of the terms and conditions of this Amended and Restated Master Resolution, or for the pursuit or exercise of any remedy available to the Trustee or any trust or power conferred on the Trustee or any other proceedings hereunder; provided, however, that the Trustee shall have been satisfactorily indemnified and that such direction shall not be contrary to law or the provisions of this Amended and Restated Master Resolution, and the Trustee shall have the right to decline to follow any such direction if the Trustee in good faith shall determine that the proceedings so directed would involve it in personal liability or would be unjustly prejudicial to the Owners of the Bonds not consenting. The rights of the Owners under this Section are in all events subject to the provisions of Section 8.04(c) hereof.

Section 8.11. Restoration of Rights and Remedies. If the Trustee or any Owner of a Bond has instituted any proceeding to enforce any right or remedy under this Amended and Restated Master Resolution and such proceeding has been discontinued or abandoned for any reason, or has been determined adversely to the Trustee or to such Owner of a Bond, then and in every such case, the Authority, the Trustee and the Owners of the Bonds shall, subject to any determination in such proceeding, be restored severally and respectively to their former positions hereunder, and thereafter all rights and remedies of the Trustee and the Owners of the Bonds shall continue as though no such proceeding had been instituted.

Section 8.12. Waiver of Stay or Extension Laws. To the extent that it may lawfully do so, the Authority covenants that it will not at any time insist upon, plead or in any manner whatsoever claim or take the benefit or advantage of any stay or extension law, whenever or wherever enacted, which may affect the covenants or the performance of this Amended and Restated Master Resolution. The Authority also covenants that it will not otherwise hinder, delay or impede the execution of any power herein granted to the Trustee.

Section 8.13. Delay or Omission Not Waiver. No delay or omission of the Trustee or of any Owner of any Bond to exercise any right or remedy accruing upon any Event of Default hereunder shall impair any such right or remedy or constitute a waiver of any such Event of Default or an acquiescence therein. Every right and remedy given by this Article or by law to the Trustee or to the Owners of the Bonds may be executed from time to time, and as often as may be deemed expedient, by the Trustee or by the Owners of the Bonds, as the case may be.

Section 8.14. Notice to Owners of the Bonds of Default. The Trustee shall promptly mail to registered Owners of Bonds written notice of the occurrence of any Event of Default of which it has notice pursuant to this Amended and Restated Master Resolution.

ARTICLE IX

CONCERNING THE FIDUCIARIES

Section 9.01. Trustee; Appointment and Acceptance of Duties. U.S. Bank National Association is hereby appointed as Trustee. The Trustee shall signify its acceptance of the duties and obligations imposed upon it by this Amended and Restated Master Resolution by executing and delivering to the Authority a written acceptance thereof, and by executing such acceptance the Trustee shall be deemed to have accepted such duties and obligations with respect to all the Bonds thereafter to be issued, but only, however, upon the terms and conditions set forth in this Amended and Restated Master Resolution.

Section 9.02. Paying Agents, Registrars and Other Agents; Appointment and Acceptance of Duties.

(a) The Authority may appoint one or more Paying Agents, Registrars, or other Fiduciaries to perform any of the duties and obligations imposed under this

Amended and Restated Master Resolution or any Supplemental Resolution, and separate appointments may be made for the Bonds of each Series. The Trustee may be appointed to serve in any such capacity.

(b) Each Paying Agent, Registrar or other Fiduciary shall signify its acceptance of the duties and obligations imposed upon it by this Resolution or any Supplemental Resolution by executing and delivering to the Authority and to the Trustee a written acceptance thereof.

Section 9.03. Responsibilities of the Trustee.

(a) The recitals of fact herein and in the Bonds contained shall be taken as the statements of the Authority and the Trustee assumes no responsibility for the correctness of the same. The Trustee makes no representations as to the validity or sufficiency of this Amended and Restated Master Resolution or of any Bonds issued thereunder or as to the security afforded by this Amended and Restated Master Resolution, and the Trustee shall not incur any liability in respect thereof. The Trustee shall, however, be responsible for its representation contained in any certificate on the Bonds. The Trustee shall not be under any responsibility or duty with respect to the application of any money paid to the Authority or money collected by the Authority prior to the delivery thereof to the Trustee. The Trustee shall not be under any obligation or duty to perform any act, whether requested by the Owners or otherwise, which would involve it in liability or to institute or defend any suit in respect hereof, or to advance any of its own money, unless it has been satisfactorily indemnified against such liability except liability resulting from its negligence or willful misconduct. Subject to the provisions of subsection (b) of this Section, the Trustee shall not be liable in connection with the performance of its duties hereunder except for its own negligence or willful misconduct.

(b) The Trustee, prior to the occurrence of an Event of Default and after the curing of all Events of Default which may have occurred, undertakes to perform such duties and only such duties as are specifically set forth in this Amended and Restated Master Resolution. In case an Event of Default has occurred (which has not been cured), the Trustee shall exercise such of the rights and powers vested in it by this Amended and Restated Master Resolution, and use the same degree of care and skill in their exercise, as a prudent person would exercise or use under the circumstances in the conduct of said person's own affairs. The Trustee shall not be required to take notice or be deemed to have notice or knowledge of any default hereunder except failure by the Authority to cause to be made any of the payments required to be made under Section 8.02(a) or (b) hereof unless the Trustee shall be specifically notified in writing of the default by the Authority or by the Owners of not less than 15% of the Bond Obligation represented by the Bonds Outstanding. All notices or other instruments required by this Amended and Restated Master Resolution to be delivered to the Trustee must, to be effective, be delivered at the principal corporate trust office of the Trustee, and in the absence of the notice so delivered, the Trustee may conclusively assume there is no default except as aforesaid. Any provision of this Amended and Restated Master Resolution relating to action taken or to be taken by the Trustee or the evidence upon which the Trustee may rely shall be subject to the provisions of this Section.

Section 9.04. Evidence on Which the Trustee May Act.

(a) The Trustee, upon receipt of any notice, resolution, request, consent, order, certificate, report, opinion, bond, or other paper or document furnished to it pursuant to any provision of this Amended and Restated Master Resolution, shall be protected in acting upon any such instrument believed by it to be genuine and to have been signed or presented by the proper party or parties. The Trustee may consult with counsel, who may or may not be counsel to the Authority or any Consultant, and the opinion of such counsel or Consultant shall be full and complete authorization and protection in respect of any action taken or suffered by it under this Amended and Restated Master Resolution in good faith and in accordance therewith.

(b) Whenever the Trustee shall deem it necessary or desirable that a matter be proved or established prior to taking or suffering any action under this Amended and Restated Master Resolution, such matter (unless other evidence in respect thereof be therein specifically prescribed) may be deemed to be conclusively proved and established by a certificate of an Authorized Authority Representative, and such certificate shall be full warrant for any action taken or suffered in good faith under the provisions of this Amended and Restated Master Resolution upon the faith thereof; but in its discretion the Trustee may in lieu thereof accept other evidence of such fact or matter or may require such further or additional evidence as to it may seem reasonable.

(c) Except as otherwise expressly provided in this Amended and Restated Master Resolution, any request, order, notice or other direction required or permitted to be furnished by the Authority to the Trustee pursuant to any provision hereof or of any Supplemental Resolution shall be sufficiently executed if executed in the name of the Authority by an Authorized Authority Representative. Unless otherwise expressly provided in a Supplemental Resolution, any such communication shall be in English in the form of a document that is signed manually or by way of a digital signature provided by DocuSign or another digital signature provider specified in writing to the Trustee by an Authorized Authority Representative. The Authority agrees to assume all risks arising out of the use of using digital signatures and electronic methods to submit communications to the Trustee, including without limitation the risk of Trustee acting on unauthorized instructions, and the risk of interception and misuse by third parties.

(d) The Trustee may execute any of the trusts or powers hereof and perform any of its duties by or through attorneys, receivers, agents or employees but shall not be answerable for the conduct of attorneys and receivers who have been selected by it with reasonable care, and may in all cases pay reasonable compensation to all attorneys, agents, receivers and employees as may reasonably be employed in connection with the trusts hereof.

(e) Except as otherwise provided in Section 6.02, the Trustee shall not be required to give any bond or surety in respect of the execution of the said trusts and powers or otherwise in respect of the premises.

Section 9.05. Compensation. The Authority shall pay to the Trustee from time to time reasonable compensation for all services rendered under this Amended and Restated Master Resolution, including reasonable default fees of the Trustee upon the occurrence of an Event of Default hereunder, and also all reasonable expenses, costs, charges, counsel fees, Consultant fees and other disbursements, including those of its attorneys, agents, Consultants and employees, incurred in and about the execution of the trusts created by this Amended and Restated Master Resolution, and in and about the exercise and performance of the powers and duties of the Trustee hereunder and for the reasonably necessary costs and expenses incurred in defending any liability in the premises of any character whatsoever (unless such liability is adjudicated to have resulted from the negligence or willful misconduct of the Trustee) under this Amended and Restated Master Resolution.

Section 9.06. Certain Permitted Acts. The Trustee may become the owner of any Bonds, with the same rights it would have if it were not the Trustee. To the extent permitted by law, the Trustee may act as depository for, and may permit any of its officers of directors to act as a member of, or in any other capacity with respect to, any committee formed to protect the rights of Bondowners or to effect or aid in any reorganization growing out of the enforcement of the Bonds or this Amended and Restated Master Resolution, whether or not any such committee shall represent the Owners of a majority in principal amount of the Bonds Outstanding.

Section 9.07. Resignation of Trustee. Except as otherwise provided by Supplemental Resolution, the Trustee may at any time resign and be discharged of the duties and obligations created by this Amended and Restated Master Resolution, effective immediately upon the appointment of a successor Trustee pursuant to Section 9.09 hereof, by giving not less than 60 days' written notice to the Authority of the date it desires to resign and mailing written notice to the Owners of all Bonds and such resignation shall take effect immediately on the appointment of a successor Trustee pursuant to Section 9.09 hereof.

Section 9.08. Removal of Trustee. The Trustee may be removed, for cause, at any time by an instrument or concurrent instruments in writing, filed with the Trustee, and signed by the Owners of a majority of the Bond Obligation represented by the Bonds Outstanding or their attorneys-in-fact duly authorized. The Trustee may be removed, without cause, at any time upon the filing with the Trustee of (i) an instrument or concurrent instruments in writing signed by the Owners of a majority of the Bond Obligation represented by the Bonds Outstanding or their duly authorized attorneys-in-fact, accompanied by the written consent of the Authority to such removal or (ii) an instrument in writing signed by an Authorized Authority Representative, accompanied by the written consents of the Owners of a majority of the Bond Obligation represented by the Bonds Outstanding or their duly authorized attorneys-in-fact.

Section 9.09. Appointment of Successor Trustee.

(a) In case at any time the Trustee shall resign or shall be removed or shall become incapable of acting, or shall be adjudged a bankrupt or insolvent, or if a receiver, liquidator or conservator of the Trustee, or of its property, shall be appointed, or if any public officer shall take charge or control of the Trustee, or of its property or affairs, a successor may be appointed by the Owners of a majority of the Bond Obligation represented by the Bonds Outstanding, excluding any Bonds held by or for the account of the Authority by an instrument or concurrent instruments in writing signed and acknowledged by such Bondowners or by their attorneys-in-fact duly authorized and delivered to such successor Trustee, notification thereof being given to the Authority and the predecessor Trustee; provided, nevertheless, that unless a successor Trustee shall have been appointed by the Bondowners as aforesaid, the Authority by duly executed written instrument signed by an Authorized Authority Representative shall forthwith appoint a Trustee to fill such vacancy until a successor Trustee shall be appointed by the Bondowners as authorized in this Section. The Authority shall mail notice of such appointment to the Owners of all Bonds. Any successor Trustee appointed by the Authority shall, immediately and without further act, be superseded by a Trustee appointed by the Bondowners.

(b) If in a proper case no appointment of a successor Trustee shall be made pursuant to the foregoing provisions of this Section within 45 days after the Trustee shall have given to the Authority written notice as provided in Section 9.07 or after a vacancy in the office of the Trustee shall have occurred by reason of its inability to act, its removal, or for any other reason whatsoever, the Trustee (in the case of a resignation under Section 9.07) or the Owner of any Bond (in any case) may apply to any court of competent jurisdiction to appoint a successor Trustee. Said court may thereupon, after such notice, if any, as such court may deem proper, appoint a successor Trustee.

(c) Any Trustee appointed under the provisions of this Section in succession to the Trustee shall be a bank or trust company or national or state banking association, having (or whose parent holding company shall have) capital stock and surplus aggregating at least $25,000,000.

Section 9.10. Transfer of Rights and Property to Successor Trustee. Any successor Trustee appointed under this Amended and Restated Master Resolution shall execute, acknowledge, and deliver to its predecessor Trustee and to the Authority an instrument accepting such appointment, and thereupon such successor Trustee, without any further act, deed or conveyance, shall become fully vested with all moneys, estates, properties, rights, powers, duties, and obligations of such predecessor Trustee, with like effect as if originally named as Trustee; but the Trustee ceasing to act shall nevertheless, on the written request of the Authority or of the successor Trustee, execute, acknowledge, and deliver such instruments of assignment and further assurance and do such other things as may reasonably be required for more fully and certainly vesting and confirming in such successor Trustee all rights, powers, duties and obligation in and to any property held by it under this Amended and Restated Master Resolution, and shall pay over, assign, and deliver to the successor Trustee any money or other property subject to the trusts and conditions herein set forth. Should any instrument in writing from the Authority be required by such successor Trustee for more fully and certainly vesting in and confirming to such successor Trustee any such estates, rights, powers, and duties, any and all such instruments in writing shall, on request, and so far as may be authorized by law, be executed, acknowledged, and delivered by the Authority. Any such successor Trustee shall promptly notify any Paying Agents and Registrars of its appointment as Trustee.

Section 9.11. Merger or Consolidation. Any bank or trust company into which the Trustee may be merged or converted or with which it may be consolidated or any bank or trust company resulting from any merger, conversion or consolidation to which it shall be a party or any bank or trust company to which the Trustee may sell or transfer all or substantially all of its corporate trust business, provided such entity shall be a bank or trust company organized under the laws of any state of the United States or a national banking association, and shall be authorized by law to perform all duties imposed upon it by this Amended and Restated Master Resolution, shall be the successor Trustee without the execution or filing of any paper or the performance of any further act.

Section 9.12. Adoption of Authentication. In case of the Bonds contemplated to be issued under this Amended and Restated Master Resolution shall have been authenticated but not delivered, any successor Trustee or Authenticating Agent may adopt the certificate of authentication of any predecessor Trustee or Authenticating Agent so authenticating such Bonds and deliver such Bonds so authenticated; and in case any of the said Bonds shall not have been authenticated, any successor Trustee or Authenticating Agent may authenticate such Bonds in the name of the predecessor Trustee or Authenticating Agent, or in the name of the successor Trustee or Authenticating Agent, and in all such cases such certificate shall have the full force which it is anywhere in said Bonds or in this Amended and Restated Master Resolution provided that the certificate of the Trustee or Authenticating Agent shall have.

Section 9.13. Resignation or Removal of Fiduciaries and Appointment of Successors.

(a) Any Paying Agent, Registrar or other Fiduciary may at any time resign and be discharged of the duties and obligations created by this Amended and Restated Master Resolution or any Supplemental Resolution by giving at least 60 days' written notice to the Authority, National, the Trustee, and the other Fiduciaries, if any. Any such Fiduciary may be removed at any time by an instrument filed with such Fiduciary and the Trustee and signed by the Authority. Any successor Fiduciary shall be appointed by the Authority with the approval of the Trustee and National and shall be willing and able to accept the office on reasonable and customary terms and authorized by law to perform all the duties imposed upon it in such capacity by this Amended and Restated Master Resolution.

(b) In the event of the resignation or removal of any Fiduciary, such Fiduciary shall pay over, assign and deliver any money held by it to its successor, or if there be no successor, to the Trustee. In the event that for any reason there shall be a vacancy in the office of any Paying Agent or Registrar appointed by the Authority the Trustee shall act as such Paying Agent or Registrar.

(c) The provisions of this Section may be modified by Supplemental Resolution in respect of any Series of Bonds, authorized thereby, and in the event of any conflict with the provisions hereof the provisions of such Supplemental Resolution shall control in respect of any Series of Bonds authorized thereby.

Section 9.14. Limitations on Indemnification. Notwithstanding any other provision hereof, no right to indemnification or limitation on the duties, responsibilities or liabilities of the Trustee or any Registrar or Paying Agent shall relieve the Trustee or any Paying Agent or

Registrar from responsibility for (i) making payments on the Bonds when due from moneys available for such purpose or (ii) making any claim under the MBIA Insurance Policy.

ARTICLE X

SUPPLEMENTAL RESOLUTIONS

Section 10.01. Supplemental Resolutions Effective Upon Filing With the Trustee. For any one or more of the following purposes and at any time or from time to time, the Authority may adopt and execute a Supplemental Resolution, which, upon the filing with the Trustee of a copy thereof certified by an officer of the Authority, shall be fully effective in accordance with its terms without the consent of any Bondholders (except as otherwise specifically provided below):

(a) to authorize Authority Bonds of a Series and, in connection therewith, to specify and determine the matters and things referred to in Article III hereof and also any other matters and things relative to such Bonds which are not in conflict with this Amended and Restated Master Resolution as theretofore in effect, or to amend, modify, or rescind any such authorization, specification, or determination at any time prior to the first delivery of such Bonds;

(b) to conform this Amended and Restated Master Resolution to any amendment of any Supplemental Resolution in accordance with its terms;

(c) to close this Amended and Restated Master Resolution or any Supplemental Resolution against, or provide limitations and restrictions in addition to the limitations and restrictions contained in this Amended and Restated Master Resolution or any Supplemental Resolution on, the delivery of Authority Bonds or the issuance of other evidences of indebtedness;

(d) to add to the covenants and agreements of the Authority in this Amended and Restated Master Resolution or any Supplemental Resolution, other covenants and agreements to be observed by the Authority which are not in conflict with this Amended and Restated Master Resolution or the applicable Supplemental Resolutions as theretofore in effect;

(e) to add to the limitations and restrictions in this Amended and Restated Master Resolution or any Supplemental Resolution other limitations and restrictions to be observed by the Authority which are not in conflict with this Amended and Restated Master Resolution or the applicable Supplemental Resolution as theretofore in effect;

(f) to confirm, as further assurance, any pledge under, and the subjection to any lien or pledge created or to be created by, this Amended and Restated Master Resolution or any Supplemental Resolution, of the Trust Estate;

(g) to modify any of the provisions of this Amended and Restated Master Resolution or any Supplemental Resolution in any respect whatever, provided that (i) such modification shall be, and be expressed to be, effective only after all Outstanding

Bonds of any Series at the date of the adoption of such Master Resolution or Supplemental Resolution shall cease to be Outstanding Bonds; and (ii) such Supplemental Resolution shall be specifically referred to in the text of all Bonds of any Series delivered after the date of the adoption of such Supplemental Resolution and of Bonds issued in exchange therefor or in place thereof;

(h) to modify, amend or supplement this Amended and Restated Master Resolution or any Supplemental Resolution in such manner as to permit, if presented, the qualification hereof and thereof under the Trust Indenture Act of 1939 or any similar federal statute hereafter in effect or under any state blue sky law;

(i) to surrender any right, power or privilege reserved to or conferred upon the Authority by the terms of this Amended and Restated Master Resolution, provided that the surrender of such right, power or privilege is not in conflict with the covenants and agreements of the Authority contained in this Amended and Restated Master Resolution;

(j) to increase the Debt Service Reserve Fund Requirement and any capitalized interest requirements;

(k) to alter the Master Resolution to comply with the requirements of a nationally recognized rating agency in order to obtain or maintain a rating on any of the Bonds in one of the four highest rating categories of such rating agency, provided that no Supplemental Resolution adopted pursuant to this clause (k) shall be effective without the written consent of National;

(l) to designate Paying Agents, Registrars, and other Fiduciaries for the Bonds of any Series;

(m) to modify, amend or supplement this Amended and Restated Master Resolution or any Supplemental Resolution in order to provide for or eliminate book-entry registration of all or any of the Bonds;

(n) to amend a prior Supplemental Resolution in accordance with the provisions thereof;

(o) for any other purpose in respect of any Bonds or any Series of Bonds which, at the time such amendments are made, are fully secured by a pledge of or lien on direct obligations of or obligations the principal of and interest on which is unconditionally guaranteed by, the United States of America, certified by an independent certified public accountant to be sufficient to provide for the full and timely payment of principal and Redemption Price of, and interest on, the Bonds;

(p) if such amendment does not amend this Section or reduce the principal amount or Maturity Value, delay principal or Maturity Value payment dates, reduce interest rates, delay Interest Payment Dates or Accretion Dates or, except to the extent contemplated therein, amend redemption provisions, then applicable to any Series of Bonds and then, at least one of the following conditions is met:

(i) on the effective date of such amendment, all Bonds of such Series are secured by a Credit Facility through the later of the next date on which such Bonds are subject to optional or mandatory purchase or their maturity, the consent of the issuer of the Credit Facility is obtained and the Trustee has been provided with proof satisfactory to it that such amendment will not result in a reduction of any Rating of any of the Bonds in effect immediately prior to such amendment;

(ii) such amendment is made to facilitate the provision of a Credit Facility for a Series of Bonds that is not then secured by a Credit Facility, provided that no Supplemental Resolution adopted pursuant to this clause (ii) shall be effective without the written consent of National; or

(iii) such amendment is made to facilitate (A) the maintenance of any current Rating of the Bonds of such Series or (B) the obtaining of any higher Rating of the Bonds of such Series desired by the Authority;

(q) if such amendment amends this Section or reduces the principal amount or Maturity Value, delays principal or Maturity Value payment dates, reduces interest rates, delays Interest Payment Dates or Accretion Dates or, except to the extent contemplated therein, amends redemption provisions, then applicable to any Series of Bonds, then, on the effective date of such amendment, all of the Bonds to which such amendment applies are subject to purchase pursuant to the Supplemental Resolution authorizing their issuance and, in the case of Bonds that are subject to optional purchase on such effective date, the notice given to the Owners of such Bonds with respect to such optional purchase described such amendment; or

(r) to facilitate the issuance of and provision of security for Parity Obligations in accordance with Section 12.01 hereof.

Section 10.02. Supplemental Resolutions Effective With Consent of Trustee. For any one or more of the following purposes and at any time or from time to time, the Authority may adopt and execute a Supplemental Resolution, which, upon (i) the filing with the Trustee of a copy thereof certified by an Authority Representative, and (ii) the filing with the Authority of an instrument in writing made by the Trustee consenting thereto, shall be fully effective in accordance with its terms without the consent of any Bondowner:

(a) to cure any ambiguity, supply any omission, or cure or correct any defect or inconsistent provision in this Amended and Restated Master Resolution;

(b) to insert such provisions clarifying matters or questions arising under this Amended and Restated Master Resolution as are necessary or desirable and are not contrary to or inconsistent with this Amended and Restated Master Resolution as theretofore in effect;

(c) to provide for additional duties of the Trustee in connection with the Trust Estate or the Project; or

(d) to modify any of the provisions of this Amended and Restated Master Resolution or any Supplemental Resolution in any respect whatsoever, provided that such action shall not adversely affect the interests of the Owners of Outstanding Bonds of any Series.

Any such Supplemental Resolution may also effect one or more of the purposes specified in Section 10.01 hereof, and in that event, the consent of the Trustee required by this Section shall be applicable only to those provisions of such Supplemental Resolution as shall effect one or more of the purposes set forth in this Section.

Section 10.03. Supplemental Resolutions Effective With Consent of Bondowners. At any time or from time to time, but subject to consent by Bondowners in accordance with and subject to the provisions of Article XI hereof, the Authority may adopt and execute a Supplemental Resolution, which Supplemental Resolution, upon the filing with the Trustee of a copy thereof certified by an officer of the Authority and upon compliance with the provisions of Article XI hereof, shall become fully effective in accordance with its terms as provided in Article XI hereof.

Section 10.04. General Provisions.

(a) This Amended and Restated Master Resolution shall not be modified or amended in any respect except as provided in and in accordance with and subject to provisions of this Article and Article XI hereof.

(b) Any Supplemental Resolution referred to and permitted or authorized by Sections 10.01 and 10.02 hereof may be adopted by the Authority without the consent of any of the Bondowners, but shall become effective only on the conditions, to the extent and at the time provided in said Sections, respectively. The copy of every Supplemental Resolution when filed with the Trustee shall be accompanied by an opinion of Bond Counsel, in form and substance satisfactory to the Trustee, stating that such Supplemental Resolution has been duly and lawfully adopted in accordance with the provisions of this Amended and Restated Master Resolution, is authorized or permitted by this Amended and Restated Master Resolution, and is valid and binding upon the Authority, and will not adversely affect the exclusion from gross income for federal income tax purposes of any interest on the Bonds.

(c) The Trustee is hereby authorized to accept the delivery of a certified copy of any Supplemental Resolution referred to and permitted or authorized by Section 10.01, 10.02 or 10.03 hereof and to make all further agreements and stipulations which may be therein contained, and the Trustee, in taking such action, shall be fully protected in relying on an opinion of counsel (which may be an opinion of Bond Counsel) that such Supplemental Resolution is authorized or permitted by the provisions of this Amended and Restated Master Resolution.

(d) Notwithstanding any provision herein to the contrary, in particular Section 10.01 hereof, no Supplemental Resolution shall change or modify any of the rights or obligations of the Trustee without its written consent thereto.

ARTICLE XI

AMENDMENTS

Section 11.01. Mailing. Any provision in this Article for the mailing of a notice or other instrument to Bondowners shall be fully complied with if it is mailed postage prepaid only to each Owner of Bonds at his address, if any, appearing upon the Register and to the Trustee.

Section 11.02. Powers of Amendment. Except as provided in Article X hereof, any modification or amendment of this Amended and Restated Master Resolution and of the rights and obligations of the Authority and of the Owners of the Bonds hereunder, in any particular, may only be made by a Supplemental Resolution with the written consent (given as provided in Section 11.03 hereof) (a) of the Owners of at least 66% of the Bond Obligation represented by the Bonds that will be Outstanding as of the effective date of such modification or amendment, and (b) in case less than all of the several Tiers of Bonds Outstanding are affected by the modification or amendment, of the Owners of at least 66% of the Bond Obligation represented by the Bonds of each Tier so affected and Outstanding as of the effective date of such modification or amendment; provided, however, that if such modification or amendment will, by its terms, not take effect as long as any Bonds of any specified like Series and maturity remain Outstanding, the consent of the Owners of such Bonds shall not be required and such Bonds shall not be deemed to be Outstanding for the purpose of any calculation of Outstanding Bonds under this Section. Except as otherwise provided in this Amended and Restated Master Resolution or any Supplemental Resolution, no such modification or amendment shall permit a change in the terms of redemption or maturity of the principal or Maturity Value of any Outstanding Bond or of any installment of interest thereon or a reduction in the principal amount, Maturity Value or the Redemption Price thereof or in the rate of interest thereon without the consent of the Owner of such Bond, or shall reduce the percentages or otherwise affect the classes of Bonds of which the consent of the Owners is required to effect any such modification or amendment, or shall change or modify any of the rights or obligations of any Fiduciary without its written consent thereto. For the purposes of this Section, a Series shall be deemed to be affected by a modification or amendment of this Amended and Restated Master Resolution if the same materially adversely affects the rights of the Owners of Bonds of such Series. The Trustee may in its discretion determine whether or not, in accordance with the foregoing powers of amendment, Bonds of any particular Series or maturity would be affected by any modification or amendment of this Amended and Restated Master Resolution and any such determination shall be binding and conclusive on the Authority and all Owners of Bonds, except that National must consent regarding the effect on MBIA Insured Bonds.

Section 11.03. Consent of Bondowners. The Authority may at any time adopt and execute a Supplemental Resolution making a modification or amendment permitted by the provisions of Section 11.02 hereof, to take effect when and as provided in this Section. A copy of such Supplemental Resolution (or brief summary thereof or reference thereto in form approved by the Trustee), together with a request to Bondowners for their consent thereto in form satisfactory to the Trustee, shall be delivered to EMMA. Such Supplemental Resolution shall not be effective unless and until: (a) there shall have been filed with the Trustee the written consent of Owners of the percentages of Outstanding Bonds specified in Section 11.02 hereof and an opinion of Bond Counsel, in form and substance satisfactory to the Trustee and National, stating that such Supplemental Resolution has been duly and lawfully adopted and filed by the Authority in accordance with the provisions of this Amended and Restated Master Resolution, is authorized or permitted by this Amended and Restated Master Resolution, is valid and binding upon the Authority and enforceable in accordance with its terms, is in accordance with this Amended and Restated Master Resolution and will not adversely affect the exclusion from gross income for federal income tax purposes of interest on any Bonds; provided, however, that such opinion may take exception for limitations imposed by or resulting from bankruptcy, insolvency, moratorium, reorganization or other laws affecting creditors' rights generally and principles of government law and equity; and (b) a notice shall have been delivered to EMMA as hereinafter in this Section provided. Each such consent shall be effective only if accompanied by proof of the holding, at the date of such consent, of the Bonds with respect to which such consent is given, which proof shall be such as is permitted by Section 13.02 hereof. A certificate or certificates by the Trustee filed with the Trustee that it has examined such proof and that such proof is sufficient in accordance with Section 13.02 hereof shall be conclusive that the consents have been given by the Owners of the Bonds described in such certificate or certificates of the Trustee. Any such consent shall be binding upon the Owner of the Bonds giving such consent and, anything in Section 13.02 hereof to the contrary notwithstanding, upon any subsequent Owner of such Bonds and of any Bonds issued in exchange therefor (whether or not such subsequent Owner thereof has notice thereof) unless such consent is revoked in writing by the Owner of such Bonds giving such consent or a subsequent Owner thereof by filing with the Trustee, prior to the time when the written statement of the Trustee hereinafter in this Section provided for is filed, such revocation. The fact that a consent has not been revoked may likewise be proved by a certificate of the Trustee filed with the Trustee to the effect that no revocation thereof is on file with the Trustee. At any time after the Owners of the required percentages of Bonds shall have filed their consents to the Supplemental Resolution, the Trustee shall make and file with the Authority a written statement that the Owners of such required percentages of Bonds have filed such consents. Such written statement shall be conclusive that such consents have been so filed. At any time thereafter notice, stating in substance that the Supplemental Resolution (which may be referred to as a Supplemental Resolution adopted by the Authority on a stated date, a copy of which is on file with the Trustee) has been consented to by the Owner of the required percentages of Bonds and will be effective as provided in this Section, may be given to Bondowners by delivering such notice to EMMA. Proof of the delivery of such notice to EMMA shall be filed with the Trustee. A record, consisting of the papers required or permitted by this Section to be filed with the Trustee, shall be proof of the matters therein stated. Such Supplemental Resolution making such amendment or modification shall be deemed conclusively binding upon the Authority, the Fiduciaries and the Owners of all Bonds at the expiration of 10 days after the filing with the Trustee of the proof of the delivery to EMMA of such last mentioned notice, except in the event of a final decree of a court of competent jurisdiction setting aside such Supplemental Resolution in a legal action or equitable proceeding for such purpose commenced within such 10-day period; provided, however, that any Fiduciary and the Authority during such 10-day period and any such further period during which any such action or proceeding may be pending shall be entitled in their absolute discretion to take such action, or to refrain from taking such action, with respect to such Supplemental Resolution as they may deem expedient. Any Bondowner (including National acting on behalf of the Owners of MBIA Insured Bonds pursuant to Section 13.25 hereof) may waive the notice required pursuant to this Section.

Section 11.04. Modifications by Unanimous Consent.

(a) The Authority may adopt and execute a Supplemental Resolution modifying or amending the terms and provisions of this Amended and Restated Master Resolution and the rights and obligations of the Authority and of the Owners of the Bonds hereunder in any respect with the consent of all the Owners of all the Bonds Outstanding, which consent shall be given as provided in Section 11.03 hereof, except that no notice to Bondowners shall be required (and which consent may be given by any underwriter, remarketing agent or broker that has purchased such Bonds and intends to resell them, provided that the Persons to whom such Bonds are to be resold are informed of the adoption of the Supplemental Resolution); provided, however, that no such modification or amendment shall change or modify any of the rights or obligations of the Trustee without the written consent thereto of the Trustee in addition to the consent of the Bondowners.

(b) The terms and provisions of this Amended and Restated Master Resolution and the rights and obligations of the Authority and the Owners of the Bonds thereunder may be modified or amended with respect to a particular Series upon the adoption and filing by the Authority of a Supplemental Resolution and the consent of the Owners of all Outstanding Bonds of the particular Series, which consent shall be given by written notice to the Trustee, and no notice to Bondowners by mailing shall be required (and which consent may be given by any underwriter, remarketing agent or broker that has purchased such Bonds and intends to resell them, provided that the Persons to whom such Bonds are to be resold are informed of the adoption of the Supplemental Resolution); provided, however, that no such modification or amendment shall change or modify any of the rights or obligations of the Trustee without the written consent thereto of the Trustee in addition to the consent of the Bondowners.

Section 11.05. Exclusion of Bonds. Bonds owned or held by or for the account of the Authority shall not be deemed Outstanding for the purpose of consent or other action or any calculation of Outstanding Bonds provided for in this Article, and the Authority shall not be entitled with respect to such Bonds to give any consent or take any other action provided in this Article. At the time of any consent or other action taken under this Article, the Authority shall furnish the Trustee a certificate of an Authorized Authority Representative, upon which the Trustee may rely, describing all Bonds so to be excluded.

Section 11.06. Notation on Bonds. Bonds authenticated and delivered after the effective date of any action taken as provided in Article X hereof or this Article may, and, if the Trustee so determines shall, bear a notation by endorsement or otherwise in form approved by the Trustee as to such action, and in that case upon demand of the Owner of any Bond Outstanding at such effective date and presentation of his Bond for the purpose at the principal office of the Trustee or other Fiduciary responsible for transferring Bonds or upon any transfer of any Bond Outstanding at such effective date, suitable notation shall be made on such Bond or upon any Bond issued upon any such transfer by the Trustee or other Fiduciary responsible for transferring Bonds as to any such action. If the Trustee shall so determine, new Bonds so modified as directed by the Trustee to conform to such action shall be prepared, authenticated and delivered, and upon demand of the Owner of any Bond Outstanding shall be exchanged, without cost to such Bondowner, for Bonds Outstanding, upon surrender of such Bonds, for Bonds of the same Series and maturity then Outstanding.

ARTICLE XII

PARITY OBLIGATIONS, SUBORDINATE LIEN OBLIGATIONS AND SPECIAL PROJECT BONDS

Section 12.01. Parity Obligations. The Authority reserves the right to issue or incur Parity Obligations and to pledge the Revenues to the payment of such Parity Obligations on a parity with the pledge of the Revenues to payment of any Tier of Bonds hereunder, but only if all the following conditions are met: (a) all conditions to the issuance of additional Bonds set forth in Section 3.02(c) hereof are met with respect to such Parity Obligations (determined for such purpose as if such Parity Obligations were Bonds); (b) such Parity Obligations shall have no right to, or lien on, (i) any moneys or investments held in any Fund, Account or Subaccount other than the Revenue Fund or (ii) any other portion of the Trust Estate other than the Revenues; (c) the Parity Obligation Instrument under which such Parity Obligations are issued incorporates the provisions of, and appoints the Trustee as trustee for the owners of such Parity Obligations for purposes of enforcing the provisions of, Article VIII hereof; and (d) following the issuance of such Parity Obligations, such Parity Obligations shall be treated as Bonds and debt service on such Parity Obligations shall be treated as Debt Service on Bonds for purposes of this Amended and Restated Master Resolution, including, but not limited to, of Sections 3.02 and 7.18 hereof.

Section 12.02. Subordinate Lien Obligations. The Authority reserves the right to issue for any lawful purpose, bonds, notes, or other obligations secured in whole or in part by liens on the Revenues that are junior and subordinate to the lien on Revenues securing payment of the Bonds. Such subordinate lien obligations may be further secured by any other source of payment lawfully available for such purposes.

Section 12.03. Special Project Bonds. Notwithstanding any other provision hereof, the Authority reserves the right to issue, pursuant to any instrument, revenue bonds which are secured by liens on and pledges of revenues and proceeds derived from any Special Project and are not Authority Bonds or Parity Obligations. In order for a project to be a Special Project, (a) the Special Project must not include any portion of the limited access highway between Interstate 25 South and Interstate 25 North, including the interchanges at Interstate 25 South and Interstate 25 North, or any property related thereto, except that the Special Project may be located on or in the right-of-way for the highway so long as the Special Project will not, in the opinion of a Toll Road Consultant, materially adversely affect the operation of the highway or materially reduce the amount of Net Revenues that would be received in the absence of the Special Project; (b) the Authority must declare in writing that it is a Special Project and is not to be part of the Project; and (c) the costs of construction, acquisition, improvement, operation and maintenance of such Special Project must be paid directly from, or from the proceeds of a financing transaction under which the amounts payable by the Authority are payable from, (i) sources that are not included in Revenues or (ii) moneys in the General Surplus Account. A Special Project shall not be deemed to be a part of the Project and the revenues from a Special Project shall not be included in Revenues.

ARTICLE XIII

MISCELLANEOUS

Section 13.01. Discharge of Master Resolution. Subject to Section 13.25(b) hereof:

(a) If (i) the Authority shall pay or cause to be paid, or there shall otherwise be paid, to the Owners of the Bonds of any Series the principal or Redemption Price thereof, and interest due or to become due thereon, at the times and in the manner stipulated therein and in this Amended and Restated Master Resolution and (ii) all amounts due to MBIA and National have been paid, then, the pledge of the Trust Estate under this Amended and Restated Master Resolution and all covenants, agreements and other obligations of the Authority to the Bondowners of such Series, shall thereupon cease, terminate and become void and be discharged and satisfied. In such event, the Trustee shall cause an accounting for such period or periods as shall be requested by the Authority to be prepared and filed with the Authority and, upon the request of the Authority, shall execute and deliver to the Authority all such instruments as may be desirable to evidence such discharge and satisfaction, and the Fiduciaries shall pay over or deliver to the Authority all moneys or securities held by them pursuant to this Amended and Restated Master Resolution in respect of such Series which are not required for the payment of principal or Redemption Price, and interest on the Bonds of such Series not theretofore surrendered for such payment, or redemption.

(b) Any Outstanding Bonds of any Series shall, prior to the maturity or redemption date thereof, be deemed to have been paid within the meaning and with the effect expressed in subsection (a) of this Section if (i) in case any of such Bonds are to be redeemed on any date prior to their maturity, the Authority shall have given to the Trustee in form satisfactory to it a Letter of Instructions containing irrevocable instructions to give notice of redemption of such Bonds on said date as provided in Article IV hereof, (ii) there shall have been deposited with the Trustee or an escrow agent, in trust, either money in an amount which shall be sufficient, or Defeasance Investment Securities the principal of and interest on which without any reinvestment thereof when due will provide money which, together with the money, if any, deposited with the Trustee or an escrow agent at the same time, shall be sufficient, to pay when due the principal or Redemption Price of, and interest due and to become due on, such Bonds on or prior to the redemption date or maturity date thereof, as the case may be, and (iii) the Trustee and National receive an opinion, in form and substance satisfactory to the Trustee and National, of counsel with recognized expertise in the area of bankruptcy, that any amounts so deposited with the escrow agent from funds provided by the Authority may not be recovered by creditors of the Authority as a voidable preference under Section 547 of the United States Bankruptcy Code. Neither Defeasance Investment Securities nor money deposited with the Trustee or an escrow agent pursuant to this Section nor principal or interest payments on any such Defeasance Investment Securities shall be withdrawn or used for any purpose other than, and shall be held in trust for, the payment of the principal or Redemption Price of and interest on said Bonds; provided that any cash received from such principal or interest payment on such Defeasance Investment Securities, (A) to the extent such cash will not be required at any time for such purpose, shall be paid over to the Authority as received, free and clear of any trust, lien, security interest, pledge or assignment securing such Bonds or otherwise existing under this Amended and Restated Master Resolution, if all Bonds have been redeemed or discharged, otherwise such cash shall be deposited as Revenues, and (B) to the extent such cash will be required for such purpose at a later date, shall, to the extent practicable, be reinvested in the Defeasance Investment Securities maturing at times and in amounts sufficient to pay when due the principal or Redemption Price of and interest to become due on such Bonds, on or prior to such Redemption Date or maturity date thereof, as the case may be, and interest earned from such reinvestment shall be paid over to the Authority, as received, free and clear of any trust, lien or pledge, if all Bonds have been redeemed or discharged, otherwise such cash shall be deposited as Revenues.

(c) If the escrow agreement allows for substitution of securities in the escrow account, then the escrow agreement must provide that no such substitution may occur unless there has first been delivered to the escrow agent and the Trustee the following: (i) a verification report from an Independent Certified Public Accounting Firm that the escrow investments, as substituted, are sufficient to pay debt service, as it becomes due, on the refunded bonds and (ii) an opinion of Bond Counsel stating that the substitution is permitted under the documents and that the substitution has no adverse effect on the exclusion from gross income for federal income tax purposes of interest on the refunding bonds.

(d) Notwithstanding any other provision of this Section, any series or subseries of Parity Obligations shall be deemed paid upon satisfaction of conditions comparable to those set forth herein for Bonds.

Section 13.02. Evidence of Signatures of Bondowners and Ownership of Bonds.

(a) Any request, consent, revocation of consent or other instrument which this Amended and Restated Master Resolution may require or permit to be signed and executed by the Bondowners may be in one or more instruments of similar tenor, and shall be signed or executed by such Bondowners in person or by their attorneys appointed in writing. Proof of the execution of any such instrument, or of an instrument appointing any such attorney, shall be sufficient for any purpose of this Amended and Restated Master Resolution (except as otherwise therein expressly provided) if made in the following manner, or in any other manner satisfactory to the Trustee, which may nevertheless in its discretion require further or other proof in cases where it deems the same desirable:

(i) The fact and date of the execution by any Bondowner or his attorney of such instruments may be proved by a guarantee of the signature thereon by a bank or trust company or member of a national securities exchange or by the certificate of any notary public or other officer authorized to take acknowledgments of deeds, that the person signing such request or other instrument acknowledged to him the execution thereof, or by an affidavit of a witness of such execution, duly sworn to before such notary public or other officer. Where such execution is by an officer of a corporation or association or a member of a partnership, on behalf of such corporation, association or partnership, such signature guarantee, certificate or affidavit shall also constitute sufficient proof of his authority.

(ii) The amount of Bonds transferable by delivery held by any Person executing any instrument as a Bondowner, the date of his holding such Bonds, and the numbers and other identification thereof, may be proved by a certificate, which need not be acknowledged or verified, in form satisfactory to the Trustee, executed by the Trustee or by a member of a financial firm or by an officer of a bank, trust company, insurance company, or financial corporation or other depository wherever situated, showing at the date mentioned that such person exhibited to such member or officer or had on deposit with such depository the Bonds described in such certificate. Such certificate may be given by a member of a financial firm or by an officer of any bank, trust company, insurance company or financial corporation or depository with respect to Bonds owned by it, if acceptable to the Trustee. In addition to the foregoing provisions, the Trustee may from time to time make such reasonable regulations as it may deem advisable permitting other proof of holding of Bonds transferable by delivery.

(b) The ownership of Bonds and the amount, numbers and other identification, and date of holding the same shall be provided by the Registrar.

(c) Any request or consent by the Owner of any Bond shall bind all future Owners of such Bond in respect of anything done or suffered to be done by the Authority or any Fiduciary in accordance herewith.

(d) Any request, consent, revocation of consent, direction or other instrument that this Amended and Restated Master Resolution may require or permit to be signed by National acting as a deemed Bondowner pursuant to Section 13.25 hereof and any request, consent, revocation of consent, direction or other instrument to be executed by National on behalf of MBIA in its capacity as the insurer of the MBIA Insured Bonds, may be executed by one or more authorized officers of National.

Section 13.03. Money Held for Participating Bonds. Subject to the provisions of Section 13.05 hereof, the amounts held by the Trustee or Paying Agent for the payment of the interest or principal or Redemption Price due on any date with respect to particular Bonds shall, on and after such date and pending such payment, be set aside on its books and held in trust by it for the Owners of the Bonds entitled thereto.

Section 13.04. Preservation and Inspection of Documents. All documents received by the Trustee under the provisions of this Amended and Restated Master Resolution shall be retained in its possession and shall be subject at all reasonable times upon reasonable notice to the inspection of the Authority, National and any Bondowner and their agents and their representatives, any of whom may make copies thereof at the expense of the party so requesting.

Section 13.05. Failure to Present Bonds. Anything in this Amended and Restated Master Resolution to the contrary notwithstanding, any money held by a Fiduciary in trust for the payment and discharge of any of the Bonds which remain unclaimed for such period of time, after the date when such Bonds have become due and payable, either at their stated maturity dates or by call for earlier redemption, that the Owner thereof shall no longer be able to enforce the payment thereof, the Fiduciary shall at the written request of the Authority pay such money to the Authority as its absolute property and free from trust, and the Fiduciary shall thereupon be released and discharged with respect thereto and the Bondowners shall look only to the Authority for the payment of such Bonds; provided, however, that before being required to make any such payment to the Authority, the Fiduciary shall, at the expense of the Authority, cause to be mailed to the Owners of the Bonds entitled to such money, a notice that such money remains unclaimed and that, after a date named in said notice, which date shall be not less than 30 days after the date of the mailing of such notice, the balance of such money then unclaimed will be returned to the Authority.

Section 13.06. Filing of Security Instruments. The Trustee hereby covenants that it will cause to be filed all documents, security instruments and financing statements as it may reasonably deem necessary to protect and maintain in force the lien and pledge of, and the security interests created by, this Amended and Restated Master Resolution. Copies of this Amended and Restated Master Resolution, any Supplemental Resolution, and any other instrument by which a pledge of revenues, money, or funds is created shall be filed or recorded with the Authority.

Section 13.07. Authorized Authority Representative. The Authority shall appoint, by delivering a written certificate to the Trustee, an Authorized Authority Representative for purposes of taking action pursuant to this Amended and Restated Master Resolution and each Supplemental Resolution and, in the same manner, may appoint one or more alternate Authorized Authority Representatives to act in the absence of action by the Authorized Authority Representative, whose actions shall, for all purposes hereof, be effective to the same degree as actions by the Authorized Authority Representative.

Section 13.08. Parties Interested Herein. Nothing in this Amended and Restated Master Resolution or any Supplemental Resolution expressed or implied is intended or shall be construed to confer upon, or to give to, any person, other than the Authority, the Trustee, National, any Liquidity Providers, any counterparty to a Related Financial Transaction and the Owners of the Bonds, any right, remedy or claim under or by reason of this Amended and Restated Master Resolution or any Supplemental Resolution or any covenant, condition or stipulation hereof or thereof; and all the covenants, stipulations, promises and agreements in this Amended and Restated Master Resolution and each Supplemental Resolution contained by and on behalf of the Authority shall be for the sole and exclusive benefit of the Authority, the Trustee, National, any Liquidity Providers, any counterparty to a Related Financial Transaction and the Owners of the Bonds thereunto appertaining.

Section 13.09. No Recourse on the Bonds. No recourse shall be had for the payment of the principal or Redemption Price of or interest on the Bonds or for any claim based thereon or for any other obligation under this Amended and Restated Master Resolution or on any Supplemental Resolution against any officer or employee of the Authority or any person executing the Bonds.

Section 13.10. No Individual Liability. No covenant or agreement contained in the Bonds, this Amended and Restated Master Resolution or any Supplemental Resolution shall be deemed to be the covenant or agreement of any member of the Board or any officer, agent, employee or representative of the Authority, and neither the officers, agents, employees or representatives of the Authority nor any person executing the Bonds shall be personally liable thereon or be subject to any personal liability or accountability by reason of the issuance thereof, whether by virtue or any constitutional provision, statute or rule of law, or by the enforcement of any assessment or penalty, or otherwise, all such liability being expressly released and waived as a condition of and in consideration for the execution of this Amended and Restated Master Resolution, any Supplemental Resolution and the issuance of the Bonds.

Section 13.11. Master Resolution and Supplemental Resolutions to Constitute Contracts. In consideration of the purchase and acceptance of any and all of the Bonds authorized to be issued hereunder by those who shall hold the same from time to time, this Amended and Restated Master Resolution and each Supplemental Resolution shall be deemed to be and shall constitute a contract among the Authority, the Trustee and the Owners of the Bonds; and the pledge made in this Amended and Restated Master Resolution and the covenants and agreements herein and therein set forth to be performed by or on behalf of the Authority shall be for the equal benefit, protection and security of the Owners of any and all of the Bonds, all of which, regardless of the time or times of their authentication and delivery or maturity, shall be of equal rank within preference, priority or distinction of any of the Bonds over any other thereof, except as otherwise provided in or permitted by this Amended and Restated Master Resolution or Supplemental Resolution.

Section 13.12. Notice. Any notice, demand, direction, request, or other instrument authorized or required by this Amended and Restated Master Resolution to be given to or filed with the Authority, National or the Trustee shall be deemed to have been given only upon receipt. Any notice shall be sent by registered or certified mail, postage prepaid, to the address specified below or, to such other address as may be designated in writing by the parties:

If to the Authority: E-470 Public Highway Authority
22470 East Stephen D. Hogan Parkway
Suite 100
Aurora, CO 80018
Attention: Executive Director

If to the Trustee: U.S. Bank National Association
950 Seventeenth Street
Denver, CO 80202
Attention: Corporate Trust Services

If to National: National Public Finance Guarantee Corporation
1 Manhattanville Road
Suite 301
Purchase, NY 10577
Attention: Portfolio Surveillance – East

Section 13.13. Governing Law. This Amended and Restated Master Resolution and each Supplemental Resolution shall be governed in all respects, including validity, interpretation and effect, by, and shall be enforceable in accordance with, the laws of the State.

Section 13.14. Severability of Invalid Provisions. If any one or more of the covenants or agreements provided in this Amended and Restated Master Resolution or any Supplemental Resolution on the part of the Authority or the Trustee to be performed shall be contrary to law, then such covenant or covenants or agreement or agreements shall be deemed severable from the remaining covenants and agreements, and shall in no way affect the validity of the other provisions of this Amended and Restated Master Resolution or any Supplemental Resolution.

Section 13.15. Successors. Whenever in this Amended and Restated Master Resolution or any Supplemental Resolution the Authority is named or referred to, it shall be deemed to include any board, body, commission, authority, county, department or instrumentality of the State succeeding to the principal functions and powers of the Authority, and all the covenants and agreements in this Amended and Restated Master Resolution and each Supplemental Resolution by or on behalf of the Authority shall bind and inure to the benefit of said successor whether so expressed or not.

Section 13.16. Holidays. If the date for making any payment or the last date for performance of any act or the exercising of any right, as provided in this Amended and Restated Master Resolution, shall not be a Business Day, such payment may be made or act performed or right exercised on the next succeeding Business Day, with the same force and effect as if done on the nominal date provided in this Amended and Restated Master Resolution, and no interest shall accrue for the period after such nominal date.

Section 13.17. Execution in Several Counterparts. This Amended and Restated Master Resolution may be simultaneously executed in several counterparts, all of which shall constitute one and the same instrument and each of which shall be, and shall be deemed to be, an original.

Section 13.18. Effective Date. This Amended and Restated Master Resolution shall be effective upon the adoption hereof.

Section 13.19. Balances in Certain Funds and Accounts. All amounts remaining on deposit in the Funds and Accounts after the principal or Redemption Price of and interest due or to become due on the Bonds has been paid or deemed to have been paid pursuant to Article XIII hereof shall be delivered to the Authority.

Section 13.20. Conflicts Among Resolutions. Notwithstanding any other provision of this Amended and Restated Master Resolution other than Section 13.25 hereof or any provision of any Supplemental Resolution, if any provision of any of this Amended and Restated Master Resolution or any Supplemental Resolution conflicts with any provision of any of the other of such resolutions, the provisions of such resolutions shall control in the following order of priority: first, such Supplemental Resolutions in reverse order of the dates on which they were adopted (with the ones most recently adopted being given priority); and second, this Amended and Restated Master Resolution; provided, however, that nothing in this Section shall be construed to permit the adoption of a Supplemental Resolution that does not meet the conditions for adoption set forth in Article X hereof.

Section 13.21. Rights of Owners of Parity Obligations. Except as provided in Section 8.04(d) hereof or except as the rights granted to the owners of Parity Obligations by this Section may be limited by the Parity Obligation Instrument authorizing such Parity Obligations, so long as any Parity Obligations are Outstanding, (i) the owners of Parity Obligations shall have the same rights as Owners of Bonds hereunder; (ii) Parity Obligations shall be included in determining whether any rights of Owners of Bonds have been or may be exercised hereunder; and (iii) this Amended and Restated Master Resolution may not be amended or supplemented unless the Trustee receives an opinion of Bond Counsel that such amendment or supplement does not adversely affect the security provided hereunder for the payment of such Parity Obligations or the exclusion of the interest thereon from gross income for federal income tax purposes.

Section 13.22. Form of Requisition. Whenever any provision of this Amended and Restated Master Resolution or any Supplemental Resolution requires a payment to be made or transfer to be made from any Fund or Account, such payment or transfer may be authorized by a requisition in the form or Exhibit A hereto, signed by an Authorized Authority Representative.

Section 13.23. Authorization of Officers. The officers of the Authority are hereby authorized and directed to take all action in conformity with this Amended and Restated Master Resolution, the PHA Law, the Constitution and other laws of the State necessary or reasonably required to effectuate the issuance of the Bonds and for carrying out, giving effect to and consummating the transactions contemplated by this Amended and Restated Master Resolution.

Section 13.24. Agreement of State Not to Limit or Alter Rights of Obligees. The PHA Law provides that the State pledges and agrees with the holders of any bonds issued under the authority of the PHA Law, including without limitation any Bondowners and any beneficial owners (as such term is used in Section 3.13 hereof) of all Bonds issued hereunder, that the State will not limit, alter, restrict or impair the rights vested in any authority created under the PHA Law or the rights or obligations of any person with which it contracts to fulfill the terms of any agreements made pursuant to the PHA Law; that the State will not in any way impair the rights or remedies of the holders of any bonds of any authority created under the PHA Law until such bonds have been paid or until adequate provision for payment has been made; and that such provisions may be included in any such bonds. The Authority acknowledges that the Bondowners and any such beneficial owners have relied and are relying upon such pledge of the State in purchasing the Bonds.

Section 13.25. Certain Rights of National. Notwithstanding any other provision hereof:

(a) Each owner of an MBIA Insured Bond by virtue of its purchase of such MBIA Insured Bond is hereby deemed to have granted the rights and privileges described in this subsection to National as a condition to, and in consideration for, MBIA's issuance and delivery of the MBIA Insurance Policy. National shall be and is hereby deemed to be the Owner of all Outstanding MBIA Insured Bonds for all purposes (other than the receipt of payments on non-defaulted Bonds), including, without limitation, for purposes of giving consents, exercising rights and directing remedies on behalf of Owners of MBIA Insured Bonds, and shall have the unimpeded right to direct all remedies available to Owners of MBIA Insured Bonds following the occurrence of an Event of Default.

(b) If MBIA or National pays the principal or interest due on an MBIA Insured Bond, such Bond shall be deemed to be Outstanding until National has been reimbursed for the amount so paid by it or by MBIA, National shall be subrogated to all rights of the record Owner of such Bond and National shall be entitled to all payments due on such Bond from the same sources and on the same priority as if the principal and interest had not been paid by it or by MBIA.

(c) National shall be a third-party beneficiary of all provisions of this Amended and Restated Master Resolution and any Supplemental Resolution. All provisions of this Amended and Restated Master Resolution and any Supplemental Resolution that benefit Owners of MBIA Insured Bonds, including, but not limited to, all representations, covenants and warranties intended for the benefit of MBIA Insured Bonds shall be construed to be for the benefit of National.

(d) Unless National consents in writing (which consent may be given or withheld in the sole discretion of National), (i) no Senior Bonds shall bear interest at a variable interest rate; (ii) none of the Authority, the Trustee or any other Person acting on behalf of either of them shall execute or enter into any Related Financial Transaction, provided that the consent of National shall not be required for the issuance of inverse floating rate securities or a derivative transaction with the same effect so long as (A) the obligations of the Authority remain limited to payment of a fixed amount of interest on principal and (B) MBIA's obligations under the MBIA Insurance Policy are not directly or indirectly modified or extended beyond the principal and fixed interest payable by the Authority with respect to the MBIA Insured Bonds in the form in which the MBIA Insured Bonds were originally issued; and (iii) none of the Authority, the Trustee or any other Person acting on behalf of either of them shall voluntarily terminate a Related Financial Transaction.

(e) The Trustee shall give National and S&P written notice prior to the effective date of any amendment to the Amended and Restated Master Resolution or the First Supplemental Resolution or the adoption of any other Supplemental Resolution, which notices shall include a copy of the proposed amendment or Supplemental Resolution in the most recent available form.

(f) If any of the MBIA Insured Bonds are defeased through an advance refunding, in addition to the requirements set forth in Section 13.01 hereof, (i) the defeasance escrow for the MBIA Insured Bonds shall not, without the written consent of National, include a forward supply agreement or float contract; (ii) National shall receive a copy of a defeasance opinion from Bond Counsel in form and substance acceptable to National; (iii) National shall receive the final debt service schedule on the issue within three Business Days from the sale date; (iv) National shall receive at least ten days in advance of closing draft copies of the escrow securities, purchase contracts of SLG subscription forms or open market confirmations; (v) National shall receive a draft opinion at least ten days in advance of closing from Bond Counsel in form and substance acceptable to National to the effect that the refunding bonds are being issued in compliance with state law and that the interest on the refunding bonds is excluded from gross income for federal income tax purposes; (vi) National shall receive at least five business days prior to closing a draft opinion from Bond Counsel stating that the refunded bonds have been legally defeased; (vii) National shall receive final executed copies of the items required by clauses (v) and (vi) above via overnight mail prior to closing; and (viii) the escrow agreement and a verification report from an Independent Certified Public Accounting Firm must be delivered to National and must be in form and substance acceptable to National at least ten days in advance of closing, the provider of such verification report to be reviewed by National on a transaction by transaction basis.

(g) None of the following shall be effective without the prior written consent of National:

(i) any amendment to any of the following provisions of this Amended and Restated Master Resolution: the definitions of National, MBIA, MBIA Insurance Policy and MBIA Insured Bonds, Authority Bonds, Bonds, Bond Obligation, Debt Service, Debt Service Reserve Fund, Defeasance Investment Securities, Investment Securities, Net Revenues, Operating Expenses, Revenues, Trust Estate, and any definitions used in such definitions or in the Articles and Sections listed below for purposes of such Articles and Sections; Articles V, VI, VIII, X, XI and Article IV (to the extent that any amendments are made to provide for the privilege of purchase by the Authority of the Bonds of a Series in lieu of redemption) hereof; and Sections 2.01(b), 3.02, 7.18, 12.02 and 13.26 hereof; Section 13.01 hereof as applied to MBIA Insured Bonds; this Section; and any other provision hereof that expressly grants rights to National; or

(ii) any amendment to any other provision of this Amended and Restated Master Resolution or any of the Prior Supplemental Resolutions, or the adoption of another Supplemental Resolution, unless National has received a copy of such amendment or Supplemental Resolution and an opinion of Bond Counsel, in form and substance reasonably satisfactory to National, stating that either (A) such amendment or Supplemental Resolution does not materially limit the rights of the Owners of the MBIA Insured Bonds or National, or materially expand the rights of the Owners of other Bonds, with respect to the Revenues, the Senior Bonds Debt Service Account, the 1997 Senior Bonds Capitalized Interest Subaccount, the 2000 Senior Bonds Capitalized Interest Subaccount or the Senior Bonds Debt Service Reserve Account under this Amended and Restated Master Resolution or any of the Prior Supplemental Resolutions, or any other Supplemental Resolution, as in effect immediately prior to the effective date of such amendment or Supplemental Resolution, or (B) such amendment or Supplemental Resolution does not materially adversely affect the security for the payment of the MBIA Insured Bonds, or the rights of the Owners of the MBIA Insured Bonds or National, under this Amended and Restated Master Resolution or any of the Prior Supplemental Resolutions, or any other Supplemental

Resolution, as in effect immediately prior to effective date of such amendment or Supplemental Resolution.

(h) Any notice required to be given to any Person pursuant to this Amended and Restated Master Resolution or any Supplemental Resolution must also be given, in the same manner and at the same time, to National Public Finance Guarantee Corporation, 1 Manhattanville Road, Suite 301, Purchase, New York 10577, Attention: Portfolio Surveillance – East.

(i) Whenever National is to receive any notice or other document hereunder, such notice or document shall also be delivered to S&P; and whenever National is to consent to any event or document hereunder, such consent shall not be deemed to be effective until the Trustee has received evidence, satisfactory to the Trustee, that such event or document will not, by itself, result in a withdrawal of or reduction in S&P's Rating of the MBIA Insured Bonds.

(j) No successor Trustee may be appointed pursuant to Section 9.09 hereof without the prior written consent of National, which consent shall not be unreasonably withheld.

(k) In the event of any conflict between this Section and any other provision of this Amended and Restated Master Resolution or any Supplemental Resolution, this Section shall control.

(l) Notwithstanding any other provision hereof, National at any time may waive any or all of the provisions of this Section, permanently or with respect to one or more transactions or events or for any period of time, by delivering a written notice to the Authority and the Trustee.

Section 13.26. Payments Under MBIA Insurance Policies.

(a) If, as of the second day next preceding any date on which payment of principal, Accreted Value or Maturity Value of or interest on any MBIA Insured Bond is due, the amount on deposit and available therefor in the appropriate Account of the Debt Service Fund, when combined with amounts scheduled to be paid on such day or on the immediately succeeding day on Investment Securities held in such Account, is not sufficient to pay all principal, Accreted Value, Maturity Value and interest coming due on such Bond on the next succeeding payment date, the Trustee shall immediately notify National or its designee by telephone or telegraph, confirmed in writing by registered or certified mail, of the amount of the deficiency.

(b) If the deficiency is made up in whole or in part prior to or on the date on which such payment is due, the Trustee shall so notify National or its designee.

(c) In addition, if the Trustee has notice that any of the Owners of the MBIA Insured Bonds have been required to disgorge payments of principal, Accreted Value or Maturity Value of or interest on MBIA Insured Bonds to the Authority or to the trustee in bankruptcy for creditors or others pursuant to a final judgment by a court of competent jurisdiction that such payment constitutes a voidable preference to such Owners within the meaning of any applicable bankruptcy laws, then the Trustee shall notify National or its designee of such fact by telephone or telegraphic notice, confirmed in writing by registered or certified mail.

(d) The Trustee is hereby irrevocably designated, appointed, directed and authorized to act as attorney-in-fact for the Owners of the MBIA Insured Bonds as follows:

> (i) if and to the extent there is a deficiency in amounts required to pay interest on the MBIA Insured Bonds, the Trustee shall (A) execute and deliver to U.S. Bank Trust National Association, or its successors under the MBIA Insurance Policy (the "Insurance Paying Agent"), in form satisfactory to the Insurance Paying Agent, an instrument appointing National as agent for the Owners of such Bonds in any legal proceeding related to the payment of such interest and an assignment to National of the claims for interest to which such deficiency relates and which are paid by MBIA or National, (B) receive as designee of the Owners of such Bonds (and not as Trustee) in accordance with the tenor of the MBIA Insurance Policy payment from the Insurance Paying Agent with respect to the claims for interest so assigned and (C) disburse the same to the Owners of such Bonds; and
>
> (ii) if and to the extent of a deficiency in amounts required to pay principal, Accreted Value or Maturity Value of the MBIA Insured Bonds, the Trustee shall (A) execute and deliver to the Insurance Paying Agent in form satisfactory to the Insurance Paying Agent an instrument appointing National as agent for the Owners of such Bonds in any legal proceeding relating to the payment of such principal, Accreted Value or Maturity Value and an assignment to National of any of the Insured Bonds surrendered to the Insurance Paying Agent of so much of the principal amount, Accreted Value or Maturity Value thereof as has not previously been paid or for which moneys are not held by the Trustee and available for such payment (but such assignment shall be delivered only if payment from the Insurance Paying Agent is received), (B) receive as designee of the Owners of such Bonds (and not as Trustee) in accordance with the tenor of the MBIA Insurance Policy payment therefor from the Insurance Paying Agent and (C) disburse the same to the Owners of such Bonds.

(e) MBIA Insured Bonds paid by MBIA or National shall be construed to be "Outstanding" and shall not be deemed paid, satisfied, redeemed, refunded, retired or discharged for purposes of this Amended and Restated Master Resolution and any Supplemental Resolution. Payments with respect to claims for interest on and principal, Accreted Value or Maturity Value of MBIA Insured Bonds disbursed by the Trustee from proceeds of the MBIA Insurance Policy shall not be considered to discharge the obligation of the Authority with respect to such MBIA Insured Bonds, and National shall become the owner of such unpaid Bond and claims for interest in accordance with the tenor of the assignment made to it under the provisions of this subsection or otherwise.

(f) Irrespective of whether any such assignment is executed and delivered, the Authority and the Trustee hereby agree for the benefit of National that:

(i) they recognize that to the extent MBIA or National makes payments, directly or indirectly (as by paying through the Trustee), on account of principal, Accreted Value or Maturity Value of or interest on the MBIA Insured Bonds, National will be subrogated to the rights of the Owners of such Bonds to receive the amount of such principal, Accreted Value or Maturity Value and interest, with interest thereon as provided and solely from the sources stated in this Amended and Restated Master Resolution and any Supplemental Resolution and the MBIA Insured Bonds; and

(ii) they will accordingly pay to National the amount of such principal and interest (including principal, Accreted Value, Maturity Value and interest recovered under subparagraph (ii) of the first paragraph of the MBIA Insurance Policy, which principal and interest shall be deemed past due and not to have been paid), with interest thereon as provided in this Amended and Restated Master Resolution and any Supplemental Resolution and the Bonds but only from the sources and in the manner provided in this subsection for the payment of principal, Accreted Value or Maturity Value of and interest on the MBIA Insured Bonds to Owners thereof and will otherwise treat National as the owner of such rights to the amount of such principal, Accreted Value, Maturity Value and interest.

(g) In connection with the issuance of additional Bonds or Parity Obligations secured on a parity with the MBIA Insured Bonds, if any, the Authority shall deliver to National a copy of the disclosure document, if any, circulated with respect to such additional Bonds or Parity Obligations.

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PASSED BY THE BOARD OF DIRECTORS OF THE E-470 PUBLIC HIGHWAY AUTHORITY on May 14, 2020.

E-470 PUBLIC HIGHWAY AUTHORITY

By ______________________________
Chairperson

(SEAL)

[Signature Page to Amended and Restated Master Bond Resolution]

EXHIBIT A

FORM OF REQUISITION

[*Omitted for the form of Amended and Restated Master Bond Resolution appended to this Official Statement*]

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FORM OF

E-470 PUBLIC HIGHWAY AUTHORITY

SERIES 2020A SUPPLEMENTAL BOND RESOLUTION

authorizing

E-470 Public Highway Authority Senior Revenue Bonds

Series 2020A

A RESOLUTION AUTHORIZING THE ISSUANCE OF THE E-470 PUBLIC HIGHWAY AUTHORITY SENIOR REVENUE BONDS, SERIES 2020A, FOR THE PURPOSE OF REFUNDING THE AUTHORITY'S OUTSTANDING SENIOR REVENUE BONDS, SERIES 2004B AND SERIES 2010C; PROVIDING FOR CERTAIN AMENDMENTS TO THE AMENDED AND RESTATED MASTER BOND RESOLUTION AND THE FIRST SUPPLEMENTAL RESOLUTION AND TO CERTAIN RELATED INTEREST RATE SWAP AGREEMENTS; PROVIDING VARIOUS COVENANTS, AGREEMENTS AND OTHER DETAILS RELATING THERETO; PROVIDING OTHER MATTERS RELATING THERETO; RATIFYING ACTION PREVIOUSLY TAKEN AND RELATING THERETO; AND PROVIDING THE EFFECTIVE DATE HEREOF.

RECITALS

WHEREAS, Capitalized terms used herein, but not defined in this 2020A Supplemental Resolution (the "2020A Supplemental Resolution"), have the meaning assigned to them in the Amended and Restated Master Resolution (as defined herein).

WHEREAS, the Board of Directors (the "Board") of the E-470 Public Highway Authority ("Authority") has previously adopted the Original Master Resolution authorizing the issuance of the First Supplemental Resolution authorizing the issuance of the 1997 Bonds, the Second Supplemental Resolution authorizing the issuance of the 2000 Bonds, the Third Supplemental Resolution authorizing the issuance of the 2001 Bonds, the Fourth Supplemental Resolution authorizing the issuance of the 2004 Bonds, the Fifth Supplemental Resolution authorizing the issuance of the 2006 Bonds, the Sixth Supplemental Resolution authorizing the issuance of the 2007 Bonds, the Seventh Supplemental Resolution authorizing a conversion of the interest rate modes on the 2007 Bonds and creating subseries thereof, the Eighth Supplemental Resolution authorizing a conversion of the interest rate modes on the 2001 Bonds, the Ninth Supplemental Resolution authorizing the issuance of the 2010 Bonds, the Tenth Supplemental Resolution authorizing the issuance of the 2011 Bonds, the Eleventh Supplemental Resolution authorizing the division of certain of the 2007 Bonds into subseries, the conversion of the interest rate modes on certain of the 2007 Bonds and the combination of the 2007 Bonds for which the interest rate modes were converted into a new Series 2007CD-2, the Twelfth Supplemental Resolution authorizing the issuance of the 2014A Bonds, the Thirteenth Supplemental Resolution making certain amendments to the Prior Master Resolution, the Fourteenth Supplemental Resolution authorizing the issuance of the 2015A Bonds, the Fifteenth Supplemental Resolution authorizing the issuance of the 2017 Bonds, and the Sixteenth Supplemental Resolution authorizing the issuance of the 2019A Bonds; and

WHEREAS, this 2020A Supplemental Resolution is a Supplemental Resolution adopted for the purposes of: (a) authorizing the issuance of a Series of Bonds to be designated the "E-470 Public Highway Authority Senior Revenue Bonds, Series 2020A" (the "2020A Bonds"); and (b) making amendments to certain provisions of the Amended and Restated Master Resolution and the First Supplemental Resolution in connection with the foregoing; and

WHEREAS, the 2020A Bonds are being authorized for the purpose of refunding all or a portion of the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2004B (Callable Capital Appreciation Bonds) (the "2004B Bonds") and E-470 Public Highway Authority Senior Revenue Bonds, Series 2010C (Current Interest Bonds) (the "2010C Bonds," and collectively with the 2004B Bonds, as further defined herein, the "Refunded Bonds"); and

WHEREAS, the 2020A Bonds are being issued in accordance with the provisions for the issuance of Authority Bonds set forth in Section 3.02 of the Amended and Restated Master Resolution; and

WHEREAS, the conditions precedent to the issuance of the 2020A Bonds contained in Section 3.02 of the Amended and Restated Master Resolution, as so amended, will, prior to the issuance of the 2020A Bonds, be satisfied; and

WHEREAS, MBIA (as defined in the Master Resolution) insures the payment of the principal of and interest when due on certain of the Bonds (as defined in the Master Resolution) pursuant to certain financial guaranty insurance policies (the "Policies"); and

WHEREAS, National Public Finance Guarantee Corporation ("National") is the Administrator for MBIA pursuant to the Administrative Services Agreement dated as of February 17, 2009, between MBIA and MBIA Insurance Corp. of Illinois, now known as National; and

WHEREAS, pursuant to such agreement and the Amended and Restated Master Resolution, all rights granted to MBIA by the Amended and Restated Master Resolution, any Supplemental Resolution or any related document have been ceded by MBIA to National, including, without limitation, the right to be deemed the Owner of all Bonds secured by a Credit Facility issued by MBIA and all rights to consent to, approve or receive notice of any action taken or to be taken under or with respect to the Amended and Restated Master Resolution, any Supplemental Resolution or any such related document, and therefore, all references to any exercise of rights by MBIA for all purposes of this 2020A Supplemental Resolution, the Outstanding Bonds and the 2020A Bonds shall be deemed to refer to National; and

WHEREAS, Section 3.02(c) of the Amended and Restated Master Resolution contains various conditions that must be met in connection with the issuance of the 2020A Bonds; and

WHEREAS, in accordance with the "provided that" clause at the end of Section 3.02(c)(iii) of the Amended and Restated Master Resolution, the conditions contained in Section 3.02(c) of the Amended and Restated Master Resolution applicable to the issuance of the 2020A Bonds may be met by the written consent of National to the issuance of the 2020A Bonds; and

WHEREAS, the 2020A Bonds will not be issued until the Trustee and the Authority have received the written consent of National to the issuance of the 2020A Bonds; and

WHEREAS, pursuant to Article X of the Amended and Restated Master Resolution, the Authority may adopt and execute a Supplemental Resolution to authorize Authority Bonds of any Series and, in connection therewith, to specify and determine the matters and things referred to in Article III of the Amended and Restated Master Resolution and also any other matters and things relative to such Bonds which are not in conflict with the Amended and Restated Master Resolution as theretofore in effect and to designate Paying Agents, Registrars and other Fiduciaries for the Bonds of any Series, which Supplemental Resolution shall be fully effective in accordance with its terms in accordance with and subject to the provisions of Article XI of the Amended and Restated Master Resolution; and

WHEREAS, this 2020A Supplemental Resolution will not be effective until the Authority has filed with the Trustee a copy of this 2020A Supplemental Resolution, certified by an officer of the Authority, accompanied by an opinion of Bond Counsel, in form and substance satisfactory to the Trustee and National, stating that this 2020A Supplemental Resolution has been duly and lawfully adopted in accordance with the provisions of the Amended and Restated Master Resolution, is authorized or permitted by the Amended and Restated Master Resolution, is valid and binding upon the Authority and will not adversely affect the exclusion from gross income for federal income tax purposes of any interest on the Bonds; and

WHEREAS, in connection with the issuance of the 2020A Bonds and the related transactions described above, the Authority desires to make certain amendments to the Amended and Restated Master Resolution and the First Supplemental Resolution; and

WHEREAS, pursuant to Article XI of the Amended and Restated Master Resolution, any modification or amendment of the Amended and Restated Master Resolution or any Supplemental Resolution and of the rights and obligations of the Authority and of the Owners of the Bonds, in any particular, may be made by a Supplemental Resolution and the satisfaction of the following conditions:

(a) the filing with the Trustee of written consents to such Supplemental Resolution (i) by the Owners of at least 66% of the Bond Obligation represented by the Bonds that will be Outstanding as of the effective date of such modification or amendment and (ii) in case less than all of the several Tiers of Bonds Outstanding are affected by the modification or amendment, by the Owners of at least 66% of the Bond Obligation represented by the Bonds of each Tier so affected and Outstanding as of the effective date of such modification or amendment;

(b) the filing with the Trustee of an opinion of Bond Counsel, in form and substance satisfactory to the Trustee and National, stating that such Supplemental Resolution has been duly and lawfully adopted in accordance with the provisions of the Amended and Restated Master Resolution, is authorized or permitted by the Amended and Restated Master Resolution, is valid and binding upon the Authority and will not adversely affect the exclusion from gross income for federal income tax purposes of any interest on the Bonds; and

(c) the commencement of the tenth day following the filing with the Trustee of proof that a notice has been delivered to EMMA stating in substance that such Supplemental Resolution (which may be referred to as a Supplemental Resolution adopted by the Authority on a stated date, a copy of which is on file with the Trustee) has been consented to by the Owners of the required percentages of Bonds and will be effective upon the satisfaction of the conditions described in this recital; and

WHEREAS, it shall be a condition to the effectiveness of the amendments made by this 2020A Supplemental Resolution to the Amended and Restated Master Resolution and the First Supplemental Resolution that the above-described conditions set forth in Article XI of the Amended and Restated Master Resolution have been satisfied; and

WHEREAS, Section 13.25 of the Amended and Restated Master Resolution provides that National shall be deemed to be the Owner of all Bonds secured by a Credit Facility issued by National; and

WHEREAS, as of the effective date of the amendments to be made to the Amended and Restated Master Resolution and the First Supplemental Resolution are to be effective, MBIA will insure at least 66% of the Bond Obligation represented by the Outstanding Bonds pursuant to the Credit Facilities (the Senior Bonds being the only Tier of Bonds Outstanding as of the date of adoption hereof); and

WHEREAS, pursuant to Section 13.25(g) of the Amended and Restated Master Resolution, certain amendments to the Amended and Restated Master Resolution and the First Supplemental Resolution made by this 2020A Supplemental Resolution are not effective without the prior written consent of National, in its individual capacity; and

WHEREAS, pursuant to Part 4(g)(ii) of the Schedule included in the 2007 JPM Swap, certain amendments to the Amended and Restated Master Resolution and the First Supplemental Resolution made by this 2020A Supplemental Resolution are not effective without the prior written consent of JPMorgan Chase Bank N.A. ("JPMorgan Chase"); and

WHEREAS, pursuant to Part 4(g)(ii) of the Schedule included in the 2007 MSCS Swap, certain amendments to the Amended and Restated Master Resolution and the First Supplemental Resolution made by this 2020A Supplemental Resolution are not effective without the prior written consent of Morgan Stanley Capital Services Inc. ("MSCS"); and

WHEREAS, the amendments to the Amended and Restated Master Resolution and the First Supplemental Resolution made by this 2020A Supplemental Resolution will not be effective until the Trustee and the Authority have received the written consent of National, MSCS and JPMorgan Chase to such amendments; and

WHEREAS, it is anticipated that National will, prior to the effectiveness of this 2020A Supplemental Resolution, consent to this 2020A Supplemental Resolution, including the amendments to the Amended and Restated Master Resolution and the First Supplemental Resolution made hereby, such consent to be given in both (a) its individual capacity and (b) its capacity as deemed Owner of (i) at least 66% of the Bond Obligation represented by the Bonds Outstanding (the Senior Bonds being the only Tier of Bonds Outstanding as of the date of adoption hereof); and

WHEREAS, it is anticipated that each of JPMorgan Chase and MSCS will, prior to the effectiveness of this 2020A Supplemental Resolution, consent to the amendments to the Amended and Restated Master Resolution and the First Supplemental Resolution made by this 2020A Supplemental Resolution; and

WHEREAS, it is hereby determined that all conditions to the adoption of this 2020A Supplemental Resolution by the Authority have been satisfied and that this 2020A Supplemental Resolution shall be effective as described in the Section hereof entitled "Effective Date."

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE E-470 PUBLIC HIGHWAY AUTHORITY:

ARTICLE I

AUTHORITY, DEFINITIONS AND OTHER INTERPRETATIVE MATTERS

Section 1.01. Authority. This 2020A Supplemental Resolution and issuance of the 2020A Bonds are authorized by the Acts and the Amended and Restated Master Resolution (both as defined in Section 1.03 hereof). The Authority hereby elects to apply the provisions of the Supplemental Public Securities Act to the 2020A Bonds and designates this 2020A Supplemental Resolution as an "act of issuance" within the meaning of the Supplemental Public Securities Act.

Section 1.02. Interpretation and Construction. For purposes of this 2020A Supplemental Resolution, except as otherwise expressly provided or unless the context otherwise requires:

(a) All references in this 2020A Supplemental Resolution designated "Articles," "Sections," "subsections," "paragraphs," "clauses" and other subdivisions are to the designated Articles, Sections, Subsections, paragraphs, clauses and other subdivisions of this 2020A Supplemental Resolution. The words "herein," "hereof," "hereto," "hereby," "hereunder" and other words of similar import refer to this 2020A Supplemental Resolution as a whole and not to any particular Article, Section, Subsection or other subdivision.

(b) The terms defined in Section 1.03 hereof have the meanings assigned to them in that Section and include the plural as well as the singular.

(c) All the accounting terms not otherwise defined herein have the meanings assigned to them in accordance with generally accepted accounting principles as in effect from time to time.

(d) The term "money" includes any cash, check, deposit, investment security or other form in which any of the foregoing are held hereunder.

(e) Every "request," "order," "demand," "application," "appointment," "notice," "statement," "certificate," "consent" or similar action hereunder by the Authority, the Trustee, the Paying Agent, the Registrar, National, National, JPMorgan Chase, MSCS, or any other party to any instrument or agreement referred to herein shall, unless otherwise specifically provided, be in writing signed by an officer or other agent of such party authorized to sign the same.

(f) In the computation of a period of time from a specified date to a later specified date, the word "from" means "from and including" and each of the words "to" and "until" means "to but excluding."

This 2020A Supplemental Resolution and all terms and provisions hereof shall be liberally construed to effectuate the purposes set forth herein to sustain the validity of this 2020A Supplemental Resolution.

Section 1.03. Definitions. Terms defined in the Amended and Restated Master Resolution and the Prior Supplemental Resolutions shall have the meanings assigned to them in the Amended and Restated Master Resolution and the Prior Supplemental Resolutions, except that if any term is defined in more than one of the Amended and Restated Master Resolution or any of the Prior Supplemental Resolutions and this Section, the definition of such term in this Section shall control for purposes of this 2020A Supplemental Resolution, the definition in the First Supplemental Resolution shall control for purposes of the First Supplemental Resolution, the definition in the Second Supplemental Resolution shall control for purposes of the Second Supplemental Resolution, the definition in Third Supplemental Resolution shall control for purposes of the Third Supplemental Resolution, the definition in the Fourth Supplemental Resolution shall control for purposes of the Fourth Supplemental Resolution, the definition in the Fifth Supplemental Resolution shall control for purposes of the Fifth Supplemental Resolution, the definition in the Sixth Supplemental Resolution shall control for purposes of the Sixth Supplemental Resolution, the definition in the Seventh Supplemental Resolution shall control for purposes of the Seventh Supplemental Resolution, the definition in the Eighth Supplemental Resolution shall control for purposes of the Eighth Supplemental Resolution, the definition in the Ninth Supplemental Resolution shall control for purposes of the Ninth Supplemental Resolution, the definition in the Tenth Supplemental Resolution shall control for purposes of the Tenth Supplemental Resolution, the definition in the Eleventh Supplemental Resolution shall control for purposes of the Eleventh Supplemental Resolution, the definition in the Twelfth Supplemental Resolution shall control for purposes of the Twelfth Supplemental Resolution, the definition in the Thirteenth Supplemental Resolution shall control for purposes of the Thirteenth Supplemental Resolution, the definition in the Fourteenth Supplemental Resolution shall control for purposes of the Fourteenth Supplemental Resolution, the definition in the Fifteenth Supplemental Resolution shall control for the purposes of the Fifteenth Supplemental Resolution and the definition in the Sixteenth Supplemental Resolution shall control for the purposes of the Sixteenth Supplemental Resolution respectively. For purposes of this 2020A Supplemental Resolution, the following terms shall have the specified meanings:

"*Acts*" means, collectively, the Act, the Supplemental Public Securities Act and the Public Securities Refunding Act.

"*Amended and Restated Master Resolution*" means the Amended and Restated Master Bond Resolution adopted by the Board on May 14, 2020, as amended by this 2020A

Supplemental Resolution, and as it may be further amended from time to time in accordance with its terms.

"*Authorized Denomination*" means $5,000 in principal amount or any integral multiple thereof.

"*Bond Purchase Agreement*" means the 2020A Bond Purchase Agreement.

"*Continuing Disclosure Undertaking*" means the Continuing Disclosure Undertaking delivered by the Authority in connection with the issuance of the 2020A Bonds.

"*JPMorgan Chase*" is defined in the recitals hereto.

"*MSCS*" is defined in the recitals hereto.

"*Public Securities Refunding Act*" means the Public Securities Refunding Act, article 56 of title 11, Colorado Revised Statutes, as amended.

"*Refunded Bonds*" means those Outstanding 2004B Bonds and 2010C Bonds that are specified as being included in the Refunded Bonds in the Sale Certificate.

"*Sale Certificate*" means the certificate executed by the Sale Delegate under the authority delegated to him pursuant to Section 7.01 hereof.

"*Sale Delegate*" means the Director of Finance of the Authority or in the absence of the Director of Finance of the Authority, the Executive Director of the Authority.

"*Series 2020A Supplemental Bond Resolution*" means this Series 2020A Supplemental Bond Resolution, as it may be amended from time to time in accordance with its terms.

"*Supplemental Public Securities Act*" means the Supplemental Public Securities Act, part 2 of article 57 of title 11, Colorado Revised Statutes, as amended.

"*Tax Compliance Certificate*" means the Tax Compliance Certificate delivered by the Authority in connection with the issuance of the 2020A Bonds.

"*2004B Bonds*" is defined in the recitals hereto.

"*2010C Bonds*" is defined in the recitals hereto.

"*2020A Bonds*" is defined in Section 2.01 hereof.

"*2020A Bond Purchase Agreement*" means the Bond Purchase Agreement pursuant to which the 2020A Underwriters will agree to purchase the 2020A Bonds from the Authority.

"*2020A Escrow Agreement*" means the Series 2020A Escrow Agreement dated as of the date of issuance of the 2020A Bonds between the Authority and U.S. Bank National Association, as escrow agent.

"*2020A Escrow Account*" means the escrow account established pursuant to the Escrow Agreement for the defeasance of the Refunded Bonds.

"*2020A Underwriters*" means, collectively, J.P. Morgan Securities LLC, Morgan Stanley & Co. LLC and Jefferies LLC.

ARTICLE II

AUTHORIZATION AND PAYMENT OF 2020A BONDS

Section 2.01. Authorization of 2020A Bonds. There are hereby authorized to be issued and shall (unless otherwise provided in the Sale Certificate) be issued under and secured by the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, the "E-470 Public Highway Authority Senior Revenue Bonds, Series 2020A" (the "2020A Bonds").

Section 2.02. Security for 2020A Bonds; Time of Payment; Delivery of Trust Estate. The 2020A Bonds are Senior Bonds within the meaning of the Amended and Restated Master Resolution and are payable from and secured by the Trust Estate in accordance with the terms of the Amended and Restated Master Resolution and this 2020A Supplemental Resolution. In accordance with Section 43-4-509 of the Act and Section 11-57-208 of the Supplemental Public Securities Act, (a) the pledge of the Trust Estate pursuant to the Amended and Restated Master Resolution shall be valid and binding as of the time it is made; (b) the Trust Estate shall immediately be subject to the lien of such pledge without any physical delivery, filing or further act; (c) the lien of such pledge shall be valid, binding and enforceable against all parties having claims of any kind in tort, contract or otherwise against the Authority, irrespective of whether such claiming party has notice of such lien and irrespective of whether the Amended and Restated Master Resolution is filed or recorded; (d) the lien of such pledge and the obligation to perform the provisions of the Amended and Restated Master Resolution shall**,** except as otherwise provided herein or in the Amended and Restated Master Resolution, have priority over any and all other obligations and liabilities of the Authority; and (e) the creation, perfection, enforcement and priority of the pledge of the Trust Estate shall be governed by the Act, the Supplemental Public Securities Act and the Amended and Restated Master Resolution. Except as otherwise provided in the Amended and Restated Master Resolution or any Supplemental Resolution, the Trustee and the Paying Agent shall have a lien on the Trust Estate for the payment of their fees and expenses equal to the lien of the Owners.

Section 2.03. 2020A Bonds Details.

(a) The 2020A Bonds shall initially be issued in fully registered form in Authorized Denominations or any integral multiple thereof. The 2020A Bonds issued on the date on which the 2020A Bonds are first issued by the Authority shall be dated and shall bear interest from their date of issuance. Any 2020A Bond issued upon transfer or exchange of another 2020A Bond, as provided in Article III of the Amended and Restated Master Resolution, shall be dated as of the date of its authentication and shall bear interest from the Interest Payment Date next preceding its date of authentication, unless the date of authentication is an Interest Payment Date, in which case such 2020A Bond shall bear interest from such Interest Payment Date, or unless the date of authentication is prior to the first Interest Payment Date, in which case such 2020A Bond shall bear interest from its Date of Issuance.

(b) The aggregate principal amount of the 2020A Bonds shall be the amount set forth as such in the Sale Certificate.

(c) The 2020A Bonds shall mature on the date or dates set forth in the Sale Certificate and shall bear interest to their respective maturities at the rate or rates, computed on the basis of a 360 day year of twelve 30 day months, set forth in the Sale Certificate.

(d) The 2020A Bonds shall be subject to redemption prior to maturity as provided in Article III hereof and set forth in the Sale Certificate.

(e) The 2020A Bonds shall be issued as DTC Bonds.

Section 2.04. Form of 2020A Bonds. The 2020A Bonds shall be in substantially the form set forth in Exhibit A hereto, with such changes thereto, not inconsistent with the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, as may be necessary or desirable and approved by the officials of the Authority whose signatures appear thereon (and whose manual or facsimile signatures thereon shall constitute conclusive evidence of such approval). All statements set forth in the Bonds are hereby approved and adopted as statements of the Authority. Although attached as an exhibit hereto for the convenience of the reader, Exhibit A is an integral part of this 2020A Supplemental Resolution and is incorporated herein as if set forth in full in the body hereof.

Section 2.05. Payment of Principal, Redemption Price and Interest. The principal and Redemption Price of each 2020A Bond shall be payable by the Paying Agent to or upon the order of the Owner thereof upon presentation and surrender of such 2020A Bond at the principal corporate trust office of the Paying Agent. Interest on the 2020A Bonds shall be paid by the Paying Agent on each Interest Payment Date (i) by check or draft mailed on such date to the Owner thereof at such Owner's address as it appears on the Register on the Record Date for such Interest Payment Date, or (ii) by wire transfer in accordance with a written notice and completed wire instructions for a wire transfer address in the continental United States provided by the Owner thereof to the Paying Agent not less than 15 days prior to such Interest Payment Date (which notice may provide that it will remain in effect with respect to subsequent Interest Payment Dates unless and until changed or revoked by subsequent notice); provided that such wire transfer shall only be made for an Owner of $1,000,000 or more in aggregate principal amount of the 2020A Bonds as of the close of business on the Record Date for such Interest Payment Date.

Section 2.06. Execution and Authentication of 2020A Bonds. The 2020A Bonds shall be executed and authenticated as provided in the Amended and Restated Master Resolution.

Section 2.07. Purpose. The 2020A Bonds are being issued for the purpose of paying a portion of the costs of refunding the Refunded Bonds and for paying all or a portion of the Costs of Issuance related to the 2020A Bonds.

Section 2.08. Application of Proceeds of 2020A Bond Proceeds and other Authority Moneys.

(a) Proceeds from the sale of the 2020A Bonds shall be applied as follows:

(i) proceeds of the 2020A Bonds in the amount set forth in the Sale Certificate, shall be deposited in the 2020A Escrow Account for the payment of a portion of the Redemption Price of the Refunded Bonds; and

(ii) the remaining proceeds of the 2020A Bonds, in the amount set forth in the Sale Certificate, if any, shall be deposited to the Costs of Issuance Account of the Construction Fund and used to pay all or a portion of the Costs of Issuance of the 2020A Bonds set forth in the Sale Certificate.

(b) Moneys of the Authority currently on deposit in the General Surplus Account of the Surplus Fund, in the respective amounts set forth in the Sale Certificate, shall be, on the date of issuance of the 2020A Bonds: (i) deposited, together with an amount equal to the accrued interest on the Refunded Bonds to such date of issuance currently on deposit in the Senior Bonds Debt Service Account of the Debt Service Fund, into the 2020A Escrow Account to pay the remainder of the Redemption Price of the Refunded Bonds and (ii) if so provided in the Sale Certificate, used to pay the Costs of Issuance of the 2020A Bonds.

Section 2.09. Flow of Funds for the Payment of Principal, Redemption Price and Interest. No later than noon, New York City time, on each Interest Payment Date, on each Redemption Date and on the date of final maturity of each 2020A Bond, the Trustee shall provide to the Paying Agent from amounts deposited to the appropriate Account of the Debt Service Fund from time to time pursuant to the Amended and Restated Master Resolution, or to the extent required from such other Funds and Accounts available therefor under the Amended and Restated Master Resolution, immediately available funds sufficient to pay (a) the principal or Redemption Price, as applicable, of the 2020A Bonds then due, and (b) interest on the 2020A Bonds then due, and the Paying Agent shall thereupon pay such amounts to the Owners thereof as provided in Section 2.05 hereof.

ARTICLE III

OPTIONAL AND MANDATORY REDEMPTION

The optional and mandatory sinking fund redemption provisions, if any, with respect to the 2020A Bonds shall be set forth in the Sale Certificate.

ARTICLE IV

COVENANTS CONCERNING CERTAIN ACCOUNTS AND CERTAIN AGENTS

Section 4.01. Establishment of Debt Service Reserve Fund Requirement. The Debt Service Reserve Fund Requirement for the 2020A Bonds shall be as specified in Section 4.03 of the First Supplemental Resolution, as amended by Article VI hereof.

Section 4.02. Appointment of Certain Fiduciaries and Agents. U.S. Bank National Association is hereby appointed as the Paying Agent, Registrar and Authenticating Agent for the 2020A Bonds.

ARTICLE V

AMENDMENTS TO THE AMENDED AND RESTATED MASTER RESOLUTION

Section 5.01. New Definition. Section 1.01 of the Amended and Restated Master Resolution is hereby amended by adding the following new definitions:

> "*2020A Bonds*" means the E-470 Public Highway Authority Senior Revenue Bonds, Series 2020A, to the extent the same are issued by the Authority.

Section 5.02. Certain Rights of National. Section 13.25(g)(ii) of the Amended and Restated Master Resolution is hereby amended to read as follows:

> (ii) any amendment to any other provision of this Amended and Restated Master Resolution, any of the Prior Supplemental Resolutions, or the 2020A Supplemental Resolution, or the adoption of another Supplemental Resolution, unless National has received a copy of such amendment or Supplemental Resolution and an opinion of Bond Counsel, in form and substance reasonably satisfactory to National, stating that either (A) such amendment or Supplemental Resolution does not materially limit the rights of the Owners of the MBIA Insured Bonds or National, or materially expand the rights of the Owners of other Bonds, with respect to the Revenues, the Senior Bonds Debt Service Account, the 1997 Senior Bonds Capitalized Interest Subaccount, the 2000 Senior Bonds Capitalized Interest Subaccount or the Senior Bonds Debt Service Reserve Account under this Amended and Restated Master Resolution, any of the Prior Supplemental Resolutions, or the 2020A Supplemental Resolution, or any other Supplemental Resolution, as in effect immediately prior to the effective date of such amendment or Supplemental Resolution, or (B) such amendment or Supplemental Resolution does not materially adversely affect the security for the payment of the MBIA Insured Bonds, or the rights of the Owners of the MBIA Insured Bonds or National, under this Amended and Restated Master Resolution, any of the Prior Supplemental Resolutions, or the 2020A Supplemental Resolution or any other Supplemental Resolution, as in effect immediately prior to effective date of such amendment or Supplemental Resolution.

ARTICLE VI

AMENDMENT TO THE FIRST SUPPLEMENTAL RESOLUTION

Section 4.03(b) of the First Supplemental Resolution* is hereby amended to read as follows:

> (b) Notwithstanding subsection (a) of this Section, a separate Debt Service Reserve Fund Requirement shall be determined as provided in subsection (a) of this Section for each Tier of Bonds and the amounts so determined for each Tier of Bonds shall be deposited in the Account of the Debt Service Reserve Fund of the same designation and the Debt Service Reserve Fund Requirement for the Senior Bonds shall be the amount determined pursuant to subsection (a) of this Section for the Senior Bonds; provided that: (i) the Debt Service Reserve Fund Requirement for the Senior Bonds shall not be determined (A) on the date the 2004 Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2004 Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until the issuance of the 2006 Bonds, (B) on the date the 2006 Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2006 Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2006 Bonds and the other Senior Bonds Outstanding on the date the 2006 Bonds are issued, (C) on the date the 2007 Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2007 Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2007 Bonds and the other Senior Bonds Outstanding on the date the 2007 Bonds are issued, (D) on the date the 2010 Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2010 Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2010 Bonds and the other Senior Bonds Outstanding on the date the 2010 Bonds are issued, (E) on the date the 2011 Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2011 Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2011 Bonds and the other Senior Bonds Outstanding on the date the 2011 Bonds are issued, (F) on the date the 2014A Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2014A Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in

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* The provisions of Section 4.03 of the First Supplemental Resolution regarding the establishment of the Debt Service Reserve Fund Requirement for the Senior Bonds, including the provisions thereof amended by this Article VI, are described in the body of the Official Statement under the caption "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2020A BONDS – Senior Bonds Debt Service Reserve Account."

addition to the 2014A Bonds and the other Senior Bonds Outstanding on the date the 2014A Bonds are issued, (G) on the date the 2015A Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2015A Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2015A Bonds and the other Senior Bonds Outstanding on the date the 2015A Bonds are issued, (H) on the date the 2017 Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2017 Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2017 Bonds and the other Senior Bonds Outstanding on the date the 2017 Bonds are issued, (I) on the date the 2019A Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2019A Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2019A Bonds and the other Senior Bonds Outstanding on the date the 2019A Bonds are issued or, (J) on the date the 2020A Bonds are issued, and the amount on deposit in the Senior Bonds Debt Service Reserve Account immediately prior to the issuance of the 2020A Bonds shall be the Debt Service Reserve Fund Requirement for the Senior Bonds until Senior Bonds are issued in addition to the 2020A Bonds and the other Senior Bonds Outstanding on the date the 2020A Bonds are issued.

ARTICLE VII

MISCELLANEOUS

Section 7.01. Delegation and Parameters.

(a) The Board has elected to apply all provisions of the Supplemental Public Securities Act to this 2020A Supplemental Resolution, including the delegation provisions contained in Section 11-57-205, C.R.S. Consistent with such election, the Board hereby delegates to the Sale Delegate the authority to determine and set forth in the Sale Certificate (i) the matters set forth in subsection (b) of this Section, subject to the applicable parameters, if any, set forth in subsection (c) of this Section; (ii) any other matters that are to be set forth in the Sale Certificate pursuant to the terms of this 2020A Supplemental Resolution, subject to the applicable parameters, if any, set forth in subsection (c) of this Section; and (iii) any other matters that, in the judgment of the Sale Delegate, are necessary or convenient to be set forth in the Sale Certificate and are not inconsistent with the parameters set forth in subsection (c) of this Section. The Board hereby authorizes and directs the Sale Delegate to prepare and execute the Sale Certificate and to file it with the Trustee after the adoption of this 2020A Supplemental Resolution. Upon the filing of the executed Sale Certificate with the Trustee, the matters set forth in the Sale Certificate shall be incorporated into this 2020A Supplemental Resolution with the same force and effect as if they had been set forth herein when this 2020A Supplemental Resolution was adopted.

(b) The Sale Certificate shall set forth the following matters and other matters permitted to be set forth therein pursuant to subsection (a) of this Section, but each such matter must fall within the applicable parameters, if any, set forth in subsection (c) of this Section:

(i) the date on which the 2020A Bonds will be issued; provided that the Sale Certificate may include a range of dates on which the 2020A Bonds will be issued, in which case the Sale Delegate may select the actual date on which the 2020A Bonds will be issued from such range after the delivery of the Sale Certificate to the Trustee;

(ii) the aggregate principal amount of the 2020A Bonds;

(iii) the maturity date or dates of the 2020A Bonds and the principal amount thereof maturing on each such date;

(iv) the rate or rates at which the 2020A Bonds will bear interest; provided that nothing herein shall prohibit 2020A Bonds maturing on the same date from bearing interest at different rates;

(v) the price at which the 2020A Bonds and each 2020A Bond will be sold; provided that nothing shall prohibit 2020A Bonds maturing on the same date from being sold at different prices;

(vi) the terms, if any, on which any 2020A Bonds will be subject to optional and mandatory sinking fund redemption prior to maturity;

(vii) the amount of proceeds of the 2020A Bonds to be deposited into the 2020A Escrow Account;

(viii) the amount of moneys on deposit in the General Surplus Account of the Surplus Fund to be deposited into the 2020A Escrow Account;

(ix) the amount of the Costs of Issuance of the 2020A Bonds, if any, to be paid from the General Surplus Account of the Surplus Fund.

(x) the identification of those 2004B Bonds, if any, that shall be included in the Refunded Bonds; and

(xi) the identification of those 2010C Bonds, if any, that shall be included in the Refunded Bonds; and

(c) The authority delegated to the Sale Delegate by this Section shall be subject to the following parameters:

(i) in no event shall the Sale Delegate be authorized to execute the Sale Certificate, and in no event shall the 2020A Bonds be issued, after the date that is one year after the adoption of this 2020A Supplemental Resolution, absent further authorization by the Board;

(ii) the aggregate principal amount of the 2020A Bonds shall not exceed the aggregate principal amount of the Refunded Bonds;

(iii) the net effective interest rate on the 2020A Bonds shall not exceed 4.75% per annum; and

(iv) the final maturity of the 2020A Bonds shall not be later than September 1, 2040;

(v) the aggregate scheduled Debt Service payable on the 2020A Bonds during the period commencing on the date on which the 2020A Bonds are issued through the final maturity date of the Refunded Bonds shall not exceed the aggregate scheduled Debt Service on the Refunded Bonds during the same period (determined without regard to the defeasance or early redemption of the Refunded Bonds or any possible early redemption of any of the 2020A Bonds).

(vi) The aggregate amount withdrawn from the General Surplus Account of the Surplus Fund and applied to the purposes provided in clauses (viii) and (ix) of subjection (b) of this Section shall not exceed $60,000,000.

Section 7.02. Approval, Authorization and Ratification of Certain Other Documents. The Board hereby approves the form of the 2020A Bonds attached hereto as Exhibit A, and approves the forms of the 2020A Escrow Agreement, the Bond Purchase Agreement and the Continuing Disclosure Undertaking made available to the Board at the meeting at which this 2020A Supplemental Resolution is being adopted. The Sale Delegate is hereby authorized and directed to execute and deliver the Bond Purchase Agreement in such form, with such changes therein, not inconsistent with the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, as is approved by the Sale Delegate (whose signature thereon shall constitute conclusive evidence of his approval of any changes appearing therein). The Chair or the Vice Chair of the Board is hereby authorized and directed to execute and deliver the 2020A Bonds and the Members of the Board, the Sale Delegate and the Authorized Authority Representative are hereby authorized and directed to execute and deliver the 2020A Escrow Agreement, the Continuing Disclosure Undertaking in such form, with such changes therein, not inconsistent with the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, as are approved by the officer or officers executing the same (whose signature or signatures thereon shall constitute conclusive evidence of his, her or their approval of any changes appearing therein). The Board further hereby authorizes and directs the Members of the Board, the Sale Delegate and the Authorized Authority Representative to execute and deliver any other documents or instruments related to the refunding of the Refunded Bonds and the completion of the transactions contemplated by this 2020A Supplemental Resolution, the Amended and Restated Master Resolution, the 2020A Bonds or any of the documents referred to in this Section, including, without limitation, the Tax Compliance Certificate, and further hereby authorizes and directs the appropriate officers of the Authority to attest, and, to the extent appropriate, affix the Authority's seal to, each such document. The Board hereby approves the preparation and distribution of a Preliminary Official Statement with respect to the 2020A Bonds in the form made available to the Board at the meeting at which this 2020A Supplemental Resolution is adopted, with such changes therein, not inconsistent with the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, as are approved by the Sale Delegate (whose signature on a certificate deeming such Preliminary Official Statement final for purposes of Securities and Exchange Commission Rule 15c2-12 under the Securities and Exchange Act of 1934, as amended, shall constitute conclusive evidence of his approval of any changes appearing therein), and further approves, and authorizes the preparation, execution by the Authorized Authority Representatives and distribution of, a final Official Statement in substantially the form of such Preliminary Official Statement, with such changes therein, not inconsistent with the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, as are approved by the officer or officers of the Authority executing the same (whose signature or signatures thereon shall constitute conclusive evidence of his, her or their approval of any changes appearing therein).

Section 7.03. Authorization of Officers. The members of the Board, the Sale Delegate and the Authorized Authority Representatives are hereby authorized and directed to take all action in conformity with the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, the other documents governing the 2020A Bonds and the security therefor and the investment of funds in connection therewith, the Acts, the Constitution and other laws of the State necessary or reasonably required to effectuate the issuance and sale of the 2020A Bonds and the refunding of the Refunded Bonds, and for carrying out, giving effect to and consummating the transactions contemplated by the Amended and Restated Master Resolution and this 2020A Supplemental Resolution, the 2020A Escrow Agreement, the Bond Purchase Agreement, the Continuing Disclosure Undertaking and any other documents governing the 2020A Bonds and the security therefor and the investment of funds in connection therewith, including, but not limited to, the execution and delivery of documents that are necessary or convenient in connection therewith. Notwithstanding any other provision hereof, or of the Amended and Restated Master Resolution, any Supplemental Resolution or any other agreement, instrument or certificate relating to the 2020A Bonds, any document relating to the 2020A Bonds that must or may be signed by the Chairman of the Board may, in his or her absence, be signed by any Vice Chairman, the Secretary or the Treasurer of the Board with the same effect as if it was signed by the Chairman of the Board.

Section 7.04. Events Occurring on Nonbusiness Days. Except as otherwise provided in this Section, in any case where any date on which any payment or other action by any Person relevant to the operation of this 2020A Supplemental Resolution is to occur on a day which is not a Business Day, such event shall not occur on such day but shall occur on the next succeeding Business Day with the same force and effect as if it occurred on such day.

Section 7.05. Successors. All of the covenants, stipulations, obligations and agreements by or on behalf of, and other provisions for the benefit of, the Authority or the Board contained herein shall bind and inure to the benefit of any successor municipal corporation or governing body thereof and shall bind and inure to the benefit of any officer, board, district, commission, authority, agent or instrumentality to whom or to which there shall be transferred by or in accordance with law any right, power or duty of the Authority or the Board or of their respective successors, if any, the possession of which is necessary or appropriate in order to comply with any such covenants, stipulations, obligations, agreements or other provisions.

Section 7.06. Parties Interested Herein. Except as otherwise expressly provided herein or by Supplemental Resolution, all the covenants, stipulations, promises and agreements herein contained by and on behalf of the Authority shall be for the sole and exclusive benefit of the Authority, the Trustee, other Fiduciaries and agents of the Authority, National, and the Owners of the Bonds, and nothing in this 2020A Supplemental Resolution is intended nor shall it be construed to confer upon or to give, to any Person, other than the Authority, the Trustee, any other Fiduciary or agent of the Authority, National, and the Owners of the Bonds, any right, remedy or claim under or by reason hereof or any covenant, condition or stipulation hereof.

Section 7.07. Compliance With Tax Compliance Certificate. The Authority and the Trustee shall invest all moneys in the Funds and Accounts created pursuant to the Amended and Restated Master Resolution and this 2020A Supplemental Resolution in accordance with the representations set forth in the Tax Compliance Certificate, unless the Trustee receives an opinion of Bond Counsel, in form and substance satisfactory to the Trustee, that noncompliance with such representations will not cause interest on the 2020A Bonds to be or become subject to federal income taxation.

Section 7.08. No Personal Liability. None of the members of the Board, the officers or employees of the Authority or any person executing the 2020A Bonds hereunder shall be personally liable on any such Bonds by reason of the issuance thereof.

Section 7.09. No Recourse Against Officers and Agents. No recourse shall be had for the payment of the 2020A Bonds or for any claims based thereon, or otherwise, upon any instruments of the Board authorizing their issuance or otherwise relating thereto, against any individual member of the Board, or any officer, employee or other agent of the Authority, past, present or future, either directly or indirectly through the Board, or otherwise, whether by virtue of the Act or any constitution, statute or rule of law, or by the enforcement of any penalty, or otherwise, all such liability, if any, being by the acceptance of the 2020A Bonds and as a part of the consideration of their issuance specially waived and released.

Section 7.10. Ratification. All action (not inconsistent with the provisions of this 2020A Supplemental Resolution) heretofore taken by the Board and the officers of the Authority directed toward the transactions described herein is hereby ratified, approved and confirmed.

Section 7.11. Amendments. This 2020A Supplemental Resolution may be amended in the same manner in which the Amended and Restated Master Resolution may be amended.

Section 7.12. Notices. Notices to an Owner shall be deemed to have been given upon transmission by Electronic Means or by deposit in the United States mail, postage prepaid, addressed to the address for such Owner shown on the Register on such date. Any notice, demand, direction, request or other instrument authorized or required by this 2020A Supplemental Resolution to be given or delivered to or filed with the Authority, the Trustee, National, S&P, the Paying Agent, the Registrar or the Authenticating Agent shall be deemed to have been given only upon receipt. Any such notice, demand, direction, request or other instrument shall be in writing, or orally confirmed within 24 hours by writing, sent by Electronic Means or by first-class or overnight mail, postage prepaid, or actually delivered, to the address specified below or, to such other address as may be designated in writing by the parties, and filed with the Trustee:

If to the Trustee:	U.S. Bank National Association 950 17th Street, 5th Floor Denver, Colorado 80202 Attention: Global Corporate Trust Services Telephone: (303) 585-4596 Telecopy: (303) 585-4530
If to Paying Agent, Registrar and Authenticating Agent:	U.S. Bank National Association 950 17th Street, 5th Floor Denver, Colorado 80202 Attention: Global Corporate Trust Services Telephone: (303) 585-4596 Telecopy: (303) 585-4530
If to the Authority:	E-470 Public Highway Authority 22470 East Stephen D. Hogan Parkway, Suite 100 Aurora, Colorado 80018 Attention: Director of Finance Telephone: (303) 537-3715 Telecopy: (303) 537-3472
If to National:	National Public Finance Guarantee Corporation 1 Manhattanville Rd, Suite 301 Purchase, New York 10577 Attention: Portfolio Surveillance - East Telephone: (914) 273-4545 Telecopy: (914) 765-3555
If to S&P:	Standard & Poor's 55 Water Street New York, New York 10004 Attention: Public Finance Structured Group

Section 7.13. Compliance With the Public Securities Refunding Act. The Authority hereby determines that the refunding of the Refunded Bonds with proceeds of the 2020A Bonds is in compliance with the provisions of the Public Securities Refunding Act and that the provisions and limitations of the Public Securities Refunding Act have been met. The Authority hereby specifically finds and determines that:

(a) by refunding the Refunded Bonds with the 2020A Bonds, the principal and interest payable on such obligations will be reduced in particular years and other economies will be effected; and

(b) the proceeds of the 2020A Bonds, net of the incidental costs and expenses of the refunding transaction, will be applied to the payment of the principal of, premium and interest on the Refunded Bonds in accordance with the Public Securities Refunding Act, and pending such use will be invested in securities meeting the investment requirements of title 24, article 75, part 6, Colorado Revised Statutes, as amended.

Section 7.14. Repealer. All bylaws, orders, ordinances and other resolutions, or parts thereof, inconsistent with this 2020A Supplemental Resolution are hereby repealed to the extent only of such inconsistency. This repealer shall not be construed to revive any bylaw, order, resolution or other ordinance, or part thereof, heretofore repealed.

Section 7.15. Effective Date. This 2020A Supplemental Resolution shall be effective upon the occurrence of the following: (a) the filing with the Trustee of a copy of this 2020A Supplemental Resolution, certified by an officer of the Authority, and a copy of the Sale Certificate, executed by the Sale Delegate; (b) the receipt by the Authority and the Trustee of the written consent of National, (i) in its individual capacity, to the issuance of the 2020A Bonds and (ii) in its individual capacity and in its capacity as the deemed Owner of at least 66% of the Bond Obligation represented by the Bonds and of each Tier of Bonds Outstanding, to this 2020A Supplemental Resolution; (c) the filing with the Trustee of an opinion of Bond Counsel, in form and substance satisfactory to the Trustee and National, stating that this 2020A Supplemental Resolution has been duly and lawfully adopted in accordance with the provisions of the Amended and Restated Master Resolution, is authorized or permitted by the Amended and Restated Master Resolution, is valid and binding upon the Authority and will not adversely affect the exclusion from gross income for federal income tax purposes of any interest on the Bonds; and (d) the commencement of the tenth day following the filing with the Trustee of proof that a notice has been delivered to EMMA stating in substance that this 2020A Supplemental Resolution (which may be referred to as the 2020A Supplemental Resolution adopted by the Authority on a stated date, a copy of which is on file with the Trustee) has been consented to by the Owners of the required percentages of Bonds and will be effective upon the satisfaction of the conditions described in this Section; provided that the amendments made to the Amended and Restated Master Resolution and the First Supplemental Resolution made by this 2020A Supplemental Resolution shall not be effective until the Authority and the Trustee receive the written consent of JPMorgan Chase, MSCS and National, in its individual capacity and its capacity as deemed Owner of all of the MBIA Insured Bonds, to such amendments.

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PASSED BY THE BOARD OF DIRECTORS OF THE E-470 PUBLIC HIGHWAY AUTHORITY on MAY 14, 2020.

By ____
Chair

[Signature Page to Series 2020A Supplemental Bond Resolution]

EXHIBIT A

FORM OF 2020A BONDS

[*Omitted for form of Series 2020A Supplemental Bond Resolution appended to Official Statement*]

APPENDIX B

AUDITED FINANCIAL STATEMENTS OF THE AUTHORITY
FOR THE FISCAL YEARS ENDED DECEMBER 31, 2019 AND 2018

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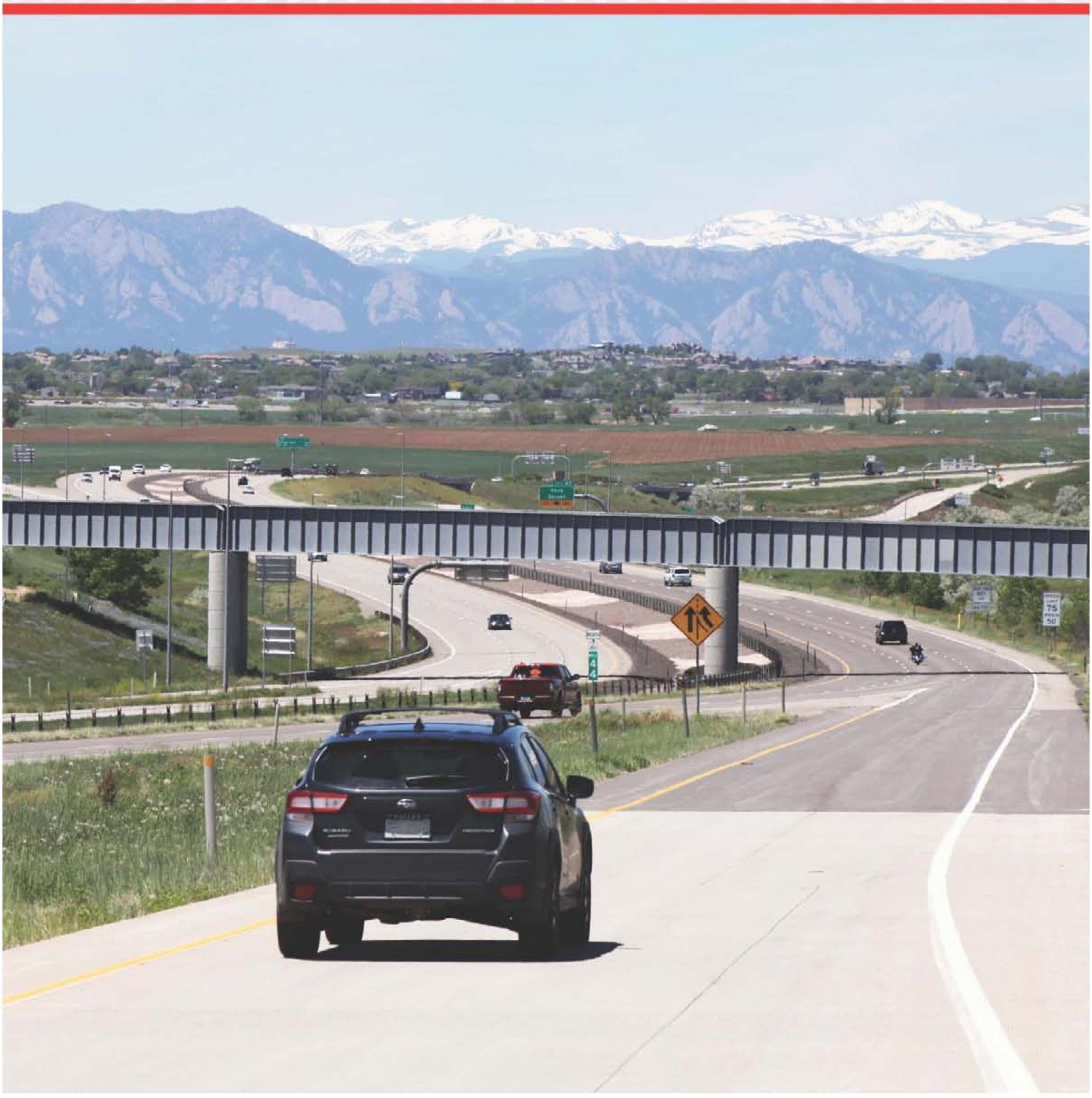
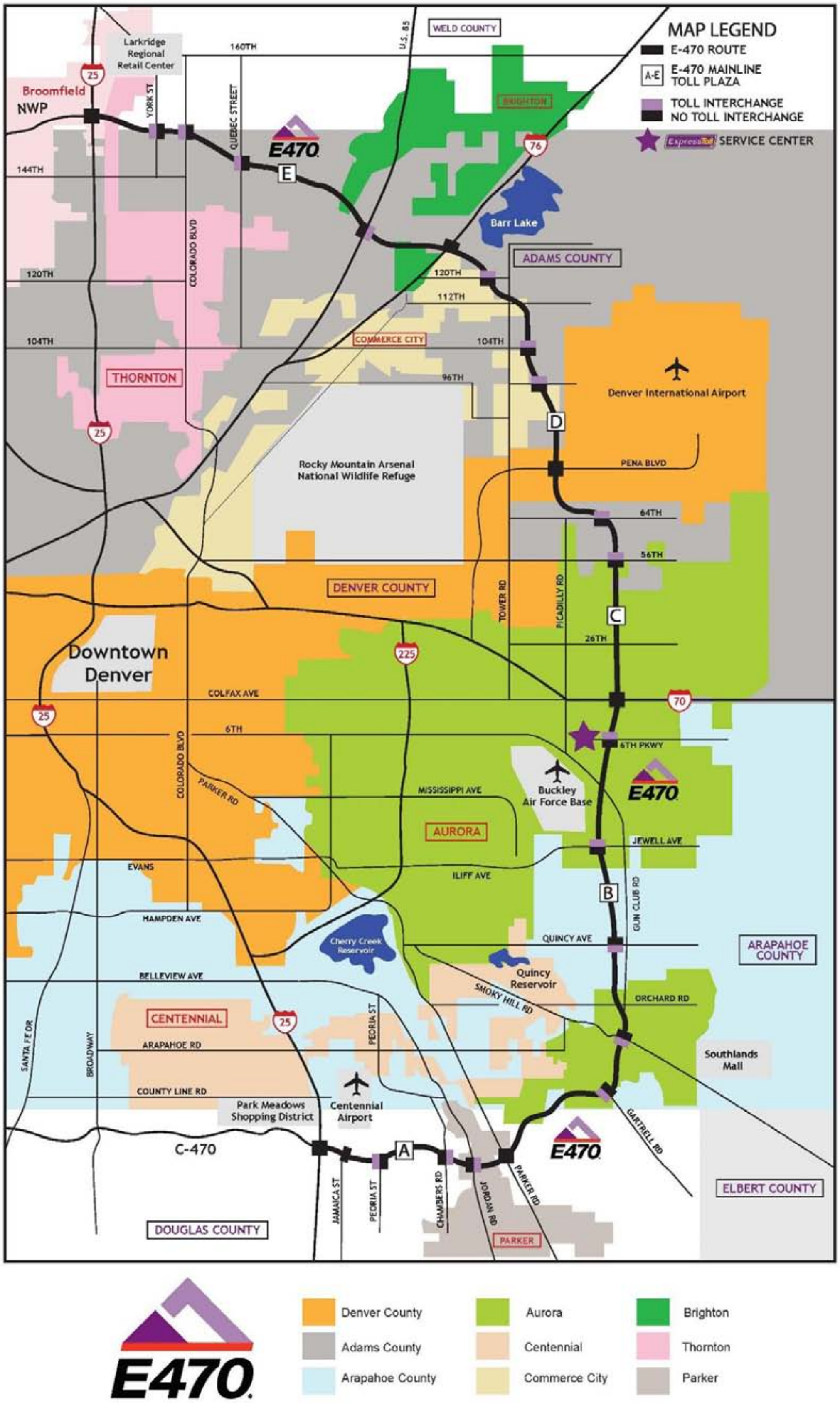
E-470 PUBLIC HIGHWAY AUTHORITY
2019 BASIC FINANCIAL STATEMENTS
DECEMBER 31, 2019 & 2018

(WITH INDEPENDENT AUDITORS' REPORT THEREON)




MAP LEGEND
E-470 ROUTE
E-470 MAINLINE TOLL PLAZA
TOLL INTERCHANGE
NO TOLL INTERCHANGE
SERVICE CENTER
WELD COUNTY
BRIGHTON
Larkridge Regional Retail Center
160TH
144TH
120TH
112TH
104TH
96TH
Broomfield
NWP
YORK ST
QUEBEC STREET
COLORADO BLVD
U.S. 85
E470
Barr Lake
ADAMS COUNTY
COMMERCE CITY
THORNTON
Denver International Airport
PENA BLVD
Rocky Mountain Arsenal National Wildlife Refuge
64TH
56TH
DENVER COUNTY
TOWER RD
PICADILLY RD
26TH
Downtown Denver
COLFAX AVE
6TH
6TH PKWY
PARKER RD
MISSISSIPPI AVE
Buckley Air Force Base
AURORA
JEWELL AVE
EVANS
ILIFF AVE
GUN CLUB RD
HAMPDEN AVE
Cherry Creek Reservoir
QUINCY AVE
ARAPAHOE COUNTY
BELLEVIEW AVE
Quincy Reservoir
SMOKY HILL RD
ORCHARD RD
CENTENNIAL
SANTA FE DR
BROADWAY
PEORIA ST
ARAPAHOE RD
Southlands Mall
COUNTY LINE RD
Park Meadows Shopping District
Centennial Airport
GARTRELL RD
C-470
JAMAICA ST
CHAMBERS RD
JORDAN RD
PARKER RD
ELBERT COUNTY
DOUGLAS COUNTY
PARKER
A
B
C
D
E
25
76
225
70
Denver County
Adams County
Arapahoe County
Aurora
Centennial
Commerce City
Brighton
Thornton
Parker

E-470 PUBLIC HIGHWAY AUTHORITY

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E-470 PUBLIC HIGHWAY AUTHORITY

Management's Discussion and Analysis

December 31, 2019 and 2018

The following is management's discussion and analysis of the financial performance and activity of the E-470 Public Highway Authority (the Authority or E-470) and is designed to provide an introduction and overview that may be used to interpret the basic financial statements as of and for the years ended December 31, 2019 and 2018. This discussion has been prepared by management covering complete data for a three-year period and should be read in conjunction with the basic financial statements and notes thereto, which immediately follow this section.

Authority Overview

E-470 is a toll road that forms a semicircular beltway along the eastern perimeter of the Denver metropolitan area. The 75 mile-per-hour toll road extends 47 miles from State Highway C-470 at I-25, to I-25 at Northwest Parkway, a toll road managed by a separate highway authority. The toll road travels through three counties and five municipalities and provides easy access to Denver International Airport.

The toll road has been financed, constructed, operated, and governed by the Authority, which is a body corporate and political subdivision of the State of Colorado, established in January 1988 with all the powers, duties, and privileges permitted by the Public Highway Authority Law of the State, part 5 of article 4 of title 43, Colorado Revised Statutes, as amended (Public Highway Act). Under the Public Highway Act, the Authority has the power without voter approval, unless limited by the contract creating such authority, to construct, finance, operate, or maintain beltways and other transportation improvements; take private property by condemnation; establish and collect tolls on any highway provided by the Authority; establish and collect a highway expansion fee from persons developing property within the boundaries of the Authority; and issue bonds and pledge its revenue to payment of bonds along with other powers as specified within the Public Highway Act.

The toll road was constructed and opened in segments from 1991 to 2003. Segment I of the toll road, I-25 South to Parker Road, was opened to traffic in June 1991. The northern portion of Segment II, 56th Avenue to 120th Avenue, and the southern portion of Segment III, Parker Road to Smoky Hill Road, opened to traffic in July 1998. In May 1999, the remaining portions of Segments II and III, Smoky Hill Road to 56th Avenue, were opened to link the already operational north and south sections of the E-470 toll road. Segment IV, the final segment of the E-470 toll road, was opened in two sections. The first, from 120th Avenue to U.S. Highway 85, opened in August 2002; the second, from U.S. Highway 85 to I-25 North, opened in January 2003. The four-lane toll road (with five miles consisting of six lanes) has been designed to accommodate future widening up to eight lanes and to allow for the addition of continuous recreation paths and future median mass transit.

The Authority consists of eight member jurisdictions, each of which has an elected official representative that sits on the Authority's board of directors as voting members (the board): Adams, Arapahoe, and Douglas counties, and the municipalities of Aurora, Brighton, Commerce City, Parker, and Thornton. The Authority also has nine nonvoting members including the cities of Arvada, Lone Tree, and Greeley, City and County of Broomfield, Weld County, Denver Regional Council of Governments (DRCOG), Regional Transportation District (RTD), Regional Air Quality Council (RAQC), and the Colorado Department of Transportation (CDOT). Appointments to the board are made annually for both voting and nonvoting members, and are made by the individual jurisdictions.

The Authority provides two options for toll payments – ExpressToll and License Plate Toll (LPT).

ExpressToll is a state-of-the-art electronic system that allows drivers to pass through mainline tolling points and ramps on any Colorado toll facility without stopping or slowing below the prevailing speed limit. ExpressToll customers paid 37% to 39% less in tolls on E-470 in 2019, depending on location, compared to License Plate Toll customers due to a toll differential. ExpressToll currently operates with either the older Title 21 hardcase transponder, the windshield 6c sticker tag, or the newer switchable High Occupancy Vehicle (HOV) transponder that allows tolls to be automatically deducted from a customer's prepaid account as the customer uses a toll facility.

LPT customers are all customers that do not have an ExpressToll account. LPT customers are generally billed on a monthly basis for all accumulated toll transactions through any tolling points (mainline and ramps) on any Colorado toll facility (except Northwest Parkway). Cameras photograph the front and rear license plates of all vehicles and, if the vehicle does not have an ExpressToll account, a statement (bill) is sent to the registered owner of the vehicle. No advance registration is required. LPT customers may also set up a managed account online to prepay tolls, leave a credit card on file, receive statements via email, or pay for tolls prior to a statement being generated.

The Authority provides various back office tolling services to the Northwest Parkway (NWP); High Performance Transportation Enterprise (HPTE), a division of CDOT; and HPTE's concessionaire, Plenary Roads Denver, LLC (Plenary) for their tolled facilities in Colorado. There are managed lane facilities on US-36, I-25 Central, I-70 Mountain Express Lane (MEXL), and I-25 North Segment 2. E-470's tolling back office, labeled and marketed with the ExpressToll+ logo, serves all customers on managed toll facilities (HOV and Express lanes), allowing customers to manage only one account and ensuring a seamless customer experience, regardless of which Colorado toll facility is used. The Authority has provided several other services to HPTE and Plenary, including, but not limited to, integrating and installing toll equipment, toll collection system enhancements and modifications, and system testing and go-live support. The Authority has been providing back office services to CDOT since 2006 and to the Northwest Parkway since 2004.

(Continued)

E-470 PUBLIC HIGHWAY AUTHORITY

Management's Discussion and Analysis

December 31, 2019 and 2018

(Unaudited)

2019 Financial Highlights

- Transactions on the E-470 toll road experienced growth of 3% from 87.3 million transactions in 2018 to 90.3 million transactions in 2019. This was the highest annual traffic on record and was the 10th straight year of traffic growth for the Authority. Traffic grew 5% from 83.2 million transactions in 2017 to 87.3 million transactions in 2018.
- Operating revenues increased 7% from 2018 to 2019 improving from $249.9 million to $267.7 million, the highest annual revenue on record. Operating revenues grew from $228.2 million to $249.9 million, or 9.5% from 2017 to 2018, respectively.
- Operating expenses, before depreciation, increased 9% from 2018 to 2019 from $52.8 million to $57.4 million. Operating expenses, before depreciation, increased 4% from 2017 to 2018 from $50.6 million to $52.8 million.
- Debt service coverage, a critical measurement of the Authority's annual operations, for fiscal year 2019 was 2.10 versus an original budgeted ratio of 1.98. Debt service coverage for fiscal year 2018 was 2.11 versus a budgeted 1.94 and was 2.12 versus a budgeted 1.75 in 2017.
- In March 2019, the Authority refinanced approximately $72.5 million related to the 2017A LIBOR Index Term Rate bonds. The 2017A bonds were subject to optional early redemption on or after March 1, 2019 with a mandatory tender and remarketing date of September 1, 2019, and the Authority exercised the early redemption option to take advantage of lower interest rates and debt service savings. The successful refunding resulted in the Series 2019A LIBOR Index Term Rate bonds of $72.5 million with no change to the principal amounts or maturities. The issuance of the Series 2019A LIBOR Index bonds saved the Authority over 48 basis points (bps) in monthly interest costs. In conjunction with the bond transaction, the Authority received reaffirmed ratings from both S&P and Moody's at A and A2, respectively. Moody's moved to a positive outlook. The Authority officially dropped the Fitch rating, as it is not required, but subsequently received a two notch rating upgrade to A from Fitch later in 2019.
- Also in conjunction with the bond transaction, the Authority removed the swap insurance on the two interest rate swaps that have been insured by MBIA – administered by National Public Finance Guarantee (NPFG) since 2007 and paid the swap counterparties a total of $974 thousand to terminate the policies. This was done in part due to negotiations with NPFG and based on the insurer rights within the swap and bond documents and will benefit the Authority in the future with greater flexibility for any swap changes.
- During 2019, the Authority began construction of the significant multiyear widening project to expand E-470 from two lanes to three lanes in each direction from Quincy Avenue to I-70. Construction is on schedule to be completed in 2020 with a total budgeted project cost of $98.3 million over a three-year period. The Capital Improvements Fund of the General Surplus account will fund all costs of the widening project along with the Authority's entire five-year capital budget program.
- E-470's back office toll collection system processed approximately 28.3 million and 27.7 million tolled transactions on other roadways in 2019 and 2018, respectively. There were no new toll facilities opened in 2019 for which E-470 provides back office services. Toll collection or system costs originally incurred by the Authority for services provided to other entities are charged to the applicable entity (CDOT, HPTE, Plenary, or NWP). Tolling services revenues to recover these costs in 2019 and 2018 totaled approximately $7.5 million and $7.1 million, respectively.

- The Authority's board of directors voted in November 2018 to reaffirm the Authority's existing toll rate structure for 2019, which continued to freeze ExpressToll rates at 2017 levels and modified the LPT premium to approximately 58% over ExpressToll. The forecasts with the 2019 toll rate structure support the Authority's debt management plan to achieve level debt service in the near future and projected capital funding needs, and the toll rate structure is subject to annual board affirmation.

  The 2019 ExpressToll rate for a two-axle vehicle was $2.70 at mainline toll plazas A and C and $2.95 at mainline toll plazas B, D, and E. ExpressToll rates increase incrementally at the mainline toll plazas if the vehicle has more than two axles. All ramp tolling points charged a rate of $1.25 (regardless of axle count) for ExpressToll accounts. The 2019 LPT toll rate for a two-axle vehicle was $4.30 at mainline toll plazas A and C and $4.65 at mainline toll plazas B, D, and E. LPT toll rates also increase incrementally at the mainline toll plazas if the vehicle has more than two axles. All ramp tolling points charged a rate of $2.05 (regardless of axles) for LPT accounts.

Summary of Operations

The Authority's operating revenues, which include toll revenues, other toll-related fees, and tolling services revenues, for 2019 were $267.7 million, a 7% increase over the $249.9 million in 2018. Toll revenues, net of related bad debts, were $249.0 million and $233.1 million of total operating revenues in 2019 and 2018, respectively. This increase is primarily due to increased overall toll transactions of 3% from 2018 and an incremental toll increase for LPT customers beginning on January 1, 2019 for all tolling points. Toll revenues, net of related bad debts, for fiscal year 2019 were $0.4 million above the $248.6 million 2019 operating budget. Traffic on E-470 during 2019 combined for 90.3 million transactions, with approximately 73% of the corresponding toll revenues coming from ExpressToll accounts. Operating revenues for 2018 were $249.9 million, a 9.5% increase over the $228.2 million in 2017. This increase is primarily due to increased overall toll transactions of 5% from 2017 and an incremental toll increase for LPT customers beginning on January 1, 2018 for all tolling points. Operating revenues for 2017 were $228.2 million, an 11% increase over 2016, which was also due to increased overall toll transactions and an incremental toll increase beginning on January 1, 2017.

Total operating expenses, before depreciation, for 2019 were $57.4 million, a 9% increase over the $52.8 million in 2018. The increase is primarily due to higher toll collection costs from the 3% increase in E-470 toll transaction volume in 2019, coupled with a 2% increase in tolled transactions incurred on other Colorado toll facilities. Costs incurred for other toll facilities are recovered and recorded as tolling services revenue. Costs such as call center and administrative law court labor, operations support labor, registered vehicle owner information retrieval, credit card fees, snow plows and snow removal materials, and law enforcement, offset by a decrease in image processing labor and printing and postage on bills and notices, accounted for $3.3 million of the overall $4.6 million increase from prior year. There were no other individually significant fluctuations. Total operating expenses, before depreciation, for 2018 were $52.8 million, a 4% increase over the $50.6 million in 2017. The increase is primarily due to higher toll collection costs from the 5% increase in E-470 toll transaction volume in 2018, coupled with a 15% increase in tolled transactions incurred on other Colorado toll facilities. Costs incurred for other toll facilities are recovered and recorded as tolling services revenue. Costs such as call center and administrative law court labor, printing and postage on bills and notices, registered vehicle owner information retrieval, credit card fees, and law enforcement, offset by a decrease in image processing labor, accounted for $1.7 million of the overall $2.2 million increase from prior year. There were no other individually significant fluctuations.

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Senior Revenue Bond principal and interest payments from the senior debt service fund during 2019 and 2018 were $108.8 million and $101.7 million, respectively, on the Series 1997, 2000, 2007, 2010, 2015, 2017, and 2019 bonds, and includes the interest rate swap differentials. In 2019 and 2018, $0 and approximately $1.5 million in principal and interest was due and separately paid on the Series 2009 Vehicle Registration Fee (VRF) bonds, respectively. In 2018, all principal and interest was paid from the VRF Bonds Debt Service account, which was funded from current year VRF revenues as specified in the Master and Supplemental Bond Resolutions (the Bond Resolutions). The VRF bonds matured on September 1, 2018. The Authority's board of directors voted in April 2018 to discontinue collection of the $10 annual vehicle registration fee, effective August 1, 2018, which was assessed on certain areas within Adams, Arapahoe, and Douglas counties and pledged to the VRF bonds. Debt service coverage for 2019 was 2.10, compared to 2.11 in 2018 and 2.12 in 2017. The Bond Resolutions require producing net revenues of at least 1.30 times the aggregate senior debt service due for the year.

Overview of Basic Financial Statements

The Authority only engages in business-type activities. These activities are intended to recover all related costs through user fee charges (tolls) to external customers for services provided. The Authority reports its business-type activities in a single enterprise fund, meaning that its activities are operated and reported like a private-sector business. The Authority's basic financial statements include comparative statements of net position; statements of revenues, expenses, and changes in net position; and the statements of cash flows. Also included are the notes to the basic financial statements that provide more detailed information. These basic financial statements are prepared in accordance with accounting principles generally accepted in the United States of America as promulgated by the Governmental Accounting Standards Board (GASB).

The Authority's net position comprises the following components:

- *Net investment in capital assets* – Consists of the Authority's investment in capital assets (e.g., land, buildings, equipment, and infrastructure), net of accumulated depreciation, and deferred outflows of resources, reduced by the outstanding balances of bonds that are attributable to the acquisition, construction, or improvement of those assets. The Authority uses these capital assets to provide services to the public; consequently, these assets are not available for future spending.
- *Restricted for debt service* – Represents resources that are subject to external restrictions on how they may be used, and consists of restricted assets reduced by restricted liabilities whereby these restricted liabilities will generally be liquidated with the restricted assets reported.
- *Unrestricted* – Represents resources that may be used to meet the Authority's ongoing obligations to the public and creditors, and are not included in the determination of net investment in capital assets or restricted for debt service components of net position.

Financial Results and Analysis

Summary of Net Position

	2019	2018	2017
Current assets:			
Current unrestricted assets	$ 325,447,095	227,185,589	201,154,684
Current restricted assets	68,701,055	60,908,939	58,604,634
Total current assets	394,148,150	288,094,528	259,759,318
Noncurrent assets:			
Capital assets, net of accumulated depreciation	587,788,716	587,620,002	618,593,181
Other noncurrent assets	246,820,262	266,027,527	200,102,207
Total noncurrent assets	834,608,978	853,647,529	818,695,388
Total assets	1,228,757,128	1,141,742,057	1,078,454,706
Deferred outflows of resources	$ 60,577,101	68,823,204	78,298,009
Total assets and deferred outflows of resources	$ 1,289,334,229	1,210,565,261	1,156,752,715
Current liabilities:			
Current liabilities payable from unrestricted assets	$ 53,290,607	42,610,193	42,409,279
Current liabilities payable from restricted assets	103,883,264	98,888,765	92,487,793
Total current liabilities	157,173,871	141,498,958	134,897,072
Noncurrent liabilities	1,387,732,751	1,408,119,215	1,441,468,553
Total liabilities	1,544,906,622	1,549,618,173	1,576,365,625
Total net position	(255,572,393)	(339,052,912)	(419,612,910)
Total liabilities and net position	$ 1,289,334,229	1,210,565,261	1,156,752,715

The largest portion of the Authority's assets is noncurrent. Approximately 48% and 51% of the total assets are capital assets (e.g., infrastructure, buildings, equipment, and other), net of accumulated depreciation as of December 31, 2019 and 2018, respectively. The Authority uses these capital assets to provide services, and consequently, these assets are not available to liquidate liabilities or for other future spending. The acquisition of capital assets was primarily financed from revenue bond proceeds, with capital assets over the past 12 years being financed with unrestricted funds. Approximately $565.0 million, or 46%, and $488.4 million, or 43%, of the total assets are cash equivalents and investments as of December 31, 2019 and 2018, respectively. Of these amounts, approximately $374.8 million and $310.8 million are within the General Surplus accounts as of December 31, 2019 and 2018, respectively, which have specific purposes, such as fully funding the Authority's future capital budget and bond defeasances. Noncurrent bonds payable was approximately 96% and 97% of total noncurrent liabilities in 2019 and 2018, respectively. Total current liabilities were $157.2 million and

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$141.5 million at the end of 2019 and 2018, respectively. Of the total current liabilities, $104.1 million (66%) and $99.1 million (70%) for 2019 and 2018, respectively, were current bonds payable, current notes payable, and related accrued interest payable. These liabilities are to be paid from current assets and the subsequent year's operating and nonoperating revenue as allowed under the Bond Resolutions.

Capital Assets

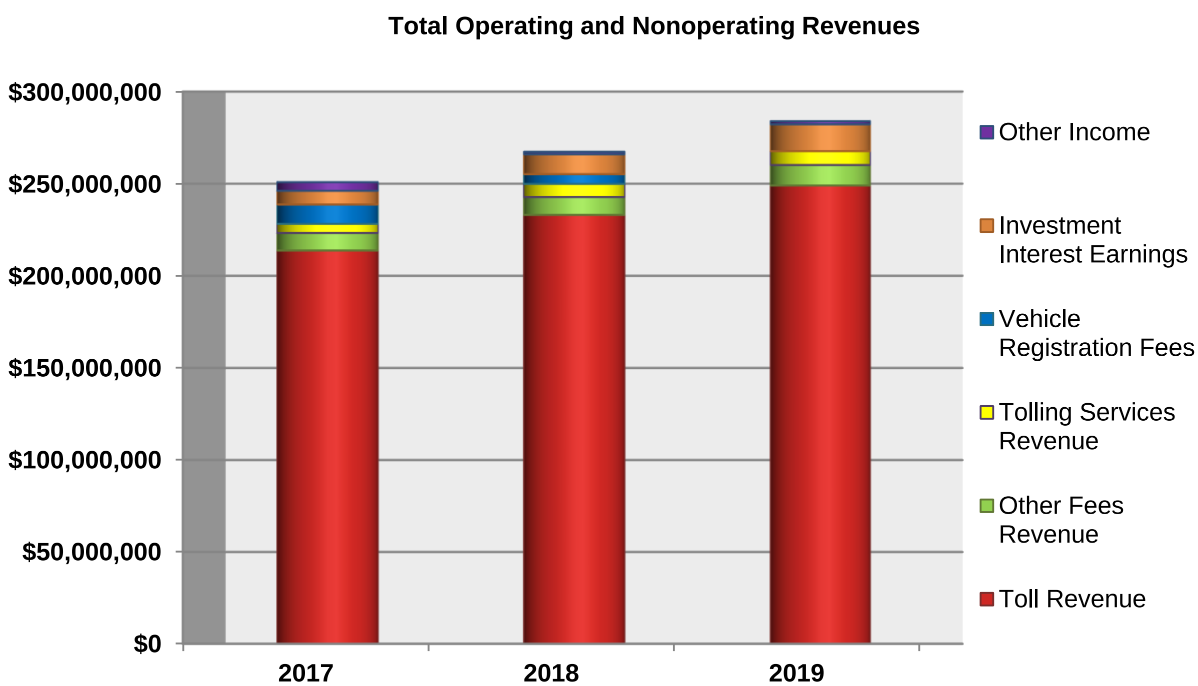
Total capital assets (gross), including construction in progress, increased from $1,206 million in 2018 to $1,247 million in 2019. Accumulated depreciation reduced the year-end capital asset balances to $587.8 million in 2019 and $587.6 million in 2018. During 2019, the Authority expended approximately $43.2 million on capital projects and successfully completed capital projects totaling $16.4 million, which were closed from construction in progress to their respective capital asset accounts. The major projects completed include a three-mile section of the widening project comprising one southbound lane from Jewell Avenue to Quincy Avenue, the purchase of temporary concrete barriers for use in the current and future widening projects, replacement of rooftop heating, ventilation, and air conditioning (HVAC) units at the Authority's headquarters building, and various enhancements to the Authority's toll collection system and technical environment. During 2018, the Authority expended approximately $10.6 million on capital projects and successfully completed capital projects totaling $10.5 million, which were closed from construction in progress to their respective capital asset accounts. The major projects completed include the remaining wrap-up work related to the multiyear widening project from Parker Road to Quincy Avenue, upgrades to fire sprinklers and computer room air conditioning units, and various enhancements to the Authority's toll collection system and technical environment. During 2017, the Authority expended approximately $62.7 million on capital projects and successfully completed capital projects totaling $87.4 million, when including completed multiyear projects, which were closed from construction in progress to their respective capital asset accounts. The major projects completed include the remaining sections of the multiyear widening project, comprising one additional southbound lane from Quincy Avenue to Gartrell Road and one additional northbound lane from Parker Road to Quincy Avenue, a parking lot expansion at the Authority's headquarters building, new variable message signs, and various enhancements to the Authority's toll collection system and technical environment.

Summary of Revenue, Expenses, and Changes in Net Position

	2019	2018	2017
Operating revenues	$ 267,666,532	249,856,733	228,211,743
Operating expenses before depreciation	(57,361,364)	(52,765,319)	(50,592,826)
Depreciation	(42,057,059)	(41,395,965)	(37,831,366)
Operating income	168,248,109	155,695,449	139,787,551
Nonoperating revenues (expenses):			
Vehicle registration fees	—	5,310,264	10,510,715
Interest expenses	(92,648,504)	(92,788,811)	(96,378,233)
Investment revenues, net	5,107,228	14,027,150	5,978,982
Intergovernmental revenue	1,109,107	—	—
Other income	1,664,579	1,338,546	4,720,552
Total nonoperating expenses	(84,767,590)	(72,112,851)	(75,167,984)
Loss before intergovernmental expense	83,480,519	83,582,598	64,619,567
Intergovernmental expense	—	(3,022,600)	—
Change in net position	83,480,519	80,559,998	64,619,567
Net position, beginning of year	(339,052,912)	(419,612,910)	(484,232,477)
Net position, end of year	$ (255,572,393)	(339,052,912)	(419,612,910)

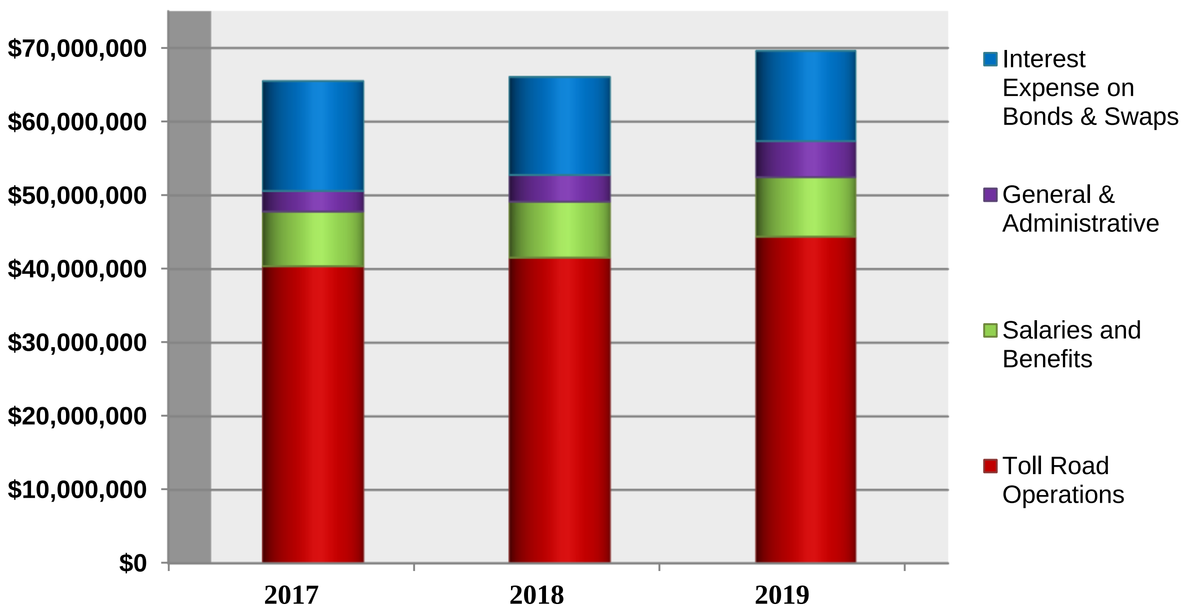
Operating revenues (which include tolls, other toll-related fees, and tolling services revenues) in 2019 and 2018 were $267.7 million and $249.9 million, respectively, an increase of 7% over 2018. Operating expenses before depreciation increased by $4.6 million to $57.4 million in 2019. Depreciation expense increased by $0.7 million to $42.1 million in 2019. Overall, operating income increased by $12.5 million from 2018 to $168.2 million. Total net nonoperating expenses increased by $12.7 million to $84.8 million in 2019, which was attributed to changes in interest rates and the corresponding effect on the change in fair value of derivative instruments and investments of $12.7 million, an increase in interest earned on investments of $3.8 million, a decrease in interest expenses of $0.1 million, an increase in intergovernmental and other revenue of $1.4 million, offset by a decrease in vehicle registration fee revenues of $5.3 million, which were eliminated in August 2018. The overall increase in net position was $83.5 million in 2019, which is $2.9 million more than the increase in net position of $80.6 million in 2018.

Operating revenues in 2018 and 2017 were $249.9 million and $228.2 million, respectively, an increase of 9.5% over 2017. Operating expenses before depreciation increased by $2.2 million to $52.8 million in 2018. Depreciation expense increased by $3.6 million to $41.4 million in 2018. Overall, operating income increased by $15.9 million from 2017 to $155.7 million. Total net nonoperating expenses decreased by $3.1 million to $72.1 million in 2018, which was attributed to changes in interest rates and the corresponding effect on the change in fair value of derivative instruments and investments of $4.6 million, an increase in interest earned on investments of $3.4 million, a decrease in interest expenses of $3.6 million, offset by a decrease in vehicle registration fee revenues, and other income of $8.5 million. The overall increase in net position was $80.6 million in 2018, which is $16.0 million more than the increase in net position of $64.6 million in 2017.



Operating and nonoperating revenues included in the chart above for 2019, 2018, and 2017 were $283.9 million, $267.3 million, and $250.9 million, respectively.

Total Operating and Interest on Bonds & Swaps Expenses



Total operating expenses, before depreciation and including nonoperating interest expense on bonds and interest rate swaps for 2019 and 2018, were $69.6 million and $66.1 million, respectively. Toll road operations expenses increased by $2.9 million to $44.4 million in 2019 versus $41.5 million in 2018. The increase is primarily due to higher toll collection costs from the 3% increase in E-470 toll transaction volume in 2019, coupled with a 2% increase in tolled transactions incurred on other Colorado toll facilities. Costs incurred for other toll facilities are recovered and recorded as tolling services revenue. These increased costs include call center and administrative law court labor, operations support labor, registered vehicle owner information retrieval, credit card fees, snow plows and snow removal materials, and law enforcement, offset by a decrease in image processing labor and printing and postage on bills and notices. Nonoperating interest expenses on bonds and swaps decreased from $13.3 million in 2018 to $12.2 million in 2019 due primarily to interest savings resulting from lower interest rates achieved in conjunction with the 2019A bond transaction as well as scheduled principal payments made in September 2018 on various bond series.

Total operating expenses, before depreciation and including nonoperating interest expense on bonds and interest rate swaps for 2018 and 2017, were $66.1 million and $65.5 million, respectively. Toll road operations expenses increased by $1.1 million to $41.5 million in 2018 versus $40.4 million in 2017. The increase is

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primarily due to higher toll collection costs from the 5% increase in E-470 toll transaction volume in 2018, coupled with a 15% increase in tolled transactions incurred on other Colorado toll facilities. Costs incurred for other toll facilities are recovered and recorded as tolling services revenue. These increased costs include call center and administrative law court labor, printing and postage on bills and notices, registered vehicle owner information retrieval, credit card fees, and law enforcement, offset by a decrease in image processing labor. Nonoperating interest expenses on bonds and swaps decreased from $14.9 million in 2017 to $13.3 million in 2018 due primarily to interest savings resulting from scheduled principal payments made in September 2017 on various bond series.

Debt Administration and Debt Service

In 2019, principal and interest paid on Senior Bond debt from restricted debt service totaling $108.8 million consisted of $44.8 million in Series 1997 bonds, $33.1 million in Series 2000 bonds, $4.3 million in Series 2010 bonds, $20.2 million in Series 2015 bonds, $2.2 million in Series 2017 bonds, $1.0 million in series 2019 bonds, and $3.2 million on the two interest rate swaps settlement differential.

In 2018, principal and interest paid on Senior Bond debt from restricted debt service totaling $101.7 million consisted of $44.8 million in Series 1997 bonds, $31.1 million in Series 2000 bonds, $12.8 million in Series 2007 bonds, $4.3 million in Series 2010 bonds, $2.0 million in Series 2015 bonds, $3.2 million in Series 2017 bonds, and $3.5 million on the two interest rate swaps settlement differential. The Authority also paid approximately $1.5 million on the Series 2009 VRF bonds from the VRF Bonds Debt Service account, which was funded from current year VRF revenues as specified in the Bond Resolutions.

In 2017, principal and interest paid on Senior Bond debt from restricted debt service totaling $95.2 million consisted of $44.8 million in Series 1997 bonds, $15.8 million in Series 2004 bonds, $21.3 million in Series 2007 bonds, $4.4 million in Series 2010 bonds, $0.3 million in Series 2014 bonds, $2.5 million in Series 2015 bonds, $1.8 million in Series 2017 bonds, and $4.3 million on the two interest rate swaps settlement differential. The Authority also paid approximately $2.5 million on the Series 2009 VRF bonds of which approximately $1.4 million was funded from the from the restricted VRF account and approximately $1.1 million was paid from the VRF Bonds Debt Service account, which was funded from current year VRF revenues as specified in the Bond Resolutions.

(Continued)

Bonds payable includes current interest bonds (CIB), capital appreciation bonds (CAB), and LIBOR index bonds, consisting of both new issue and refunded bonds of the Authority.

E-470 Revenue Bonds Outstanding Principal

	2019	2018
Series 1997 B Capital Appreciation	$ 258,395,800	287,937,434
Series 2000 B Capital Appreciation	451,311,822	455,968,493
Series 2004 A Capital Appreciation	170,322,082	161,484,709
Series 2004 B Capital Appreciation	164,117,722	155,174,007
Series 2006 B Capital Appreciation	110,725,706	105,315,920
Series 2010 A Capital Appreciation	41,499,938	38,696,790
Series 2010 C Current Interest	81,655,000	81,655,000
Series 2015 A Current Interest	20,590,000	38,985,000
Series 2017 A LIBOR Notes	—	72,565,000
Series 2017 B LIBOR Notes	66,075,000	66,075,000
Series 2019 A LIBOR Notes	72,565,000	—
Premiums, net of discounts	244,707	852,730
Total	$ 1,437,502,777	1,464,710,083

The Authority actively manages its debt based on the current debt profile and market opportunities as they relate to the overall operating condition of the Authority. Below is a summary of the significant debt management activities in 2019 and 2018:

- In March 2019, the Authority refinanced approximately $72.5 million related to the 2017A LIBOR Index Term Rate bonds, as this series was subject to optional early redemption on or after March 1, 2019 with a mandatory tender and remarketing date of September 1, 2019. The Authority exercised the early redemption option to take advantage of low interest rates and debt service savings. The successful refunding resulted in the Series 2019A LIBOR Index Term Rate bonds with no change to the principal amounts or maturities. The Series 2017A bonds of $72.5 million paid interest each month based on the previous period's final calculated LIBOR market pricing plus 90 basis points (0.90%), which was refunded with the new Series 2019A LIBOR Index bonds plus 42 basis points (0.42%) over a two and a half year term, saving the Authority over 0.48% in monthly interest costs. Lastly, in February 2019 and related to this transaction, the Authority removed the swap insurance on the two interest rate swaps that have been insured by MBIA – administered by National Public Finance Guarantee (NPFG) since 2007 and paid the swap counterparties a total of $974 thousand to terminate the policies. This was done in part due to negotiations with NPFG and based on the insurer rights within the swap and bond documents and will benefit the Authority in the future with greater flexibility for any swap changes. The Authority retained the 67% of one-month LIBOR convention on the bonds to match the associated index of the interest rate swaps and eliminate basis risk.
- The provisions of GASB Statement No. 53, *Accounting and Financial Reporting for Derivative Instruments*, are applicable to the Authority due to the two remaining 2007 pay-fixed interest rate swaps. The notional amounts on the two swaps in total correspond with specific maturities of the Series 2017 and 2019 bonds.

The swaps were determined to be investment derivatives as of December 31, 2019 and 2018 with a net liability fair value of $50.2 million and $37.8 million, respectively, and derivative instruments investment loss of $12.3 million in 2019 and gain of $5.7 million in 2018. The Authority values the interest rate swap derivatives at fair value in accordance with GASB Statement No. 72, *Fair Value Measurement and Application.*

As of December 31, 2019, the Authority maintains underlying senior bonds ratings from Moody's and Standard and Poor's. Standard and Poor's and Moody's reaffirmed the Authority's rating in conjunction with the 2019 bond transaction based on the continued financial strength, positive traffic and revenue trends, liquidity, and upcoming debt restructuring opportunities to achieve level annual debt service. Standard and Poor's kept the Authority at a stable outlook, while Moody's moved the Authority to a positive outlook at December 31, 2019. The Authority did not request a Fitch rating in conjunction with the 2019 bond transaction. Fitch subsequently upgraded the Authority two notches in 2019, though the Authority is not required to carry the Fitch rating and does not intend to request a Fitch rating on future bond transactions.

Ratings and outlook as of December 31, 2019:

	Rating	Outlook
Rating agency:		
Moody's	A2	Stable
Standard and Poor's	A	Positive
Fitch	A	Stable

Notes Payable

The Authority entered into an intergovernmental agreement with Douglas County in 2003 to receive contributed funds for costs of the Jamaica Road interchange ramp construction. Based on this agreement, the remaining contributed funds as of 2008 of $2.4 million are to be repaid in 10 equal payments (noninterest-bearing) beginning in 2011. The annual payment of $0.24 million is made from unrestricted funds, and the final scheduled payment occurs in January 2020.

	2019	2018	2017
Local member jurisdiction (Douglas County)	$ 240,769	481,538	722,308

Economic Factors

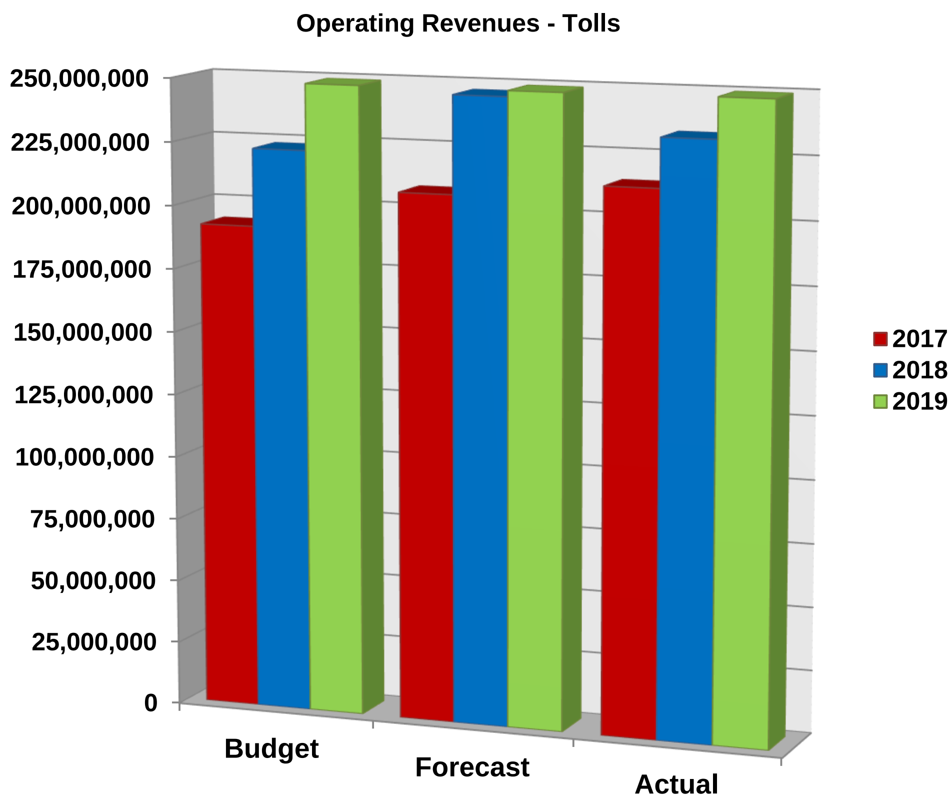
Estimates by the Authority's traffic and revenue consultant are shown against actual toll revenue, net of uncollectible amounts for the fiscal years ended 2019, 2018, and 2017. The Authority has engaged a traffic and revenue consultant to conduct investment-grade traffic and revenue studies and updated reviews over the years based on current economic conditions of surrounding areas and bond refunding transactions. The Authority conducted a toll rate study during 2017, which was finalized and published in January 2018. The 2018 study refined future traffic and revenue forecasts from the previous 2017 update letter by considering the new toll rate structure, actual historical growth, current economic conditions, future transportation forecasts, and development plans for the Authority, local jurisdictions, and the state in the surrounding area. Based on this underlying 2018 study, the Authority obtained an update letter dated December 2018 in conjunction with the 2019 bond transaction. The 2019 forecast figure below is from the bring down letter dated December 2018, while the 2018 forecast figure is from the toll rate report dated January 2018, and the 2017 forecast figure is from the 2017 update letter. The toll forecasts may differ from the Authority's budget, and only includes the toll revenue, net of estimated bad debts, and excludes the Authority's other toll-related fees that are included in operating revenues during the reporting period.

Transactions (Annual Total)

Year	ExpressToll	LPT	Total traffic	Forecast	Variance	Percentage variance
2019	65,832,535	24,447,035	90,279,570	92,311,000	(2,031,430)	(2.20)
2018	64,198,257	23,140,543	87,338,800	90,836,000	(3,497,200)	(3.85)
2017	59,466,183	23,708,987	83,175,170	84,118,000	(942,830)	(1.12)

Toll Revenues, Net (Annual Total)

Year	ExpressToll	LPT	Total toll revenue	Forecast	Variance	Percentage variance
2019	182,952,082	66,061,014	249,013,096	248,626,000	387,096	0.16
2018	171,031,824	62,056,503	233,088,327	246,318,000	(13,229,673)	(5.37)
2017	159,127,687	54,637,962	213,765,649	207,935,000	5,830,649	2.80



Budget Results

The Authority is required under state law and board resolutions to prepare an annual budget of operating and capital outlays as well as debt service due in the upcoming year. The annual budget is approved by the Authority's board of directors before the budget (calendar) year begins. Appropriations generally do not carry over to future periods, and overall net outlay overages, or budget amendments, require additional approval by the board. The original approved budget by the board is generally considered the final budget. The budget is recorded on the Authority's budget basis and conforms to the Bond Resolutions Revenue Covenant calculation. Refer to the Supplementary Information – Revenue Covenant section for reconciliation to the basic financial statements for operating balances and senior debt service due. Further, toll revenue amounts budgeted by management may differ from the traffic and revenue consultant's forecasts.

E-470 PUBLIC HIGHWAY AUTHORITY

Management's Discussion and Analysis

December 31, 2019 and 2018

(Unaudited)

The following is a summary of the Authority's 2019 operating budget compared to the actual results, as well as the capital budget compared to the actual results as of and for the year ended December 31, 2019:

		2019 Budget	2019 Results	Variance	Percentage variance
Total revenue	$	275,015,500	282,408,836	7,393,336	3 %
Total operating expenditures		(58,059,900)	(54,333,954)	3,725,946	(6)
Net revenue		216,955,600	228,074,882	11,119,282	5
Less VRF bonds debt service due				—	
Senior debt service due		109,500,000	108,844,013	(655,987)	(1)
Debt service coverage ratio		1.98	2.10	0.12	6 %
Capital and renewal and replacement costs	$	70,724,100	46,051,150	(24,672,950)	(35)%

During 2019, the original budget was the final approved budget and total budgeted operating revenues ended $7.4 million, or 3%, over budget. This is primarily due to unrestricted investment income ending over budget by $4.8 million, as well as net toll revenues and toll fees ending over budget by $0.4 million and $1.2 million, respectively, from the higher than budgeted traffic during the year, coupled with the new LPT toll rates implemented on January 1, 2019. Total operating expenses ended $3.7 million, or 6%, under budget, which is mainly attributable to lower than expected snow removal costs due to a drier than average winter and lower than budgeted customer service and image review labor costs. These final budget results led to a debt service coverage ratio of 2.10, which is greater than the original budgeted ratio of 1.98 for 2019.

Capital and renewal and replacement costs, which are excluded from the debt service coverage ratio as specified in the Bond Resolutions and fully paid from unrestricted funds, were $24.7 million, or 35%, under budget. This variance is due to overall capital projects coming in under budget for items, such as roadway and facility maintenance; technology upgrades and enhancements; and construction projects, such as interchange improvements, where budgeted projects were either completed under budget or postponed until future years and will be grouped with larger capital projects to achieve economies of scale.

(C o n t i n u e d)

The following is a summary of the Authority's 2018 operating budget compared to the actual results, as well as the capital budget compared to the actual results as of and for the year ended December 31, 2018:

		2018 Budget	2018 Results	Variance	Percentage variance
Total revenue	$	251,587,000	266,108,940	14,521,940	6 %
Total operating expenditures		(54,745,700)	(49,809,319)	4,936,381	(9)
Net revenue		196,841,300	216,299,621	19,458,321	10
Less VRF bonds debt service due		—	(1,464,750)	(1,464,750)	100
Senior debt service due		101,684,600	101,729,596	44,996	—
Debt service coverage ratio		1.94	2.11	0.17	9 %
Capital and renewal and replacement costs	$	48,260,800	18,759,305	(29,501,495)	(61)%

During 2018, the original budget was the final approved budget and total budgeted operating revenues ended $14.5 million, or 6%, over budget. This is primarily due to net toll revenues and toll fees ending over budget by $10.5 million and $1.7 million, respectively, from the higher than budgeted traffic during the year, as the 2018 budget was based on the CDM Smith 2017 bring down letter, coupled with the new LPT toll rates implemented on January 1, 2018. Total operating expenses ended $4.9 million, or 9%, under budget, which is mainly attributable to lower than expected snow removal costs due to a drier than average winter and lower than budgeted customer service and image review labor costs. These final budget results led to a debt service coverage ratio of 2.11, which is greater than the original budgeted ratio of 1.94 for 2018.

Capital and renewal and replacement costs, which are excluded from the debt service coverage ratio as specified in the Bond Resolutions and fully paid from unrestricted funds, were $29.5 million, or 61%, under budget. This variance is due to overall capital projects coming in under budget for items, such as roadway and facility maintenance; technology upgrades and enhancements; and construction projects, such as interchange improvements and pavement resurfacing, where budgeted projects were either completed under budget or postponed until future years and will be grouped with larger projects to achieve economies of scale.

Reserves Management

Pursuant to the Bond Resolutions, the Authority is required to maintain reserve accounts, including the Senior Bonds Debt Service Reserve Fund and an Operating Reserve Fund. In addition, a General Surplus account is maintained in accordance with the Bond Resolutions. The General Surplus account is unrestricted and is currently divided into three subaccount funds for administrative purposes: the Senior Bonds Defeasance Fund, the Capital Improvements Fund, and the Rainy Day Fund. At December 31, 2019 and 2018, all required and restricted reserves were fully funded as specified by the Bond Resolutions.

Tolling Services Agreements

The Authority entered into a tolling services agreement with HPTE for tolled facilities on I-25 North and I-70 Mountain Express Lanes, a tolling services agreement with HPTE and its concessionaire, Plenary, for tolled facilities on US-36 and I-25 Central, as well as a tolling services agreement with NWP to provide certain electronic toll collection back office services. Back office services occur after toll commencement on each toll facility and include major items, such as maintenance of the toll system and website, toll billing and collections, license plate image review, and provision of the customer service center. These agreements provide economies of scale for toll collection costs and seamless interoperability for customers on Colorado toll facilities, allowing them to maintain and manage one toll account. As part of the agreements, the Authority collects electronic tolls for the other tolling facilities and transfers the funds daily to NWP (ExpressToll only) and to HPTE/Plenary (ExpressToll and LPT) for transactions that occurred and were collected on their toll facilities. The tolls collected and remitted on behalf of other entities are not included in the basic financial statements of the Authority. Costs incurred are recovered by tolling services revenues charged to NWP, HPTE, and Plenary for their share of toll collection costs that are included in operating expenses on the statements of revenues, expenses, and changes in net position. These revenues totaled $7.5 million and $7.1 million in 2019 and 2018, respectively.

Future Management Plans

In 2018, the Authority began design work on the next projected segment for widening from two lanes to three lanes in each direction between Quincy Avenue and I-70. This multiyear project began construction in 2019 and is scheduled to be completed in 2020 with a total budgeted project cost of $98.3 million to be funded from the Authority's Capital Improvements Fund of the General Surplus account. The Authority has budgeted and anticipated approximately $63 million to be expended in 2020 to complete the project, which includes construction and completion of the Quincy Avenue ramps redesign totaling approximately $9 million. Other major projects planned in 2020 include expansion of a new storage facility at Maintenance Support Site A, totaling $4.6 million for additional snow removal material and plow storage, as well as beginning a system-wide modernization of tolling lane equipment. A consultant was employed to help the Authority solicit proposals for implementation of next generation toll lane software and equipment along the E-470 toll road. The Authority conducted an RFQ in 2018 and 2019 and shortlisted the respondents to four qualified companies. The evaluation is underway to determine if new toll lane software and equipment should be installed at all tolling points along the corridor. The RFP responses were received in October 2019 and the Authority's staff has selected a preferred vendor, Electronic Transaction Consultants Corporation (ETCC), a Texas Corporation, and commenced negotiations during the first quarter of 2020 that will likely go into the second quarter. The Authority's board will ultimately approve the final contract assuming successful contract negotiations. At this time, the impact on the Authority operations or financial status, if any, is not known.

Additionally, a consultant has been employed to help the Authority solicit proposals from development entities interested in repurposing or redeveloping the abandoned mainline toll plaza locations along the E-470 roadway. There are four toll plazas under consideration comprising all locations except Toll Plaza C, just north of I-70, with both northbound and southbound locations eligible for potential development as part of the RFP. This may include service stations (food, fuel, rest areas, etc.), office space, or other uses that would benefit the Authority, and rent would be charged under a master lease agreement. The RFP responses were received in December 2019 and the procurement process is ongoing. The current schedule anticipates finalizing the lease(s) and/or

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agreement(s) by the end of 2020 with development starting thereafter. At this time, the impact on Authority operations or financial status, if any, is unknown.

Regarding 2020 toll rates, in November 2019, the Authority's board of directors approved and adopted Resolution 19-03, "Regarding the Adoption of a Toll Rate Schedule," to adjust and restructure the toll rates for 2020 for commercial vehicles and LPT customers. For commercial vehicles classified as three+ axles, which represents approximately 4% of total transactions on the E-470 toll road, the Authority enacted a two-year pilot program to encourage commercial vehicles to use the roadway during non-peak hours between 9:00 a.m. and 12:00 p.m. daily. The pilot program provides for an overall approximate 5% discount from the ExpressToll base rate for three+ axle vehicles, and provides a reduction for multi-axle vehicles of 25% from the ExpressToll base rate for each additional axle during the hours of 12:00 p.m. to 9:00 a.m. daily. The board also approved a freeze of the LPT toll rates to remain at the 2019 level. The 2020 ExpressToll rate for a two-axle vehicle is $2.70 at mainline toll plazas A and C; $2.95 at mainline toll plazas B, D, and E; and $1.25 at all ramp tolling points, which remain flat with 2017 through 2019 rates. ExpressToll rates increase incrementally at the mainline toll plazas if the vehicle has more than two axles. The 2020 LPT toll rate for a two-axle vehicle is $4.30 at mainline toll plazas A and C; $4.65 at mainline toll plazas B, D, and E; and $2.05 at all ramp tolling points.

Regarding tolling services, the Authority will continue to provide back office services on other tolled facilities in the State of Colorado for NWP, HPTE, and Plenary. Other future toll facilities scheduled to become operational by HPTE in the next few years include C-470 from I-25 to Wadsworth Boulevard, and I-25 North Segment 3 extending the current managed lanes north from 120th Avenue to E-470/Northwest Parkway. The Authority plans to continue services under the separate agreements for these facilities, including integration and installation of toll equipment, toll collection system enhancements and modifications, system testing, analysis and go-live support, and will begin back office toll collection services when tolling commences.

Regarding debt management, the Authority has approximately $252 million of callable debt on September 1, 2020 that has been strategically planned and managed by the Authority for several years. The callable debt comprises approximately $170 million of the Series 2004B capital appreciation bonds, representing the estimated accreted value to the call date plus principal value, with yields ranging from 5.600 to 5.720%; and approximately $81.7 million of the Series 2010C fixed-rate current interest bonds with interest rates ranging from 5.250 to 5.375%. These callable principal amounts provide the Authority with the ability to manage annual debt service and maturity levels for the years 2025 through 2034 and 2036, and the Authority plans to contribute unrestricted funds from the Senior Bonds Defeasance Fund of the General Surplus Account to pay off maturities early and refund the remaining amounts at lower fixed interest rates to manage the debt service structure and achieve a more level debt profile. The Authority may close on the refunding transaction as early as June 2020 and put amounts in escrow to exercise the call on September 1, 2020, but the exact timing and contributed amount from the General Surplus Account are unknown at this time. In conjunction with this anticipated transaction, the Authority has engaged its Traffic and Revenue Consultant to conduct an updated Investment Grade Traffic and Revenue study that will include revised future forecasts for the E-470 toll road from 2020 through 2050. Included in this report will be a new future toll rate schedule, as the current policy approved by the board expires the end of 2020. Based on the planned reduction and leveling of annual debt service due following the 2020 bond transaction, toll rates may remain frozen or even decrease in future periods, but specific board decisions are unknown at this time. Finally, the Authority plans to update its Debt Management and Derivative Policy with board approval in conjunction with the 2020 bond transaction to include

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new financial goals regarding, but not limited to, debt service coverage, capital funding, future debt management, and unrestricted fund balances. These new goals will consider the updated toll revenue forecasts from the new study for the planning, budgeting, and financial future and stability of the Authority.

Business Risks

Current events concerning the novel coronavirus disease (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and declared a pandemic by the World Health Organization in March 2020, could adversely impact the Authority's 2020 operations and financial condition. In December 2019, COVID-19 emerged in Wuhan, Hubei Province, China. While the outbreak was initially concentrated in China and caused significant disruptions to the economy there, infections have spread globally, including to the United States. The COVID-19 pandemic has dramatically altered the behavior of businesses and people in a manner that is causing broad negative effects on global and local economies. These adverse impacts are evident and continue to evolve daily within the United States, the State of Colorado, and the Authority's service area.

Highway tolls are the predominant source of revenue available to the Authority to pay debt service on its outstanding bonds. The ultimate use of the E-470 toll road by motorists and the level of toll revenues to be generated through such use are influenced by numerous factors. The COVID-19 pandemic has had, and is likely to continue to have, an adverse impact on travel. This has resulted in decreased traffic volume generally on all Colorado roads. Such decreased traffic volume has impacted the levels of the traffic on the E-470 toll road generally, and also the use of the toll road by motorists to achieve time savings due to congestion on alternative roads. The level of toll revenues has been negatively impacted by such decreased traffic levels, but the degree and duration of the impact is extremely difficult to predict at this time.

The Authority has been closely monitoring traffic volume on the E-470 toll road as a result of these recent developments. Before noticeable traffic impacts to the E-470 toll road, the Authority's year to date transactions through February were 3.8% above toll transaction levels when compared to the same period in 2019. However, due to the recent significant events caused by COVID-19, the Authority's toll transaction volume in March 2020 is down 32.1% when compared to March of 2019; is down 8.9% cumulatively year to date through March 2020 when compared to the same period in 2019; and is 85.6% of forecasted 2020 transactions through March 31, 2020.

While traffic volume has been negatively impacted in March and will likely remain impacted for the immediate future, the Authority currently has unrestricted funds within the General Surplus Account which could be available to pay debt service when due. Additionally, in response to and as a result of such decreased traffic volume, the Authority's operating expenses and budgeted capital spending are expected to be reduced. The Authority believes, although there is no certainty, that such unrestricted funds together with future net toll revenues will be sufficient to pay debt service when due. However, the extent to which the COVID-19 pandemic impacts the Authority's operations and its financial condition will depend on future developments, which are highly uncertain and cannot be fully determined at this time, including the duration and severity of the COVID-19 outbreak and further directives of federal, State and local officials.

We note that multiple rating agencies issued negative outlook reports in March for the U.S. toll road sector as a result of the pandemic. Furthermore, S&P has assigned a "negative outlook" to the Authority's rated debt, along with the entire toll road sector. On the other hand, Fitch reaffirmed the Authority's current rating and outlook (A – Stable) in April 2020 despite the uncertainty caused by COVID-19.

Contacting E-470's Financial Management

This financial report is designed to provide overview information to the Authority's bondholders, customers, and other interested parties. Should you have any questions about this report, contact the E-470 Public Highway Authority's Director of Finance at 22470 E. Stephen D. Hogan Parkway, Suite 100, Aurora, Colorado 80018.

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KPMG LLP
Suite 800
1225 17th Street
Denver, CO 80202-5598

Independent Auditors' Report

To the Board of Directors
E-470 Public Highway Authority:

We have audited the accompanying financial statements of the E-470 Public Highway Authority (the Authority) as of and for the years ended December 31, 2019 and 2018, and the related notes to the financial statements, which collectively comprise the Authority's basic financial statements for the years then ended as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the E-470 Public Highway Authority as of December 31, 2019 and 2018, and the changes in its financial position and its cash flows for the years then ended in accordance with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 2–22 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audits of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary and Other Information

Our audits were conducted for the purpose of forming an opinion on the financial statements that collectively comprise the Authority's basic financial statements. The accompanying supplementary information relating to the revenue covenant is presented for purposes of additional analysis and is not a required part of the basic financial statements.

The accompanying supplementary information relating to the revenue covenant has not been subjected to the auditing procedures applied in the audit of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on it.

KPMG LLP

Denver, Colorado
April 17, 2020

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E-470 PUBLIC HIGHWAY AUTHORITY

Statements of Net Position

December 31, 2019 and 2018

Assets		2019	2018
Current unrestricted assets:			
Cash and cash equivalents	$	89,553,135	70,926,380
Investments		198,887,137	124,199,058
Cash and cash equivalents limited for construction		752,855	—
Accrued interest receivable		3,025,190	2,742,180
Accounts receivable, net of allowance for uncollectibles		31,643,217	28,852,021
Notes receivable		1,582,966	178,500
Prepaid expenses and other current assets		2,595	287,450
Total current unrestricted assets		325,447,095	227,185,589
Current restricted assets:			
Cash and cash equivalents for debt service		48,813,468	41,628,218
Investments for debt service		19,707,418	19,216,774
Accrued interest receivable		180,169	63,947
Total current restricted assets		68,701,055	60,908,939
Total current assets		394,148,150	288,094,528
Noncurrent assets:			
Unrestricted investments		134,615,059	155,707,939
Restricted investments for debt service		97,081,894	96,460,831
Prepaid bond costs and other noncurrent assets		11,184,933	12,037,257
Notes receivable		3,938,376	1,821,500
Capital assets, net of accumulated depreciation		587,788,716	587,620,002
Total noncurrent assets		834,608,978	853,647,529
Total assets		1,228,757,128	1,141,742,057
Deferred outflows of resources:			
Loss on refundings of debt		60,577,101	68,823,204
Total assets and deferred outflows of resources	$	1,289,334,229	1,210,565,261

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E-470 PUBLIC HIGHWAY AUTHORITY

Statements of Net Position

December 31, 2019 and 2018

Liabilities		**2019**	**2018**
Current liabilities payable from unrestricted assets:			
Accounts payable and accrued expenses	$	12,166,549	7,958,177
Unearned toll revenue		35,479,843	34,165,336
Notes payable		240,769	240,769
Intergovernmental liability		5,100,855	—
Derivative instruments – interest rate swaps		302,591	245,911
Total current liabilities payable from unrestricted assets		53,290,607	42,610,193
Current liabilities payable from restricted assets:			
Bonds payable (including accumulated accretion on capital appreciation bonds of $57,670,428 in 2019 and $54,021,868 in 2018)		101,590,000	96,295,000
Accrued interest payable		2,293,264	2,593,765
Total current liabilities payable from restricted assets		103,883,264	98,888,765
Total current liabilities		157,173,871	141,498,958
Noncurrent liabilities:			
Bonds payable (including accumulated accretion on capital appreciation bonds of $702,579,241 in 2019 and $690,553,952 in 2018)		1,335,912,777	1,368,415,083
Notes payable		—	240,769
Other restricted noncurrent liabilities		1,953,114	1,878,651
Derivative instruments – interest rate swaps		49,866,860	37,584,712
Total noncurrent liabilities		1,387,732,751	1,408,119,215
Total liabilities		1,544,906,622	1,549,618,173
Net position:			
Net investment in capital assets		76,336,471	43,136,596
Restricted for debt service		8,300,950	3,603,554
Unrestricted deficit		(340,209,814)	(385,793,062)
Total net position		(255,572,393)	(339,052,912)
Commitments and contingencies (notes 9, 10, 13, 14, 15, and 16)			
Total liabilities and net position	$	1,289,334,229	1,210,565,261

See accompanying notes to basic financial statements.

E-470 PUBLIC HIGHWAY AUTHORITY

Statements of Revenues, Expenses, and Changes in Net Position

Years ended December 31, 2019 and 2018

		2019	2018
Operating revenues:			
Tolls	$	249,013,096	233,088,327
Other fees		11,134,335	9,696,174
Tolling services		7,519,101	7,072,232
Total operating revenues		267,666,532	249,856,733
Operating expenses:			
Toll road operations		44,385,288	41,541,170
Salaries and benefits		8,080,092	7,596,234
General and administrative		4,895,984	3,627,915
Total operating expenses before depreciation		57,361,364	52,765,319
Depreciation		42,057,059	41,395,965
Total operating expenses		99,418,423	94,161,284
Operating income		168,248,109	155,695,449
Nonoperating revenue (expenses):			
Vehicle registration fees		—	5,310,264
Interest expenses:			
Interest on bonds and interest rate swaps		(12,248,511)	(13,300,319)
Accretion on capital appreciation bonds		(69,695,717)	(70,002,810)
Other bond amortization expenses		(10,704,276)	(9,485,682)
Investment revenues (expenses):			
Interest earned on investments		14,599,361	10,816,457
Net change in the fair value of investments		2,846,695	(2,501,995)
Net change in the fair value of derivative instruments		(12,338,828)	5,712,688
Intergovernmental revenue		1,109,107	—
Other income		1,664,579	1,338,546
Total nonoperating expenses		(84,767,590)	(72,112,851)
Income before intergovernmental expense		83,480,519	83,582,598
Intergovernmental expense		—	(3,022,600)
Change in net position		83,480,519	80,559,998
Net position, beginning of year		(339,052,912)	(419,612,910)
Net position, end of year	$	(255,572,393)	(339,052,912)

See accompanying notes to basic financial statements.

E-470 PUBLIC HIGHWAY AUTHORITY

Statements of Cash Flows

Years ended December 31, 2019 and 2018

		2019	2018
Cash flows from operating activities:			
Receipts of authority vehicle tolls and toll fees	$	258,603,272	246,161,277
Receipts from third parties for tolling services		7,448,417	6,989,561
Payments to employees		(7,981,267)	(7,622,646)
Payments to suppliers		(44,990,037)	(48,109,316)
Net cash provided by operating activities		213,080,385	197,418,876
Cash flows from capital and related financing activities:			
Payment of other noncurrent liabilities		(42,837)	—
Payment of notes payable		(240,769)	(240,770)
Purchase and construction of capital assets		(42,760,114)	(10,538,482)
Proceeds from sale of capital assets		55,027	6,500
Interest paid		(12,549,013)	(13,564,347)
Principal payments on bonds		(96,295,000)	(89,630,000)
Proceeds from refunded bond series		72,565,000	—
Payment of cash from bond proceeds to refund related bond series		(72,565,000)	—
Payment of bond issuance costs for related bond series		(1,239,871)	(46,978)
Payment of swap insurance termination		(974,000)	—
Receipt of other intergovernmental contributions for capital assets		2,509,962	—
Net cash used in capital and related financing activities		(151,536,615)	(114,014,077)
Cash flows from noncapital financing activities:			
Receipts of vehicle registration fees		—	6,077,579
Receipts of non-Authority third party vehicle tolls and toll fees		53,055,105	49,039,324
Remittance to third parties for non-Authority vehicle tolls and toll fees		(52,797,742)	(49,114,564)
Purchases of equipment and support services for third parties		(179,366)	(268,438)
Receipts from third parties for equipment and support services		188,274	185,232
Other receipts and disbursements		2,395,656	5,837,211
Payment of other noncapital intergovernmental obligations		—	(6,230,300)
Net cash provided by noncapital financing activities		2,661,927	5,526,044
Cash flows from investing activities:			
Proceeds from sales of investments		193,402,465	173,201,161
Purchases of investments		(243,782,449)	(262,844,217)
Interest received		12,512,358	8,987,542
Loan disbursements		—	(2,000,000)
Receipts of scheduled principal and interest on loans		226,789	—
Net cash used in investing activities		(37,640,837)	(82,655,514)
Net increase in cash and cash equivalents		26,564,860	6,275,329
Cash and cash equivalents, beginning of year		112,554,598	106,279,269
Cash and cash equivalents, end of year	$	139,119,458	112,554,598
Reconciliation of cash and cash equivalents to the statements of net position:			
Cash and cash equivalents – current – unrestricted	$	89,553,135	70,926,380
Cash and cash equivalents – current – restricted for debt service		48,813,468	41,628,218
Cash and cash equivalents – current – restricted for construction		752,855	—
Cash and cash equivalents, end of year	$	139,119,458	112,554,598

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E-470 PUBLIC HIGHWAY AUTHORITY

Statements of Cash Flows

Years ended December 31, 2019 and 2018

		2019	2018
Reconciliation of operating income to net cash provided by operating activities:			
Operating income	$	168,248,109	155,695,449
Adjustments to reconcile operating income to net cash provided by operating activities:			
Depreciation		42,057,059	41,395,965
Changes in assets and liabilities:			
Accounts receivable, net (tolls, late fees, and tolling services)		(2,775,154)	(3,221,207)
Prepaid expenses and other current assets		284,855	2,850
Accounts payable and accrued expenses		4,104,435	(2,968,946)
Unearned toll revenue		1,161,081	6,514,765
Net cash provided by operating activities	$	213,080,385	197,418,876
Noncash transactions:			
Interest expense recorded due to bond accretion	$	69,695,717	70,002,810
Interest expense recorded due to amortization of deferred outflows of resources		8,246,103	9,474,805
Interest expense recorded due to amortization of prepaid bond costs and other assets		1,169,925	1,158,977
Interest expense recorded due to amortization of net bond premiums		608,023	1,148,100
Increase (decrease) in fair value of derivative instruments – interest rate swaps		(12,338,828)	5,712,688
Investment loss recorded due to amortization of net investment discounts		(1,478,603)	(952,838)
Investment loss recorded due to amortization of other restricted noncurrent liabilities		(324,844)	(189,989)
Increase (decrease) in fair value of investments		2,846,695	(2,501,995)
Net loss on disposal of capital assets		(479,314)	(109,196)
Increase in other restricted noncurrent liabilities		207,544	207,544
Intergovernmental liability		899,145	—

See accompanying notes to basic financial statements.

(1) Financial Reporting Entity

The E-470 Authority (the First Authority) is a separate legal entity, created in February 1985, by an intergovernmental agreement among Adams County, Arapahoe County, Douglas County, and the City of Aurora. The purpose of the agreement was to plan, design, and construct the E-470 Highway (the Project). The First Authority did not have the power to incur debt; therefore, Arapahoe County (the County) issued bonds to finance the Project.

In January 1988, the E-470 Public Highway Authority (the Authority) was created by the original members of the First Authority pursuant to Colorado Revised Statutes Title 43, Article 4, Part 5. The Town of Parker, City of Thornton, City of Brighton, and City of Commerce City became participants in the Authority in 1989, 1990, 1991, and 1995, respectively. In February 1989, all rights, privileges, obligations, and liabilities of the First Authority were assigned to the Authority. In the event the Authority is ever dissolved, all rights, privileges, obligations, and liabilities will transfer back to the First Authority. As required by accounting principles generally accepted in the United States of America, the accompanying basic financial statements present the Authority and its component unit, an entity for which the Authority is considered to be financially accountable, as discussed below. The blended component unit, although a legally separate entity, is, in substance, part of the Authority's operations, and therefore, data from this component unit is combined with data of the primary government.

The First Authority is a blended component unit of the Authority; however, it currently has no assets, liabilities, or operations.

In an opinion dated May 15, 1995, the Colorado Supreme Court held that the County had relinquished any control it had over the 1986 Bonds and the alignment of the Project in February 1989 when it executed the Delegation and Substitution Agreement and amendments to the Establishing Contract to that effect. Therefore, the Authority is not a component unit of the County.

Intergovernmental Agreements with Arapahoe County, Colorado

Since its creation, the First Authority was not legally empowered to issue debt; therefore, the County authorized issuance of $722,010,000 of Capital Improvement Trust Fund Highway Revenue Bonds Series 1986A-M. The ultimate objective of this issuance was to remit the proceeds to the Authority for the construction of the Project. In the contract establishing the Authority, the County assigned to the Authority all of the County's rights and privileges with respect to the bonds, and the Authority assumed all of the County's obligations with respect to the bonds. The proceeds of the bond issue were invested and held in trust for the benefit of the owners of the bonds (until the releases, as described below). The bonds were generally remarketed every six months.

In February 1989, the Authority released from escrow the Series D bonds in the amount of $63,260,000 to complete construction on the first phase of the toll road (Segment I). In consideration of the obligations assumed by the Authority and to assist the Project, the County granted to the Authority all the County's rights to the excess investment earnings for all bond series. In addition, the Authority agreed to pay all bond administration costs with no financial obligation to the County.

At the August 31, 1995 remarketing of the bonds, the funds remaining were released from escrow to finance the costs associated with the design, acquisition of property, and construction of Segments II and III of the Project. Any bonds that were not remarketed were redeemed on August 31, 1995.

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Due to the interrelationship between the County and the Authority in this financing arrangement, all the transactions incurred by the County relating to this financing are included in the accompanying basic financial statements as if they were incurred by the Authority.

Tolling Services Agreements

The Authority provides various services to the Northwest Parkway (NWP); High Performance Transportation Enterprise (HPTE), a division of Colorado Department of Transportation (CDOT); and HPTE's concessionaire, Plenary Roads Denver, LLC (Plenary), including, but not limited to, integrating and installing toll equipment, toll collection system enhancements and modifications, system testing and go-live support, and back office toll collection services. E-470's tolling back office process allows customers to have a single account to manage and ensures a seamless customer experience regardless of which Colorado tolled facility is used. Toll collection or system costs originally incurred by the Authority for services provided to other entities are charged to the applicable entity (CDOT, HPTE, Plenary, or NWP).

(2) Summary of Significant Accounting Policies

(a) Basis of Accounting

The operations of the Authority are accounted for as an enterprise fund. Enterprise funds are accounted for on the flow of economic resources measurement focus and use the accrual basis of accounting. Under this method, revenue is recorded when earned, and expenses are recorded at the time liabilities are incurred. Enterprise funds are used to account for those operations for which the pricing policies of the entity establish fees and charges designed to recover its costs, including capital costs, such as depreciation and debt service. The basis of accounting also incorporates Governmental Accounting Standards Board (GASB) Statement No. 62, *Codification of Accounting and Financial Reporting Guidance Contained in Pre-November 30, 1989 FASB and AICPA Pronouncements*.

(b) Use of Estimates

The preparation of financial statements in accordance with accounting principles generally accepted in the United States of America involves the use of management's estimates. These estimates are based upon management's best judgments, after considering past and current events and assumptions about future events. Actual results could differ from those estimates.

(c) Cash and Cash Equivalents

The Authority considers all highly liquid instruments purchased with an original maturity of three months or less to be cash equivalents, which may include authorized money market mutual funds, local government investment pools, commercial paper, or repurchase agreements. Cash and cash equivalents may be restricted by the Trustee under the Master and Supplemental Bond Resolutions (Bond Resolutions) or other externally imposed restrictions. The basic financial statements include statements of cash flows showing cash and cash equivalents provided by and used in operating, noncapital and capital financing, and investing activities.

(d) Investments

The Authority invests its funds in accordance with the Authority's Bond Resolutions and Colorado statutes (CRS 24-75-601). The Authority's authorized investments may consist of U.S. government agency securities, U.S. Treasury securities, commercial paper, municipal bonds, and an investment agreement. Investments may be restricted by the Trustee under the Bond Resolutions. Investments are reported in the financial statements at fair value, with the exception of the following assets, which are recorded using a cost-based measure in accordance with GASB Statement No. 31, *Accounting and Financial Reporting for Certain Investments and for External Investment Pools,* and GASB Statement No. 72, *Fair Value Measurement and Application*:

- Money market investments that have a remaining maturity at time of purchase of one year or less. These money market accounts are held with Securities and Exchange Commission registered investment companies under Rule 2a-7 of the Investment Company Act of 1940, as amended, and are reported at amortized cost.
- Nonparticipating investment agreement with Societe Generale, as it cannot be traded and its value is not affected by market interest rate changes.

(e) Accounts Receivable

Accounts receivable represents amounts due for customer tolls (License Plate Toll (LPT) and ExpressToll) and any assessed late fees, net of the estimated uncollectible toll and fee receivables, and other miscellaneous receivables from third parties. The Authority accrues the related revenue when earned. An allowance for estimated uncollectible toll receivables is recognized to reduce the gross amount of receivables to its net realizable value. The allowance for customer tolls is estimated based on historical collection information by revenue type.

(f) Capital Assets

Capital assets have an estimated useful life in excess of one year and an initial cost greater than $5,000 for software, fixtures, and equipment; $50,000 for land improvements; $100,000 for buildings; and $500,000 for infrastructure (roadway, bridges, and ramps).

Capital assets are recorded at historical cost. Costs include not only purchase price or construction cost, but also ancillary charges necessary to place the asset in its intended location and condition for use. Ancillary charges include, but are not limited to, costs, such as freight and transportation charges, site preparation expenditures, professional fees, and legal expenses directly attributable to asset acquisition. Donations of capital assets represent facilities, or cash payments for facilities, received from property owners, governmental agencies, and customers. Donated capital assets are recorded at estimated fair value at the date of transfer.

(Continued)

Capital assets are depreciated using the straight-line method over their estimated useful lives. Those capital assets subject to depreciation have the following useful lives:

Assets	Years
Software	3
Fixtures and equipment	5–10
Land and building improvements	20
Buildings	40
Infrastructure	30

Ongoing construction costs associated with the Authority's toll road are capitalized as construction in progress (CIP). As construction is not yet complete, depreciation is not recorded on these CIP costs. The Authority recognizes interest costs on the tax-exempt debt used to finance the assets under construction (if applicable) as an expense in the period in which the cost is incurred.

(g) Prepaid Bond Costs and Premiums and Discounts

Prepaid bond costs and other noncurrent assets as well as bond premiums and discounts are deferred and amortized as a component of interest expense – other bond amortization expenses using the effective-interest method over the life of the related bonds.

(h) Deferred Outflows of Resources

Deferred outflows of resources represent a consumption of net assets that applies to a future period and will not be recognized as an outflow of resources (expense) until that time. The deferral balances are from losses on refundings of debt that are amortized as a component of interest expense – other bond amortization expenses using the straight-line method over the remaining life of the old (refunded) debt or the life of the new debt, whichever is shorter.

(i) Revenue and Expenses

The Authority's statements of revenue, expenses, and changes in net position distinguish between operating and nonoperating revenue and expenses. Operating revenues consist of vehicle tolls and other toll-related fees assessed (late fees, civil penalties, or other fines and fees) associated with the operation of the Authority's toll road, net of estimated bad debts. The Authority recognizes toll operating revenues when earned. Advance payments received for toll operating revenues are deferred as unearned toll revenue on the statements of net position and are recognized as revenue as the customers use the Authority's toll road. Advance payments used as customers drive on non-Authority facilities in Colorado are remitted to the appropriate agency and are not recognized as revenue on the Authority's statements of revenues, expenses, and changes in net position. Operating revenues also include revenues for providing tolling services to other entities, and is recognized as an exchange transaction. Any amounts collected and remitted to external entities for tolls incurred on other tolled facilities are not included in the basic financial statements of the Authority. Operating expenses include costs incurred to provide for maintenance and administration of the toll road.

Nonoperating revenue and expenses consist of vehicle registration fees, interest expense, investment revenues, including interest earned on investments and change in derivative instruments, and other miscellaneous revenues and expenses. Vehicle registration fees were assessed by Adams, Arapahoe, and Douglas counties based on enabling legislation and remitted to the Authority on a monthly basis net of related administrative costs; however, collection of these fees was discontinued as of August 1, 2018.

(j) Net Position Amounts

Net position amounts reported in the Authority's statements of net position consist of three categories: net investment in capital assets; restricted for debt service; and unrestricted. The Authority's board of directors, along with any state statutes, has official authorization to assign funds for a specific purpose. Net investment in capital assets consists of the Authority's investment in capital assets (e.g., land, buildings, equipment, and infrastructure), net of accumulated depreciation, and deferred outflows of resources, reduced by the outstanding balances of bonds that are attributable to the acquisition, construction, or improvement of those assets. Restricted for debt service represents resources that are subject to external restrictions on how they may be used, and consists of restricted assets reduced by restricted liabilities where the restricted liability will generally be liquidated with the restricted assets reported. Unrestricted net position represents resources that may be used to meet the Authority's ongoing obligations to the public and creditors and are not included in the determination of net investment in capital assets or restricted for debt service components of net position. This balance includes any noncurrent accreted portions of revenue bonds payable. These net position amounts are available to fund any obligation of the Authority. When an expense is incurred for purposes for which both restricted and unrestricted net position is available, the Authority generally uses unrestricted funds first, then restricted as needed.

As of December 31, 2019 and 2018, the Authority had a total net deficit of approximately $255.6 million and $339.1 million, respectively. The Authority primarily plans to fund this net deficit with increased annual growth in toll operations revenues and other nonoperating revenues.

(k) Income Taxes

The income derived by the Authority is exempt from federal income tax under the provisions of Internal Revenue Code Section 115 and as a governmental entity that is not a college or university, the Authority is not subject to any unrelated business income tax under Internal Revenue Code Section 511. Accordingly, no provision for the payment or refund of income taxes has been made in the accompanying basic financial statements.

(3) Fair Value Measurements

The Authority categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. Under GASB Statement No. 72, fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. GASB Statement No. 72 establishes a hierarchy of three levels of inputs that may be used to measure fair value:

- Level 1 – Quoted prices (unadjusted) in active markets for identical assets or liabilities, accessible at the measurement date. Observable markets include exchanges markets, dealer markets, brokered markets, and principal-to-principal markets.

- Level 2 – Inputs other than quoted prices included within Level 1 that are observable for an asset or liability, either directly or indirectly. Level 2 inputs include quoted prices for similar assets or liabilities in active markets; quoted prices for identical or similar assets or liabilities in inactive markets; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities, such as interest rates and yield curves observable at commonly quoted intervals, implied volatilities, credit spreads, and market-corroborated inputs.
- Level 3 – Unobservable inputs for an asset or liability.

Investments

Where quoted market prices for identical assets are available in an active market, securities are classified within Level 1 of the hierarchy. If quoted market prices for identical assets are not available, then fair values are estimated by using quoted prices of securities with similar characteristics or independent asset pricing services and pricing models, the inputs of which are market-based or independently sourced market parameters, including, but not limited to, yield curves, interest rates, reported trades of comparable securities, spreads off benchmark yields, and issuer spreads. Such securities are classified in Level 2 of the valuation hierarchy. In certain cases where Level 1 or Level 2 inputs are not available, securities would be classified within Level 3 of the hierarchy. The Authority has no Level 3 securities as of December 31, 2019 or 2018, respectively.

Interest Rate Swap Agreements

The fair values are based on the notional amounts outstanding and estimated using forward-looking interest rate curves (swap reference rate), discounted future cash flows, and credit spreads that are observable or can be corroborated by observable market data and, therefore, are classified within Level 2 of the hierarchy.

The Authority has the following recurring fair value measurements as of December 31, 2019:

		Fair value measurement using		
	Total 2019	**Quoted prices in active markets for identical assets (Level 1)**	**Significant other observable inputs (Level 2)**	**Significant unobservable inputs (Level 3)**
Investment type:				
U.S. government agency	$ 295,197,899	—	295,197,899	—
U.S. Treasury securities	121,962,279	—	121,962,279	—
Commercial paper	29,657,383	—	29,657,383	—
Total investments measured at fair value	446,817,561	—	446,817,561	—
Cash Equivalents (CE) and investments measured at cost:				
Money market mutual funds	109,672,549			
Investment agreement	8,471,273			
Total CE and investments measured at cost	118,143,822			
Total CE and investments held by the authority	$ 564,961,383			
Liability type:				
Derivative instruments – interest rate swaps	$ (50,169,451)	—	(50,169,451)	—
Total liabilities measured at fair value	$ (50,169,451)	—	(50,169,451)	—

The Authority has the following recurring fair value measurements as of December 31, 2018:

		Fair value measurement using		
	Total 2018	Quoted prices in active markets for identical assets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Investment type:				
U.S. government agency	$ 261,814,785	—	261,814,785	—
U.S. Treasury securities	100,685,788	—	100,685,788	—
Commercial paper	24,612,756	—	24,612,756	—
Total investments measured at fair value	387,113,329	$ —	387,113,329	—
Cash Equivalents (CE) and investments measured at cost:				
Money market mutual funds	92,822,109			
Investment agreement	8,471,273			
Total CE and investments measured at cost	101,293,382			
Total CE and investments held by the authority	$ 488,406,711			
Liability type:				
Derivative instruments – interest rate swaps	$ (37,830,623)	—	(37,830,623)	—
Total liabilities measured at fair value	$ (37,830,623)	—	(37,830,623)	—

(4) Cash, Cash Equivalents, and Investments

The Colorado Public Deposit Protection Act (PDPA) requires that all units of local government deposit cash in eligible public depositories. Eligibility is determined by state regulators. Amounts on deposit in excess of federal insurance levels (currently, $250,000 by the Federal Deposit Insurance Corporation (FDIC)) must be collateralized. The eligible collateral is specified by the PDPA. The PDPA allows the institution to create a single collateral pool for all public funds, and the pool is to be maintained by another institution or held in trust for all the uninsured public deposits as a group. The State Regulatory Commission for banks and savings and loan associations is required by statute to monitor the naming of eligible depositories and reporting of the uninsured deposits and assets maintained in the collateral pools. At December 31, 2019 and 2018, the Authority's cash deposits had a book balance of $24.4 million and $19.7 million, respectively, and a corresponding bank balance of $24.9 million and $19.8 million, respectively. The difference between the book and bank balances is due to outstanding checks and deposits not yet processed by the banks.

As of December 31, 2019 and 2018, the Authority's book balances are classified as follows:

		2019		
		Deposits	**Cash equivalents and investments**	**Total**
Restricted cash and cash equivalents by trustee under the Bond Resolutions	$	—	48,813,468	48,813,468
Unrestricted cash and cash equivalents – undesignated		24,449,583	65,856,407	90,305,990
Restricted investments by trustee under the Bond Resolutions		—	116,789,312	116,789,312
Unrestricted investments – undesignated		—	333,502,196	333,502,196
	$	24,449,583	564,961,383	589,410,966

	2018		
	Deposits	Cash equivalents and investments	Total
Restricted cash and cash equivalents by trustee under the Bond Resolutions	$ —	41,628,218	41,628,218
Unrestricted cash and cash equivalents – undesignated	19,732,489	51,193,891	70,926,380
Restricted investments by trustee under the Bond Resolutions	—	115,677,605	115,677,605
Unrestricted investments – undesignated	—	279,906,997	279,906,997
	$ 19,732,489	488,406,711	508,139,200

The following is a summary of the Authority's cash equivalents and investments by type at December 31, 2019 and 2018, at fair value, including the money market mutual funds and investment agreement using a cost-based measurement:

	2019	2018
U.S. government agency	$ 295,197,899	261,814,785
U.S. Treasury securities	121,962,279	100,685,788
Money market mutual funds	109,672,549	92,822,109
Commercial paper	29,657,383	24,612,756
Investment agreement	8,471,273	8,471,273
	$ 564,961,383	488,406,711

 (C o n t i n u e d)

(a) Credit Risk

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. The Authority's policies regarding credit risk comply with Colorado statutes (CRS 24-75-601, as amended) and the Bond Resolutions. Colorado statutes specify the following investment instruments that meet defined rating and risk criteria in which local government entities may invest:

- Obligations of the United States and certain U.S. government agency securities
- Bonds of certain government entities
- Bankers' acceptances of certain banks
- Commercial paper with a certain rating
- Repurchase agreements
- Certain money market mutual funds
- Local government investment pools
- Certain investment agreements

The Authority may invest or deposit any funds in the manner provided by law for political subdivisions of the state. In addition, the Authority may direct a corporate trustee, which holds funds of the Authority, to invest or deposit such funds in investments or deposits other than those specified by law for political subdivisions of the state if the board of directors determines, by resolution, that (1) such investment or deposit meets the standard established in the Colorado Revised Statutes; (2) the income is at least comparable to income available on investments or deposits specified by law for political subdivisions of the state; and (3) such investments will assist the Authority in the financing, construction, maintenance, or operation of public highways.

The following is a summary of the Authority's cash equivalents and investments at December 31, 2019 with credit ratings based on the Standard & Poor's and Moody's ratings scales:

	2019	
	Fair value	**Rating**
U.S. government agency:		
Federal Farm Credit Banks (FFCB)	$ 75,827,935	AA+/Aaa
FFCB Discount Note	596,780	A-1+/P-1
Federal Home Loan Banks (FHLB)	79,220,714	AA+/Aaa
FHLB Discount Note	13,818,152	A-1+/P-1
Federal Home Loan Mortgage Corporation (FHLMC)	27,132,222	AA+/Aaa
Federal National Mortgage Association (FNMA)	44,571,619	AA+/Aaa
International Bank for Reconstruction and Development	45,654,062	AAA/Aaa
Student Loan Marketing Association Discount Note	8,376,415	Not rated/Aaa
Total U.S. government agency	295,197,899	
U.S. Treasury securities:		
U.S. Treasury notes	100,247,262	Not applicable
U.S. Treasury bills	21,715,017	Not applicable
Total U.S. Treasury securities	121,962,279	
Money market mutual funds:		
Federated Government Obligations Fund	91,947,824	AAAm/Aaa-mf
PFM Funds Government Select Series	17,724,725	AAAm/Not rated
Total money market mutual funds	109,672,549	
Investment agreement:		
Societe Generale	8,471,273	A/A2
Commercial paper:		
American Honda Finance Corporation	2,499,125	A-1/P-1
JP Morgan Securities LLC	5,487,285	A-1/P-1
MUFG Bank Ltd/NY	7,364,170	A-1/P-1
Paccar Financial	2,498,202	A-1/P-1
Rabobank Nederland NV NY	2,983,504	A-1/P-1
Toyota Motor Credit Corporation	8,825,097	A-1+/P-1
Total commercial paper	29,657,383	
Total cash equivalents and investments	$ 564,961,383	

U.S. Treasury notes are guaranteed by the U.S. federal government and are, therefore, not subject to credit risk.

The following is a summary of the Authority's cash equivalents and investments at December 31, 2018 with credit ratings based on the Standard & Poor's and Moody's ratings scales:

		2018	
		Fair value	**Rating**
U.S. government agency:			
Federal Farm Credit Banks (FFCB)	$	51,783,848	AA+/Aaa
Federal Home Loan Banks (FHLB)		71,636,097	AA+/Aaa
Federal Home Loan Mortgage Corporation (FHLMC)		38,102,636	AA+/Aaa
Federal National Mortgage Association (FNMA)		46,233,211	AA+/Aaa
International Bank for Reconstruction and Development		46,112,458	AAA/Aaa
Student Loan Marketing Association Discount Note		7,946,535	Not rated/Aaa
Total U.S. government agency		261,814,785	
U.S. Treasury securities:			
U.S. Treasury notes		100,685,788	Not applicable
Money market mutual funds:			
Federated Government Obligations Fund		74,327,278	AAAm/Aaa-mf
PFM Funds Government Select Series		18,494,831	AAAm/Not rated
Total money market mutual funds		92,822,109	
Investment agreement:			
Societe Generale		8,471,273	A/A2
Commercial paper:			
American Honda Finance Corporation		3,727,722	A-1/P-1
JP Morgan Securities LLC		4,846,680	A-1/P-1
MUFG Bank Ltd/NY		4,795,850	A-1/P-1
Rabobank Nederland NV NY		4,844,673	A-1/P-1
Toyota Motor Credit Corporation		6,397,831	A-1+/P-1
Total commercial paper		24,612,756	
Total cash equivalents and investments	$	488,406,711	

U.S. Treasury notes are guaranteed by the U.S. federal government and are, therefore, not subject to credit risk.

(b) Interest Rate Risk

Interest rate risk is the risk that an investment's value will change due to change in the level of interest rates. The Authority currently employs one professional investment management firm to manage its investments. The funds are all "laddered" so that investments do not mature all at once and are in compliance with the Colorado statutes and Bond Resolutions. Additionally, 86% and 83% of the cash equivalents and investments have maturities of three years or less at December 31, 2019 and 2018, respectively.

As of December 31, 2019, the Authority held the following cash equivalents and investments:

	Fair value	Less than one year	Between one and two years	Between two and three years	Greater than three years
U.S. government agency	$ 295,197,899	110,382,873	51,972,581	65,528,565	67,313,880
U.S. Treasury securities	121,962,279	83,551,625	12,295,870	21,077,551	5,037,233
Investment agreement	8,471,273	—	—	—	8,471,273
Commercial paper	29,657,383	29,657,383	—	—	
Total investments	455,288,834	223,591,881	64,268,451	86,606,116	80,822,386
Money market mutual funds	109,672,549	109,672,549	—	—	—
Total cash equivalents and investments	$ 564,961,383	333,264,430	64,268,451	86,606,116	80,822,386

Because the money market mutual funds have a weighted average maturity less than three months as of December 31, 2019, the funds are presented as cash equivalents with maturities of less than one year.

As of December 31, 2018, the Authority held the following cash equivalents and investments:

	Fair value	Less than one year	Between one and two years	Between two and three years	Greater than three years
U.S. government agency	$ 261,814,785	71,117,952	86,371,254	34,072,304	70,253,275
U.S. Treasury securities	100,685,788	47,685,124	40,634,157	8,139,594	4,226,913
Investment agreement	8,471,273	—	—	—	8,471,273
Commercial paper	24,612,756	24,612,756	—	—	—
Total investments	395,584,602	143,415,832	127,005,411	42,211,898	82,951,461
Money market mutual funds	92,822,109	92,822,109	—	—	—
Total cash equivalents and investments	$ 488,406,711	236,237,941	127,005,411	42,211,898	82,951,461

(C o n t i n u e d)

Because the money market mutual funds have a weighted average maturity less than three months as of December 31, 2018, the funds are presented as cash equivalents with maturities of less than one year.

(c) Custodial Credit Risk

For an investment, custodial credit risk is the risk that, in the event of the failure of the counterparty, the Authority will not be able to recover the value of its investment or collateral securities that are in the possession of an outside party. The Authority has no custodial credit risk as all securities are registered in the name of the Authority and held by a third-party safekeeping agent. Investments in money market mutual funds are not exposed to custodial credit risk because their existence is not evidenced by securities that exist in physical or book entry form.

(d) Concentration of Credit Risk

The Authority does not have a limit on the amount that may be invested in any one issuer. As of December 31, 2019 and 2018, approximately 52% and 54%, respectively, of the Authority's cash equivalents and investments are in U.S. government agency investments that are not fully backed by the full faith and credit of the federal government. The investments include FFCB, FHLB, FHLMC, FNMA, International Bank for Reconstruction and Development, and Student Loan Marketing Association investments.

(e) Restricted Funds

The Authority maintains restricted accounts and funds as required per the Bond Resolutions or other externally imposed restrictions. Cash and cash equivalents and investments as of December 31, 2019 and 2018 are restricted as follows:

		2019	2018
Senior Bonds Debt Service Reserve Fund	$	95,565,193	95,271,932
Senior Bonds Debt Service Account		40,766,684	37,715,513
Trust Revenue Fund		18,508,765	14,410,992
Operating Reserve Fund		10,762,138	9,907,386
	$	165,602,780	157,305,823

The restricted funds and accounts have been established in accordance with the Bond Resolutions or other externally imposed restrictions. The Authority maintains other restricted accounts that do not have any funding requirements and thus have a $0 balance as of December 31, 2019 and 2018 and are not shown above. The Bond Resolutions provide, among other provisions, that certain accounting procedures be followed and certain funds and accounts be established to provide bondholders a degree of security against certain contingencies. Brief descriptions of these funds and accounts are as follows:

Senior Bonds Debt Service Reserve Fund – Pursuant to the Bond Resolutions, a Senior Bonds Debt Service Reserve Fund was established solely for the benefit of the holders of the Senior Bonds in the event amounts on deposit in the Senior Bonds Debt Service Account are insufficient to make required payments. As of December 31, 2019 and 2018, the Senior Bonds Debt Service Reserve Fund requirement was $118.0 million, and the account was fully funded at December 31, 2019 and 2018, with balances of $120.6 million and $120.3 million, respectively. The change in year-end balances is due to fair value fluctuations. These balances include cash and cash equivalents and investments of $95.6 million and $95.3 million at December 31, 2019 and 2018, respectively, combined with the $25 million available under a reserve fund surety bond provided by MBIA – administered by National Public Finance Guarantee (NPFG). Within the fund, the Authority holds numerous long-term investment securities, one of which is an investment agreement with Societe Generale. Under the agreement, among other provisions, Societe Generale pays the Authority 6.61% of the investment principal amount on a semiannual basis and must post collateral at a specified amount if their long-term unsecured credit rating is reduced below AA– by Standard and Poor's (S&P) or Aa3 by Moody's. Societe Generale was rated A by S&P and A2 by Moody's at December 31, 2019 and 2018, respectively, and thus has posted collateral in accordance with the agreement. The Authority may terminate the agreement at any time; however, Societe Generale may not terminate the agreement until final maturity in 2026.

Senior Bonds Debt Service Account – Pursuant to the Bond Resolutions, the Senior Bonds Debt Service account is funded from current year revenues in an amount equal to the aggregate senior bond debt service payable during the current fiscal year, including the monthly cash settlements paid on the Authority's interest rate swaps and London Interbank Offered Rate (LIBOR) Index Term Rate bonds. Other senior bond series' interest due is paid semiannually by the Trustee on March 1 and September 1, with outstanding senior bonds payable principal (including any accretion) due on September 1 for the applicable bond series.

Trust Revenue Fund – Except as otherwise provided in the Bond Resolutions, all revenues will be delivered to the Trustee immediately upon receipt by the Authority and will be deposited by the Trustee in the Trust Revenue Fund to be used by the Authority for the purposes of funding any other restricted accounts (including the Senior Bond Debt Service Account) and current year operating expenses. The Master Bond Resolutions allow the Authority to move surplus funds from the Trust Revenue Fund to the General Surplus account (or subaccounts therein) on a monthly basis but also must maintain a retained balance within the Trust Revenue Fund at month-end equal to one-half of the aggregate amount required to be transferred to the Senior Bonds Debt Service Account during such month. The required retained balance was $4.7 million as of December 31, 2019 and $4.6 million as of December 31, 2018 and was fully funded.

Operating Reserve Fund – Under the provisions of the Bond Resolutions, the Operating Reserve Fund is required to be maintained in an amount equal to one-sixth of annual budgeted operating expenses, as determined by the Authority. As of December 31, 2019 and 2018, $10.8 million and $9.9 million, respectively, were on deposit in the Operating Reserve Fund, which exceeded the required balance of $9.7 million and $9.1 million, respectively, during these periods.

Rebate Fund – Moneys will be deposited into the Rebate Fund pursuant to the Bond Resolutions and used solely for the purpose of paying amounts due to the United States of America pursuant to the Internal Revenue Code and arbitrage rebate regulations issued by the Internal Revenue Service (IRS). Funds within the Rebate Fund are only required when an arbitrage rebate liability is due. If the amount in the Rebate Fund is in excess of the amount required to be deposited based on the assessed arbitrage rebate liability, such excess will be transferred to the Authority.

(f) Unrestricted Funds

The General Surplus account is unrestricted and is currently divided into three subaccounts for administrative purposes: the Senior Bond Defeasance Fund, the Capital Improvements Fund, and the Rainy Day Fund. These unrestricted funds are available to fund any allowable obligations of the Authority; however, the Bond Resolutions include a requirement that the General Surplus account not be reduced below $20.0 million unless the Authority's bond issuer, MBIA – administered by NPFG, provides written consent to such a distribution below this level. As of December 31, 2019 and 2018, the Authority held $423.8 million and $350.8 million, respectively, in total unrestricted funds, including cash and cash equivalents and investments. Approximately $374.8 million and $310.8 million were within the General Surplus accounts as of December 31, 2019 and 2018, respectively, which have specific purposes, such as fully funding the Authority's future capital budget and bond defeasances.

(g) Investment Income

Investment income's interest earned on investments consists of restricted and unrestricted investment earnings, any associated premium or discounts, and any realized gains or losses on the investments. Also, included in total investment income is the change in the fair value of investments as of the end of the reporting period. The Authority recognized total investment gain of $17.4 million in 2019 and total investment gain of $8.3 million in 2018, excluding the net change in fair value of derivative instruments. Restricted interest earned on investments was $0.8 million in 2019 and $0.5 million in 2018 and is restricted by the Bond Resolutions or by other externally imposed restrictions. Unrestricted investment income may be earned within restricted investment accounts as long as those accounts are fully funded by year-end, as required by the Bond Resolutions.

(5) Accounts Receivable

The following is a summary of accounts and tolls receivable balances and related allowance as of December 31, 2019 and 2018:

		2019	2018
Tolls receivable (billed)	$	28,779,708	26,952,714
Accrued toll revenue – transactions still processing		7,867,259	4,196,557
Unbilled toll revenue		2,677,552	4,235,230
Late fee receivable		1,959,236	1,767,451
Accounts receivable		1,479,372	1,440,964
Total accounts receivable		42,763,127	38,592,916
Allowance for uncollectible tolls receivable		(10,348,368)	(9,121,050)
Allowance for uncollectible late fee receivable		(771,542)	(619,845)
Total accounts receivable, net of allowance for uncollectibles	$	31,643,217	28,852,021

(C o n t i n u e d)

With LPT tolls receivable, there are three stages accrued within the basic financial statements: accrued toll revenue (transactions in process for billing); unbilled toll revenue (transactions assigned to a customer account and are waiting to be billed); and tolls receivable (transactions that have been billed to a customer and are awaiting payment). Customers are generally billed each month for all toll activity incurred during the previous month and have 30 days to pay. If the first bill is unpaid, customers will be sent a second and third bill with a $5 late fee assessed on the second bill only and have an additional 60 days to pay the outstanding tolls and fee. If still unpaid, the tolls may be remitted to a collection law firm where additional collection fees, including civil penalties and adjudication fees, may be assessed with a possible hold being placed on the customer's vehicle registration. ExpressToll customers with unpaid tolls may have their transponder deactivated, account converted to LPT, and may be remitted to the collection law firm where additional collection fees, including civil penalties and adjudication fees, may be assessed with a possible hold being placed on the customer's vehicle registration. Once converted, future tolls on these accounts will be at the higher LPT rate. Further, tolls charged to customers for LPT versus ExpressToll vary based on the approved two-tiered toll rates, which were effective beginning January 1, 2019. Based on the outstanding tolls and related late fees in fiscal years 2019 and 2018, the Authority has approximately $11.1 million and $9.7 million, respectively, in outstanding tolls and late fee receivables at year-end that are not expected to be collected within the next fiscal year.

(6) Notes Receivable

The following is an analysis of changes in notes receivable for the year ended December 31, 2019:

		Balance at January 1, 2019	Additions	Reductions	Balance at December 31, 2019	Due within one year
Other intergovernmental agreements	$	2,000,000	3,700,000	178,658	5,521,342	1,582,966

		Balance at January 1, 2018	Additions	Reductions	Balance at December 31, 2018	Due within one year
Other intergovernmental agreements	$	—	2,000,000	—	2,000,000	178,500

(a) *Intergovernmental Agreement with City of Aurora regarding Stephen D. Hogan Parkway*

The Authority entered into an intergovernmental agreement in 2015 with the City of Aurora (the City) regarding the extension of 6th Avenue from its former terminus in an eastward direction from Buckley Air Force Base to East 6th Parkway and E-470. This extension, opened in 2019 as East Stephen D. Hogan Parkway, established a more direct route of travel, thereby filling a gap in the regional roadway network. In addition, the forecasted traffic and revenue on E-470 indicates that the extension will provide future revenue increases for the Authority. In consideration of the potential future revenue impacts, the Authority agreed to contribute $4.0 million toward the cost of construction in the form of a $2.0 million contribution and a $2.0 million loan, both of which were disbursed to the City on August 9, 2018 from the Capital Improvements Fund. The $2.0 million contribution was presented as an intergovernmental expense in 2018. The loan has a 10-year term beginning on August 9, 2018, the date the Authority’s proceeds were disbursed to the City, and bears interest at a rate of 2.5% per annum. At December 31, 2019 and 2018, the current notes receivable balance was $0.2 million, respectively. At December 31, 2019 and 2018, the noncurrent notes receivable balance was $1.6 million and $1.8 million, respectively.

(b) *Intergovernmental Agreement with South Aurora Regional Improvement Authority and Arapahoe County regarding E-470 Ramp Relocation at Quincy Avenue*

The Authority entered into an intergovernmental agreement in 2019 with South Aurora Regional Improvement Authority (SARIA) and Arapahoe County (the County) regarding relocation of the northbound on and off-ramps at Quincy Avenue, including the installation of a new signalized intersection to assist with mitigation of traffic congestion. The County is improving the current intersection of Quincy Ave and Gun Club Road with a partial continuous flow intersection, and the proximity of the northbound on and off-ramps of E-470 at Quincy Avenue creates operational and safety concerns, which the relocation will alleviate. The Authority is responsible for facilitating, overseeing, and completing the project, which will be constructed in conjunction with the Quincy to I-70 widening project to achieve economies of scale and other efficiencies and cost savings and is expected to be completed in 2020. Under the agreement, SARIA and the County will each contribute one-third of the project costs, estimated at the time of the agreement to be $3.0 million each. E-470 received $2.0 million from SARIA and $0.3 million from the County in 2019. The remaining unpaid balance due from SARIA as of December 31, 2019 is $1.0 million and may be paid at any date prior to May 10, 2024, with the exact timing subject to funding availability. The remaining unpaid balance due from the County as of December 31, 2019 is $2.7 million, scheduled to be paid in installments of $1.4 million in 2020 and $1.3 million in 2021. The unpaid balances do not accrue interest.

(7) Capital Assets

A summary of changes in capital assets for the year ended December 31, 2019 is as follows:

		Balance at January 1, 2019	Increases	Decreases	Transfers	Balance at December 31, 2019
Capital assets not being depreciated:						
Land	$	110,538,228	1,029,483	—	—	111,567,711
Construction in progress		2,364,746	42,150,613	(419,982)	(16,358,706)	27,736,671
Total capital assets not being depreciated		112,902,974	43,180,096	(419,982)	(16,358,706)	139,304,382
Depreciable capital assets:						
Infrastructure		994,265,586	8,127,266	(159,723)	—	1,002,233,129
Buildings		24,536,706	684,461	(539,326)	—	24,681,841
Equipment		36,532,439	2,955,452	(1,399,183)	—	38,088,708
Software, fixtures, improvements, and other assets		37,995,426	4,591,527	—	—	42,586,953
Total depreciable capital assets		1,093,330,157	16,358,706	(2,098,232)	—	1,107,590,631
Less accumulated depreciation for:						
Infrastructure		(553,019,389)	(33,053,896)	103,962	—	(585,969,323)
Buildings		(11,137,827)	(839,106)	305,233	—	(11,671,700)
Equipment		(28,138,157)	(2,548,712)	1,154,696	—	(29,532,173)
Software, fixtures, improvements, and other assets		(26,317,756)	(5,615,345)	—	—	(31,933,101)
Total accumulated depreciation		(618,613,129)	(42,057,059)	1,563,891	—	(659,106,297)
Depreciable capital assets, net		474,717,028	(25,698,353)	(534,341)	—	448,484,334
Total capital assets, net	$	587,620,002	17,481,743	(954,323)	(16,358,706)	587,788,716

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Notes to Basic Financial Statements

December 31, 2019 and 2018

A summary of changes in capital assets for the year ended December 31, 2018 is as follows:

	Balance at January 1, 2018	Increases	Decreases	Transfers	Balance at December 31, 2018
Capital assets not being depreciated:					
Land	$ 110,538,228	—	—	—	110,538,228
Construction in progress	2,331,813	10,631,690	(93,207)	(10,505,550)	2,364,746
Total capital assets not being depreciated	112,870,041	10,631,690	(93,207)	(10,505,550)	112,902,974
Depreciable capital assets:					
Infrastructure	993,406,281	1,207,305	(348,000)	—	994,265,586
Buildings	24,238,282	298,424	—	—	24,536,706
Equipment	35,023,803	2,218,747	(710,111)	—	36,532,439
Software, fixtures, improvements, and other assets	31,567,733	6,781,074	(353,381)	—	37,995,426
Total depreciable capital assets	1,084,236,099	10,505,550	(1,411,492)	—	1,093,330,157
Less accumulated depreciation for:					
Infrastructure	(520,218,490)	(33,038,845)	237,946	—	(553,019,389)
Buildings	(10,327,537)	(810,290)	—	—	(11,137,827)
Equipment	(26,033,269)	(2,809,356)	704,468	—	(28,138,157)
Software, fixtures, improvements, and other assets	(21,933,663)	(4,737,474)	353,381	—	(26,317,756)
Total accumulated depreciation	(578,512,959)	(41,395,965)	1,295,795	—	(618,613,129)
Depreciable capital assets, net	505,723,140	(30,890,415)	(115,697)	—	474,717,028
Total capital assets, net	$ 618,593,181	(20,258,725)	(208,904)	(10,505,550)	587,620,002

(Continued)

(8) Deferred Outflows of Resources

The deferred outflows of resources represent the remaining unamortized deferral balances from losses on refundings of debt. The balances of $60.6 million and $68.8 million as of December 31, 2019 and 2018, respectively, are included within the net investment in capital assets component of net position.

A summary of deferred outflows of resources as of December 31, 2019 and 2018 is as follows:

		2019	2018
Deferred refunding 1997	$	13,313,002	15,313,987
Deferred refunding 2004		17,637,613	18,728,600
Deferred refunding 2006		5,045,098	5,367,125
Deferred refunding 2008		9,557,389	10,434,935
Deferred refunding 2010		7,327,774	8,429,161
Deferred refunding 2015		1,394,618	3,303,600
Deferred refunding 2017		2,829,960	7,245,796
Deferred refunding 2019		3,471,647	—
	$	60,577,101	68,823,204

(9) Bonds Payable

Bonds payable include current interest bonds (CIB), capital appreciation bonds (CAB), and LIBOR index bonds, consisting of both new issue and refunded bonds of the Authority. The Authority is committed to repay the bonds and related interest from its revenues and allowable restricted investments. Interest rates on outstanding current interest bonds at December 31, 2019 ranged from 2.35% to 5.375%. The average outstanding coupon (interest) rate on all outstanding current interest bonds was 4.49% and 4.20% for the years ended December 31, 2019 and 2018, respectively. Yields on outstanding capital appreciation bonds at December 31, 2019 and 2018 ranged from 5.06% to 7.13%. The average outstanding yield rate on all outstanding capital appreciation bonds was 5.90% and 5.89% for the years ended December 31, 2019 and 2018, respectively. Most bond series' interest due is paid semiannually on March 1 and September 1, with outstanding principal due on September 1 for the applicable bond series. Only the Series 2017 and Series 2019 LIBOR index term rate bonds accrue and pay interest monthly based on the variable 67% of one month LIBOR index plus 105 basis points (bps), or 1.05% on the 2017B bonds, and 42 basis points, or 0.42% on the 2019A bonds.

The Bond Resolutions require that the Authority maintain a Revenue Covenant (also referred to as the debt service coverage ratio) of at least 1.30 times the aggregate debt service due for the year. For the years ended December 31, 2019 and 2018, the Authority exceeded the required debt service coverage ratio of 1.30. Refer to the Supplementary Information – Revenue Covenant section for the 2019 debt service coverage calculation and reconciliation to the basic financial statements for operating balances and senior debt service due.

(C o n t i n u e d)

The following is a summary of the bonds payable by bond series and type as of December 31, 2019:

Bonds outstanding		Original principal amount	Refunded series (if applicable)	Current maturity dates (1)	Current interest rate/yield ranges	Annual principal maturity due ranges
Series 1997 B CAB	$	342,217,730	1986 Bonds	2020 – 2026	5.50% – 5.52%	$ $44,795,000 – 44,800,000
Series 2000 B CAB		252,848,750	—	2020 – 2033	6.20% – 6.35%	36,200,000 – 104,200,000
Series 2004 A CAB		76,484,624	2000 B CAB *	2027 – 2036	5.33% – 5.46%	78,425,000 – 78,500,000
Series 2004 B CAB		70,705,810	2000 B CAB *	2027 – 2036	5.60% – 5.72%	23,300,000 – 49,075,000
Series 2006 B CAB		56,932,723	2000 A CIB	2035 – 2039	5.06% – 5.08%	60,000,000 – 70,720,000
Series 2010 A CAB		21,834,746	1997B CAB *	2035 – 2041	7.08% – 7.13%	7,860,000 – 52,385,000
Series 2010 C CIB		81,655,000	2007A2–D2 *	2025 – 2026	5.25% – 5.375%	24,180,000 – 57,475,000
Series 2015 A CIB		41,550,000	2007 A1–D1 *	2020	2.35% – 5.00%	20,590,000
Series 2017 B LIBOR		66,075,000	2007 CD-2	2026 – 2039	67% LIBOR + 105 bps	5,115,000 – 22,210,000
Series 2019 A LIBOR		72,565,000	2017 A	2026 – 2039	67% LIBOR + 42 bps	13,515,000 – 22,250,000

(1) The current maturity dates include a range, but does not indicate that there are maturities every year within the range.

* The refunded bonds were partially refunded by the new series bonds.

Series 2019A Bonds – On March 7, 2019, The Authority successfully refunded the Series 2017A LIBOR Index Term Rate bonds with the Series 2019A LIBOR Index Term Rate bonds totaling approximately $72.5 million at par, with no change to the principal amounts or maturities. The Series 2017A bonds were subject to optional early redemption on or after March 1, 2019, with a mandatory tender and remarketing date of September 1, 2019. The Authority exercised the early redemption option on both series to take advantage of low interest rates and debt service savings. The Series 2017A bonds of $72.5 million paid interest each month based on the previous period’s final calculated LIBOR market pricing plus 90 basis points (0.90%), which was refunded with the new Series 2019A LIBOR Index bonds plus 42 basis points (0.42%) over a two-and-a-half-year term (term date of September 1, 2021), saving the Authority over 0.48% in monthly interest costs. The proceeds totaling $72.5 million were used to defease the outstanding Series 2017A bonds, and the related liability for those bonds were removed from the Authority’s statements of net position. The Authority used funds from the General Surplus account (Senior Bond Defeasance Fund) to pay all related underwriting fees and other issuance costs totaling approximately $969,000.

The principal portions of the Series 2019A bonds are payable in September 2026 and September 2037 to September 2039, with amounts ranging between $13.5 million and $22.3 million. These principal amounts due did not change from the refunded bonds principal debt service requirements. The Series 2019A bonds are subject to an optional redemption on or after September 1, 2020, with a mandatory tender and remarketing date of September 1, 2021. If the bonds are not converted (or refunded) by the mandatory redemption date, the bonds will reset to a failed remarketing rate during the first 90 days at the greater of (a) applicable LIBOR index rate plus 4.50% or (b) 7.00%; thereafter the failed remarketing rate is 9.00% based on the Bond Resolutions.

The refunding resulted in a difference between the reacquisition price and the net carrying amount of the old debt of $3.9 million in the prior year for the 2019A bonds. This difference, reported in the accompanying basic financial statements as a component of deferred outflows of resources within the 2019 deferred refunding balance, are being amortized as a component of interest expense over the shorter life of the old (including previous refunded debt) and the new debt, which is 2026. The refunding resulted in a net present value economic gain of $0.2 million, and the refunding reduces debt service payments in the years 2019 to and including 2039 by a total of $1.3 million. The Authority retained the 67% of one-month LIBOR convention on the bonds to match the associated index of the interest rate swaps and eliminate basis risk (note 10). Lastly, and related to this transaction, the Authority removed the swap insurance on the two interest rate swaps that have been insured by NPFG since 2007 and paid the swap counterparties a total of $974 thousand to terminate the policies. This was done in part due to negotiations with NPFG and based on the insurer rights within the swap and bond documents and will benefit the Authority in the future with greater flexibility for any swap changes. NPFG's financial strength and claims paying ability rating was reaffirmed and then subsequently withdrawn by S&P in December 2017 and was downgraded by Moody's to Ba3 in January 2018, which is lower than the Authority's stand-alone rating.

The following is an analysis of changes in bonds payable and associated bond premiums and discounts for the year ended December 31, 2019:

	Balance at January 1, 2019	Additions	Reductions	Balance at December 31, 2019	Due within one year
Series 1997B CAB (Principal)	$ 90,296,951	—	13,658,176	76,638,775	12,854,016
Series 1997B CAB (Accretion)	197,640,484	15,258,365	31,141,824	181,757,025	31,945,984
Series 2000B CAB (Principal)	143,746,679	—	10,219,956	133,526,723	10,475,556
Series 2000B CAB (Accretion)	312,221,814	28,443,329	22,880,044	317,785,099	25,724,444
Series 2004A CAB (Principal)	76,484,624	—	—	76,484,624	—
Series 2004A CAB (Accretion)	85,000,085	8,837,373	—	93,837,458	—
Series 2004B CAB (Principal)	70,705,810	—	—	70,705,810	—
Series 2004B CAB (Accretion)	84,468,197	8,943,715	—	93,411,912	—
Premium Series 2004	395,692	—	24,265	371,427	—
Series 2006B CAB (Principal)	56,932,723	—	—	56,932,723	—
Series 2006B CAB (Accretion)	48,383,198	5,409,785	—	53,792,983	—
Series 2010A CAB (Principal)	21,834,746	—	—	21,834,746	—
Series 2010A CAB (Accretion)	16,862,042	2,803,150	—	19,665,192	—
Series 2010C CIB	81,655,000	—	—	81,655,000	—
Discount 2010C CIB	(148,932)	22,212	—	(126,720)	—
Series 2015A CIB	38,985,000	—	18,395,000	20,590,000	20,590,000
Premium 2015A CIB	605,970	—	605,970	—	—
Series 2017A LIBOR Notes	72,565,000	—	72,565,000	—	—
Series 2017B LIBOR Notes	66,075,000	—	—	66,075,000	—
Series 2019A LIBOR Notes	—	72,565,000	—	72,565,000	—
Total	$ 1,464,710,083	142,282,929	169,490,235	1,437,502,777	101,590,000

The following is an analysis of changes in bonds payable and associated bond premiums and discounts for the year ended December 31, 2018:

	Balance at January 1, 2018	Additions	Reductions	Balance at December 31, 2018	Due within one year
Series 1997B CAB (Principal)	$ 104,712,695	—	14,415,744	90,296,951	13,658,176
Series 1997B CAB (Accretion)	211,219,843	16,804,897	30,384,256	197,640,484	31,141,824
Series 2000B CAB (Principal)	154,024,296	—	10,277,617	143,746,679	10,219,956
Series 2000B CAB (Accretion)	304,440,594	28,603,603	20,822,383	312,221,814	22,880,044
Series 2004A CAB (Principal)	76,484,624	—	—	76,484,624	—
Series 2004A CAB (Accretion)	76,621,428	8,378,657	—	85,000,085	—
Series 2004B CAB (Principal)	70,705,810	—	—	70,705,810	—
Series 2004B CAB (Accretion)	76,011,802	8,456,395	—	84,468,197	—
Premium Series 2004	418,672	—	22,980	395,692	—
Series 2006B CAB (Principal)	56,932,723	—	—	56,932,723	—
Series 2006B CAB (Accretion)	43,237,806	5,145,392	—	48,383,198	—
Series 2007 A-1 CIB	3,025,000	—	3,025,000	—	—
Series 2007 B-1 CIB	3,025,000	—	3,025,000	—	—
Series 2007 C-1 CIB	3,025,000	—	3,025,000	—	—
Series 2007 D-1 CIB	3,060,000	—	3,060,000	—	—
Series VRF 2009 CIB	1,395,000	—	1,395,000	—	—
Series 2010A CAB (Principal)	21,834,746	—	—	21,834,746	—
Series 2010A CAB (Accretion)	14,248,176	2,613,866	—	16,862,042	—
Series 2010C CIB	81,655,000	—	—	81,655,000	—
Discount 2010C CIB	(171,149)	22,217	—	(148,932)	—
Series 2015A CIB	39,185,000	—	200,000	38,985,000	18,395,000
Premium 2015A CIB	1,753,307	—	1,147,337	605,970	—
Series 2017A LIBOR Notes	72,565,000	—	—	72,565,000	—
Series 2017B LIBOR Notes	66,075,000	—	—	66,075,000	—
Total	$ 1,485,485,373	70,025,027	90,800,317	1,464,710,083	96,295,000

At December 31, 2019, scheduled payments for bonds payable over the next five years and thereafter are as follows:

		Principal	Swap and debt interest	Total
Year(s) ending December 31:				
2020	$	101,590,000	11,620,985	113,210,985
2021		82,495,000	10,812,159	93,307,159
2022		84,200,000	11,301,450	95,501,450
2023		85,895,000	11,301,450	97,196,450
2024		87,695,000	11,303,594	98,998,594
2025 – 2029		619,020,000	38,819,118	657,839,118
2030 – 2034		637,500,000	29,570,173	667,070,173
2035 – 2039		576,095,000	22,856,900	598,951,900
2040 – 2041		104,770,000	—	104,770,000
		2,379,260,000	147,585,829	2,526,845,829
Add premiums, net of discounts		244,707	—	244,707
Total scheduled payments		2,379,504,707	147,585,829	2,527,090,536
Less future years' accretion		(942,001,930)	—	(942,001,930)
Total bonds payable	$	1,437,502,777	147,585,829	1,585,088,606

Included in the above principal payment schedule is $942 million of expected future year interest accretion on the Senior CAB 1997B bond series, Senior CAB 2000B bond series, Senior CAB 2004A and 2004B bonds series, Senior 2006B bond series, and the Senior 2010A bond series.

(10) Derivative Instruments

The Authority has two outstanding interest rate swap agreements that are considered investment derivatives under GASB Statement No. 53, *Accounting and Financial Reporting for Derivative Instruments*, as of December 31, 2019 and 2018.

As a means to hedge its borrowing costs, when compared against fixed-rate bonds at the time of issuance of the Series 2007 auction-rate bonds in June 2007, the Authority originally entered into separate pay-fixed, receive-floating LIBOR interest rate swap agreements with Morgan Stanley (MS-1) and JP Morgan (JP-1) (formerly known as Bear Stearns). The intention of these two pay-fixed swaps was to effectively change the Authority's variable interest rate on the Series 2007 auction-rate bonds to a synthetic fixed rate of 3.832% until final maturity of the bonds in September 2039. The swaps and related Series 2007 bonds have since gone through a series of remarketings, refundings, and partial swap terminations since 2007 and are now associated only with the remaining 2017B and 2019A LIBOR Index Term Rate Bonds.

The 2007 pay-fixed MS-1 and JP-1 swaps have outstanding notional amounts from 2026 to 2039 related to the outstanding Series 2017B and 2019A bond maturities. The Authority pays variable interest on each month based on the previous months' final 67% of LIBOR index rate plus 105 basis points (1.05%) for the Series 2017B bonds, and pays 42 basis points (0.42%) for the Series 2019A bonds. These spreads plus the MS-1 and JP-1 pay-fixed interest rate of 3.832% leads to a synthetic interest rate of 4.882% and 4.252% on the outstanding Series 2017B and 2019A bonds, respectively, during the term-rate period, where the Authority has removed the basis risk (both the bonds and swaps are 67% of LIBOR based). However, the relationship between both the Series 2017B and 2019A bonds and the two swaps did not meet the requirements of a hedging derivative instrument; therefore, the related swap fair values are recorded as investment derivatives as of December 31, 2019 and 2018.

During 2019 and 2018, the Authority recognized, on the accrual basis, swap settlements on the 2007 pay-fixed swaps (MS-1 and JP-1) of $3.2 million and $3.4 million, respectively.

The following table provides a summary of the Authority's investment derivative interest rate swaps as of December 31, 2019 and 2018:

Swap	Counterparty	Effective date	Maturity date	Terms	Original notional amount	2019 and 2018 notional amount
JP-1	JP Morgan	June 14, 2007	September 1, 2039	Pay 3.832%; receive 67% one-month LIBOR	$ 155,252,500	69,320,000
MS-1	Morgan Stanley	June 14, 2007	September 1, 2039	Pay 3.832%; receive 67% one-month LIBOR	155,252,500	69,320,000
				Total notional amounts for pay-fixed swaps	$ 310,505,000	138,640,000

The Authority values the interest rate swap derivatives at fair value in accordance with generally accepted accounting principles (note 3) and has subscribed to an independent monitoring service to assist in the review of the monthly cash flows and fair market valuations.

The fair values of derivative instruments outstanding at December 31, 2019, classified by type, and changes in fair value of such derivative instruments for the year then ended, as reported in the basic financial statements, are as follows:

		2019 Changes in fair value		Fair value at December 31, 2019	
		Classification	**Amount**	**Classification**	**Amount**
Investment derivative instruments:					
JP-1	Pay-fixed interest rate swap	Derivative loss	$ (6,168,127)	Derivative instruments	$ (25,087,335)
MS-1	Pay-fixed interest rate swap	Derivative loss	(6,170,701)	Derivative instruments	(25,082,116)
		Investment revenues: Derivative loss	$ (12,338,828)	Derivative instruments	$ (50,169,451)

The fair values of derivative instruments outstanding at December 31, 2018, classified by type, and changes in fair value of such derivative instruments for the year then ended, as reported in the basic financial statements, are as follows:

		2018 Changes in fair value		Fair value at December 31, 2018	
		Classification	**Amount**	**Classification**	**Amount**
Investment derivative instruments:					
JP-1	Pay-fixed interest rate swap	Derivative gain	$ 2,851,894	Derivative instruments	$ (18,919,208)
MS-1	Pay-fixed interest rate swap	Derivative gain	2,860,794	Derivative instruments	(18,911,415)
		Investment revenues: Derivative gain	$ 5,712,688	Derivative instruments	$ (37,830,623)

(a) Credit Risk

Credit risk can be measured by actual market value exposure or theoretical exposure. When the fair value of any swap has a positive fair market value, the Authority is exposed to the actual risk that the counterparty will not fulfill its obligations. As of December 31, 2019 and 2018, the Authority did not have credit risk as the fair value on the two remaining swaps are liabilities to the Authority.

Under the current swap agreements, JP Morgan Chase Bank, N.A. is required to maintain credit quality ratings of "Aa3" by Moody's or "AA–" by S&P, while Morgan Stanley Capital Services Inc. is required to maintain credit quality ratings of at least two of the following ratings, which is a "Baa2" from Moody's, "BBB" from S&P, and "BBB" from Fitch. As of December 31, 2019, the swap counterparties had the following ratings from Moody's, S&P, and Fitch:

Counterparty	Moody's	S&P	Fitch
JP Morgan	Aa2	A+	AA
Morgan Stanley	A3	BBB+	A

Due to ratings adjustments with both swap counterparties over the past several years, the Authority entered into a separate credit support annex agreement with Morgan Stanley in 2010 during the time of the 2010 tender transaction and entered into a credit support annex agreement with JP Morgan in 2013 due to their S&P rating downgrade to A+. Under these agreements, the Authority can require the counterparty to post collateral at any time when the aggregate fair market value of the Morgan Stanley swaps or the separate JP Morgan swap is an asset to the Authority; however, these counterparty rating downgrades did not trigger a termination event. The Authority monitors its fair market value and the ratings on its counterparties regularly to determine if credit risk is a concern. The Authority has not calculated theoretical credit exposure on its swaps. There is no master netting agreement between the Authority and either counterparty.

(b) Interest Rate Risk

Interest rate risk exists if the investment derivative exposes the Authority to interest rate risk. Each of the investment derivatives exposes the Authority to interest rate risk because changes in interest rates will affect the fair market value of each of the investment derivatives. As variable LIBOR rates increase or decrease, the amount of each net settlement changes resulting in potentially dramatic changes in fair market value from period to period.

The following table shows the impact of a 25 basis point (0.25%) increase and decrease in related rates in a parallel yield curve shift for each outstanding investment derivative as of December 31, 2019:

		Fair value at December 31, 2019	Interest rates up 25 basis points	Interest rates down 25 basis points
JP-1 Receive-variable (LIBOR) swap	$	(25,087,335)	(23,459,893)	(26,716,166)
MS-1 Receive-variable (LIBOR) swap		(25,082,116)	(23,455,007)	(26,710,614)
	$	(50,169,451)	(46,914,900)	(53,426,780)

The following table shows the impact of a 25 basis point (0.25%) increase and decrease in related rates in a parallel yield curve shift for each outstanding investment derivative as of December 31, 2018:

		Fair value at December 31, 2018	Interest rates up 25 basis points	Interest rates down 25 basis points
JP-1 Receive-variable (LIBOR) swap	$	(18,919,208)	(17,009,936)	(20,906,249)
MS-1 Receive-variable (LIBOR) swap		(18,911,415)	(17,002,113)	(20,898,470)
	$	(37,830,623)	(34,012,049)	(41,804,719)

(c) Foreign Currency Risk

All of the interest rate swaps are denominated in U.S. dollars; therefore, the Authority is not exposed to foreign currency risk.

(d) Contingent Features

The Authority or counterparty may terminate the swap if the other party fails to perform under the terms of the swap contract or any credit support annex agreement. In such cases, the Authority may owe or be due a termination payment depending on the fair market value of the interest rate swap at that time. The termination payment due to the counterparty or from the counterparty may not be equal to the fair market value. A termination of any interest rate swap may automatically occur due to cross default, bankruptcy, merger, and other defined events found in the swap agreements. Termination risk is a contingent feature of the investment derivatives and is described below. The Authority is not required to post collateral under its swap agreements.

Termination Risk: The 2007 LIBOR interest rate swap agreements (JP-1 and MS-1) expire on September 1, 2039. Both swap agreements are subject to early termination by the parties in certain specified events. These events include events of default and other ratings of the Authority and swap counterparty falling below the specified ratings in the swap agreements. No additional early automatic termination events were triggered as of December 31, 2019 or 2018. The Authority's underlying senior bond rating would have to go below BBB– by S&P or Baa3 by Moody's to cause a termination event. As of December 31, 2019 and 2018, the Authority's underlying senior bond rating was A by S&P and A2 by Moody's. If the swap agreements had an unscheduled ending, any associated termination payments would not impact the Authority's asset/liability strategy as the Authority holds approximately $423.8 million and $350.8 million in total unrestricted funds at December 31, 2019 and 2018, respectively. In addition, the Authority has the ability to exercise, at its sole discretion, early termination of the swap agreements at a mutually agreed-upon price for any reason.

Further, related to the 2019A bond transaction, the Authority removed the swap insurance on the two interest rate swaps that have been insured by NPFG since 2007 and paid the swap counterparties a total of $974 thousand to terminate the policies. This was done in part due to negotiations with NPFG and based on the insurer rights within the swap and bond documents and will benefit the Authority in the future with greater flexibility for any swap changes. NPFG's financial strength and claims paying ability rating was reaffirmed and then subsequently withdrawn by S&P in December 2017 and was downgraded by Moody's to Ba3 in January 2018, which is lower than the Authority's stand-alone rating.

(11) Notes Payable

The following is an analysis of changes in notes payable for the years ended December 31, 2019 and 2018:

		Balance at January 1, 2019	Additions	Reductions	Balance at December 31, 2019	Due within one year
Other intergovernmental agreements	$	481,538	—	240,769	240,769	240,769

		Balance at January 1, 2018	Additions	Reductions	Balance at December 31, 2018	Due within one year
Other intergovernmental agreements	$	722,308	—	240,770	481,538	240,769

The Authority entered into an intergovernmental agreement with Douglas County in 2003 to receive contributed funds for costs of the Jamaica Road interchange ramp construction. Based on this agreement, the remaining contributed funds of $2.4 million as of 2008 are to be repaid in 10 equal payments (noninterest-bearing) beginning in 2011. The annual payment of $0.2 million is made from unrestricted funds, and the final scheduled payment occurs in January 2020.

(12) Other Restricted Noncurrent Liabilities

Other restricted noncurrent liabilities includes the remaining unamortized balance of the 1997 forward delivery agreement and any arbitrage rebate liability to the Authority, if applicable. The following is an analysis of changes in the unamortized balance of the 1997 forward delivery agreement for the years ended December 31, 2019 and 2018:

	Balance at January 1, 2019	Additions	Reductions	Balance at December 31, 2019
$	1,585,983	—	207,544	1,378,439

	Balance at January 1, 2018	Additions	Reductions	Balance at December 31, 2018
$	1,793,527	—	207,544	1,585,983

Under the Bond Resolutions, the Authority is required to make scheduled payments with respect to 1997 Senior Bonds by depositing certain moneys into the Senior Bonds Debt Service Account held by the Trustee. The Authority has deemed the reinvestment of these funds for a period prior to the required payment date to be desirable. To facilitate the reinvestment, the Authority entered into a Debt Service Forward Delivery Agreement in December 1997 with U.S. Bank National Association and Lehman Brothers Special Financing Inc. (LBSF). Under the terms of the original agreement in 1997, LBSF agreed to pay a facility fee of $11.3 million for the opportunity to use the funds to invest in qualified securities. The agreement provides for the appropriate amounts to be available as needed for scheduled debt service payments.

During 2007, 2008, and 2010, the Authority refunded, tendered, and redeemed a portion of the Series 1997A, 1997B, and 1997C bonds, respectively. By entering into these transactions on the Series 1997 bonds, the Authority no longer had a requirement to deposit interest and principal into the Senior Bonds Debt Service Account in the amount that was originally agreed upon when entering into the Debt Service Forward Delivery Agreement with LBSF. Partial termination payments were made to LBSF in 2007 ($6.5 million), 2008 ($0.3 million), and 2010 ($0.2 million). Due to bankruptcy of LBSF, the Authority entered into a novation agreement in 2013 to transfer the forward delivery agreement from LBSF to Deutsche Bank. No terms of the original agreement were changed, and the Authority did not incur any expenses from the novation. The remaining balance of the 1997 forward delivery agreement is being amortized over the life of the outstanding 1997 bonds, which reach final maturity in September 2026.

The Internal Revenue Code and arbitrage rebate regulations issued by the IRS require rebate to the federal government of excess investment earnings on tax-exempt debt proceeds if the yield on those earnings exceeds the effective yield on the related tax-exempt debt issued. Excess earnings must be rebated every five years or upon maturity of the debt, whichever is earlier. The Authority has an assessed arbitrage rebate liability of $0.6 million as of December 31, 2019 and $0.3 million as of December 31, 2018. A rebate of $0.04 million related to the 2015A bonds was due and paid in 2019. There were no amounts due or paid in 2018.

(13) Commitments and Contingencies

(a) Tax, Spending, and Debt Limitations

In November 1992, the voters of Colorado approved Amendment 1, referred to as the Taxpayers Bill of Rights (TABOR), which added a new Section 20 to Article X of the Colorado Constitution. TABOR contains tax, spending, revenue, and debt limitations that apply to the State of Colorado and all local governments. Enterprises, defined as government-owned businesses authorized to issue revenue bonds and receiving less than 10% of annual revenue in grants from all state and local governments combined, are excluded from the provisions of TABOR. The Authority's operations qualify for this exclusion.

(b) Risk Management

The Authority is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors or omissions; injuries to employees; and natural disasters. The Authority maintains commercial insurance for most risks of loss. Claims, expenses, and liabilities are reported when it is probable that a loss has occurred and the amount of that loss can be reasonably estimated. At December 31, 2019 and 2018, no amounts have been recorded for pending or future claims. Further, claims have not exceeded insurance limits for each of the past three years.

(c) Solar Equipment

The Authority entered into a solar power purchase agreement in July 2011 with Renewable Social Benefit Funds (RSBF), L3C, which provided RSBF the right to install solar power–generating facilities within the Authority's 16-mile Xcel Energy corridor. Generating facilities were installed at 18 ramp locations and four building locations within this corridor (Authority headquarters, toll plazas B and C, and the central maintenance facility) for an estimated generating capacity of 707 kilowatts. RSBF is responsible for all installation, operation and maintenance, and other associated costs of the entire generating system for a 20-year period. The solar power–generating facilities were fully operational in early 2012. However, the Authority has the right and option, but not the obligation, to purchase the generating system in its entirety on the anniversary of the sixth year of full operation at a mutually agreed-upon fair market value of the solar equipment. If the option is exercised by the Authority, the generating assets will be transferred to the Authority, and all responsibilities and aspects of the solar power purchase agreement will be terminated. The Authority did not exercise this option.

(d) Intergovernmental Agreement with City of Aurora regarding Stephen D. Hogan Parkway

The Authority entered into an intergovernmental agreement in 2015 with the City of Aurora (the City) regarding the extension of 6th Avenue from its former terminus in an eastward direction from Buckley Air Force Base to East 6th Parkway and E 470. This extension, opened in 2019 as East Stephen D. Hogan Parkway, established a more direct route of travel, thereby filling a gap in the regional roadway network. In addition, the forecasted traffic and revenue on E-470 indicates that the extension will provide future revenue increases for the Authority. In consideration of the potential future revenue impacts, the Authority agreed to contribute $4.0 million toward the cost of construction in the form of a $2.0 million contribution and a $2.0 million loan, which has a 10-year term beginning on August 9, 2018, the date the Authority's proceeds were disbursed to the City, and bears interest at a rate of 2.5% per annum. Both components of the Authority's contribution were conditioned upon all other funds being appropriated by the City of Aurora or otherwise irrevocably committed to the City of Aurora by third parties. The loan is presented as notes receivable on the statement of revenues, expenses, and changes in net position as of December 31, 2019 and 2018, with an outstanding principal balance of $1.8 million and $2.0 million, respectively. The $2.0 million contribution is presented as an intergovernmental expense and reflected as a special item on the statement of revenues, expenses, and changes in net position for the year ended December 31, 2018 due to its infrequent nature.

(e) Intergovernmental Agreement with City of Commerce City regarding 120th Avenue Traffic Signals

The Authority entered into an intergovernmental agreement in 2019 with the City of Commerce City (Commerce City) regarding the funding of traffic signals located on the northbound and southbound on and off-ramps at the intersection of E-470 and 120th Avenue. The traffic signals will benefit the travelling public in this area by way of increased safety and traffic control, and construction is expected to occur in 2020. Commerce City is responsible for project design and construction, as well as being solely responsible for operation and maintenance in perpetuity. The Authority shall provide funding for design, construction, and construction management in an amount not to exceed $750 thousand. Funds are placed in a designated and segregated E-470 account, which corresponds with the cash and cash equivalent limited for construction on the statement of net position as of December 31, 2019 and will be released to Commerce City upon presentation and mutual approval of progress invoices for eligible expenses. The Authority did not recognize an intergovernmental liability as of December 31, 2019, as no eligible expenses were incurred by Commerce City as of year-end.

(14) Intergovernmental Liability

(a) E-470 Ramp Relocation at Quincy Avenue

The Authority entered into an intergovernmental agreement in 2019 with South Aurora Regional Improvement Authority (SARIA) and Arapahoe County (the County) regarding relocation of the northbound on and off-ramps at Quincy Avenue, including the installation of a new signalized intersection to assist with mitigation of traffic congestion. The County is improving the current intersection of Quincy Ave and Gun Club Road with a partial continuous flow intersection, and the proximity of the northbound on and off-ramps of E-470 at Quincy Avenue creates operational and safety concerns, which the relocation will alleviate. The Authority is responsible for facilitating, overseeing, and completing the project, which will be constructed in conjunction with the Quincy to I-70 widening project to achieve economies of scale and other efficiencies and cost savings and is expected to be completed in 2020. Under the agreement, SARIA and the County will each contribute one-third of

 (Continued)

the project costs, estimated at the time of the agreement to be $3.0 million each, or $6.0 million in total. As the capital outlay is probable and expected to occur in 2020, the Authority accrued the liability as of December 31, 2019 as a current intergovernmental liability for the ramp construction. Two-thirds, or $0.9 million, of the project construction costs expended by the Authority in 2019 was recognized as intergovernmental revenue and a reduction of the intergovernmental liability. The remaining current intergovernmental liability as of December 31, 2019 is $5.1 million. The remaining unpaid amounts due from SARIA and the County are presented as notes receivable on the statement of net position as of December 31, 2019, with an outstanding principal balance of $1.0 million and $2.7 million, respectively.

(b) Ramp Financing

The Authority entered into an intergovernmental agreement in 1995 with the City of Commerce City regarding coordination of road improvements and operations. At that time, the Authority was seeking funding for design and construction of Segments II and III and entered into numerous agreements with local jurisdictions. The agreement with Commerce City included a provision for the Authority to fully finance and construct the west ramps of the Tower Road/Pena Boulevard interchange based on a mutually agreed-upon design if the west ramps had not been constructed by January 1, 2012. As of this date, only the southwest ramp has been designed or constructed, and all other provisions in the agreement have been satisfied. In April 2014, the Authority’s board of directors and Commerce City approved a new intergovernmental agreement regarding funding of the Tower Road/Pena Boulevard Interchange, and the board of directors approved the 2014 capital budget, including the outlay of $3.2 million to relieve the Authority of this infrequent obligation. Further, in February 2018, the Authority and Commerce City amended the 2014 IGA to add an additional $1.0 million in ramp funding to the liability, which was fully funded in 2018. The related intergovernmental expense of $1.0 million is reflected as a special item on the statement of revenues, expenses, and changes in net position for the year ended December 31, 2018 due to its infrequent nature, while the original $3.2 million was recognized in this manner on the statement of revenues, expenses, and changes in net position for the year ended December 31, 2013 when the original liability was established. Commerce City began construction on the project in January 2018, and the ramp opened to traffic in October 2018. In accordance with the provisions of the IGA, the Authority disbursed the full $4.2 million during 2018, which reduced the liability to $0 as of December 31, 2018.

(15) Litigation

The Authority is from time to time involved in various legal proceedings characterized as normally incidental to the business of the Authority. Management does not believe that the outcome of any legal proceedings will have a materially adverse impact on the financial position or results of operations of the Authority.

(16) Retirement Plans

In lieu of Social Security, the Authority contributes 6.2% of all compensation for regular employees to a retirement plan, up to the maximum Federal Insurance Contributions Act (FICA) base level of $132,900 in 2019 and $128,400 in 2018, for a maximum contribution of $8,240 for 2019 and $7,961 for 2018. Plan members are also required to contribute 6.2% of their annual covered salary. The plan is a defined-contribution plan administered by International City/County Management Association (ICMA) Retirement Corporation. Plan provisions and contribution requirements are established by and can be amended by the Authority's board of directors. The Authority and its employees each contributed $0.4 million to this plan in 2019 and $0.3 million in 2018. Employees are immediately vested.

In addition, the Authority contributes to 401(a) Retirement Plan covering 10% of all compensation for regular employees. Employees are not allowed to make contributions to the plan. The plan is a defined-contribution plan administered by ICMA Retirement Corporation. Plan provisions and contribution requirements are established by and can be amended by the Authority's board of directors. Employees are 50% vested at the date of hire and 100% vested after one year of service. The Authority also matches employee contributions to the available 457 deferred compensation retirement plan up to $3,000 per employee per year, and these employer contributions are deposited into the 401(a) Retirement Plan due to the IRS annual deferral limit for 457 plans. The Authority contributed $0.7 million to this plan in 2019 and $0.7 million in 2018.

(17) Subsequent Events

The recent outbreak of the novel coronavirus COVID-19, which was declared a pandemic by the World Health Organization on March 11, 2020, has led to adverse impacts on the U.S. and global economies and created uncertainty regarding potential impacts to the Authority's daily toll transaction levels and operations. The pandemic has impacted and could further impact the Authority's operations and the operations of the Authority's vendors and customers as a result of quarantines or stay-at-home orders, facility closures, and travel and logistics restrictions. While the disruption caused by the pandemic is currently expected to be temporary, there is uncertainty regarding its duration. Therefore, while management of the Authority expects the pandemic will have a certain level of impact on its results of operations, financial position, and liquidity, management cannot reasonably estimate the impact at this time.

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E-470 PUBLIC HIGHWAY AUTHORITY

Supplementary Information – Revenue Covenant

Year ended December 31, 2019

(Unaudited)

Section 7.18 of the Master and Supplemental Bond Resolutions (Bond Resolutions), titled "Revenue Covenant," requires that there shall be sufficient revenues (as defined) collected, after the provision for the payment of operating expenses (as defined), to produce net income at least 1.30 times the aggregate senior debt service due for the year. The year ended December 31, 2002 was the first fiscal year the revenue covenant was applicable, and such covenant is applicable to all subsequent years through the payment of the Senior Bonds.

For the year ended December 31, 2019, the Authority exceeded the required debt service coverage ratio reporting an actual ratio of 2.10. Below is the calculation for the year ended December 31, 2019.

Revenue:		
Operating revenues	$	267,666,532
Unrestricted investment income		12,252,963
Other income		2,489,341
Total revenue		282,408,836
Less operating expenses before depreciation, net of renewal and replacement expenses		(54,333,954)
Net income available for senior debt service		228,074,882
Aggregate senior debt service due during the year	$	108,844,013
Senior debt service coverage ratio		2.10

E-470 PUBLIC HIGHWAY AUTHORITY

Supplementary Information – Revenue Covenant

Year ended December 31, 2019

(Unaudited)

The following is a summary description of key terminology of terms identified in the Bond Resolutions. Please refer to the Bond Resolutions for a complete description and additional clarification of the below terms.

Revenue: As defined by the Bond Resolutions, revenue comprises amounts received by the Authority from fees, tolls, rates, and charges for the privilege of traveling on the E-470 toll road. Revenues also include all other amounts derived from or in respect of the ownership or operation of the toll road, which constitute revenues in accordance with generally accepted accounting principles, including accrued toll revenues. Revenues also include other amounts derived from the E-470 toll road, as defined in the Bond Resolutions. Revenues do not include investment income that is externally restricted by credit agreements for purposes other than senior debt service. Revenues also do not include investment income that is noncash in nature, such as unrealized gains (losses), premiums, and discounts.

The following is a reconciliation of investment income reported in the audited basic financial statements of the Authority for the year ended December 31, 2019 to unrestricted investment income available for senior debt service:

Interest earned on investments per the basic financial statements	$	14,599,361
Less:		
Gain on investments		(1,624)
Restricted investment income		(837,299)
Unamortized investment discount		(1,507,475)
Unrestricted investment income	$	12,252,963

The following is a reconciliation of other income reported in the audited basic financial statements of the Authority for the year ended December 31, 2019 to other income available for senior debt service:

Other income per the basic financial statements	$	1,664,579
Less:		
Loss on disposal of capital assets		479,315
Increase in arbitrage rebate		324,843
Add:		
Other nonoperating expenses		20,604
Other income	$	2,489,341

Operating Expense: As defined by the Bond Resolutions, operating expenses are amounts expended for the operation, maintenance, repair, and any other current expenses or obligations required to be paid by the Authority directly attributable to the operation of the E-470 toll road. Operating expenses do not include depreciation expense, interest for debt service, or expenses associated with the renewal and replacement accounts established under the Bond Resolutions. Per the Bond Resolutions, renewal and replacement expenses are to be funded after senior debt service.

(Continued)

E-470 PUBLIC HIGHWAY AUTHORITY

Supplementary Information – Revenue Covenant

Year ended December 31, 2019

(Unaudited)

The following is a reconciliation of operating expenses before depreciation expense reported in the audited basic financial statements of the Authority for the year ended December 31, 2019 to operating expenses before depreciation expense, net of nonoperating fund expenses, included in the revenue covenant calculation:

Operating expenses before depreciation and interest per the audited basic financial statements	$	57,361,364
Less renewal and replacement expenses		(3,027,410)
Operating expenses before depreciation expense, net of nonoperating fund expenses	$	54,333,954

Aggregate Senior Debt Service Due: For the year ended December 31, 2019, aggregate senior debt service due is all principal and interest paid on outstanding senior bonds (cash basis), which includes Senior Bond Series 1997B, 2000B, 2010C, 2015A, 2017A, 2017B, and 2019A, as well as the paid settlement differential on the Authority's interest rate swaps during the year.

Senior Debt Service Coverage Ratio: Senior debt service coverage ratio is the ratio of net income available for senior debt service to aggregate debt service due during the fiscal year.

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APPENDIX C

MAY 2020 COMPREHENSIVE TRAFFIC & REVENUE STUDY

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E-470 Comprehensive Traffic and Revenue Study

Final Report

May 2020

E470

CDM Smith

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Chapter 1

Introduction

The E-470 Public Highway Authority (Authority) has requested CDM Smith perform a comprehensive traffic and revenue study, culminating in the development of updated long-term traffic and revenue forecasts for the Authority. This study will serve to update prior forecasts. Those include studies developed as part of the last investment-grade traffic and revenue study prepared in 2014 and the latest forecasts developed in the study titled, *E-470 Traffic and Revenue Forecasts, New Toll Structure* dated January 5, 2018, and updated in the 2018 Traffic and Toll Revenue "Bring-Down" Letter dated December 20, 2018 (referred to in this report as the "2018 Update"). This current study and the associated forecasts of transactions and revenue include the collection of significant amounts of original traffic data, an independent review of the Region's underlying socioeconomic forecasts by Economic & Planning Systems (EPS), and culminating in a detailed traffic and revenue evaluation. All standard due-diligence data review and analyses for this study were performed as noted in this report. The study was conducted at a level of detail to meet the typical requirements of an Investment Grade Traffic and Revenue Study for the financial community for major bond issues.

This chapter provides a summary of the E-470 system including its current configuration, planned interchange improvements, toll collection and toll rates, and recent historical transaction and revenue trends. Also presented is the study team and report structure.

E-470 Description

As shown in **Figure 1-1**, E-470 is a 47-mile toll road running along the eastern perimeter of the Denver Metro area, forming the eastern half of the originally conceived I-470, the outer circumferential highway around Denver. E-470 extends from C-470 at I-25 in Douglas County south of Denver to the east and north through Aurora and then passes along the western edge of Denver International Airport (DIA). The road then turns westward, terminating at the Northwest Parkway at I-25 just south of 160th Avenue north of Denver in Thornton.

E-470 Configuration

E-470 was built in four phases beginning at the south end with a 5-mile segment between I-25 in Lone Tree and Parker Road that opened to traffic on June 1, 1991. The final 12-mile segment in the north between 120th Avenue and I-25 in Thornton opened to traffic on January 3, 2003, less than a year before the 8.7-mile Northwest Parkway toll road opened on November 24, 2003. The Northwest Parkway extends west and south from I-25 to U.S. 36 and constitutes the northwest quadrant of the outer beltway. With the soon-to-be-completed widening of E-470 from Quincy Avenue to I-70, 21 miles of E-470 from I-25 (south) to I-70 will be six-lane limited access. The remaining 26 miles are currently four lanes with future capital plans to widen based on demand.

Existing and Planned Interchanges

A total of 24 interchanges exist along the E-470 alignment. In addition, four completely new interchanges have been programmed for construction.

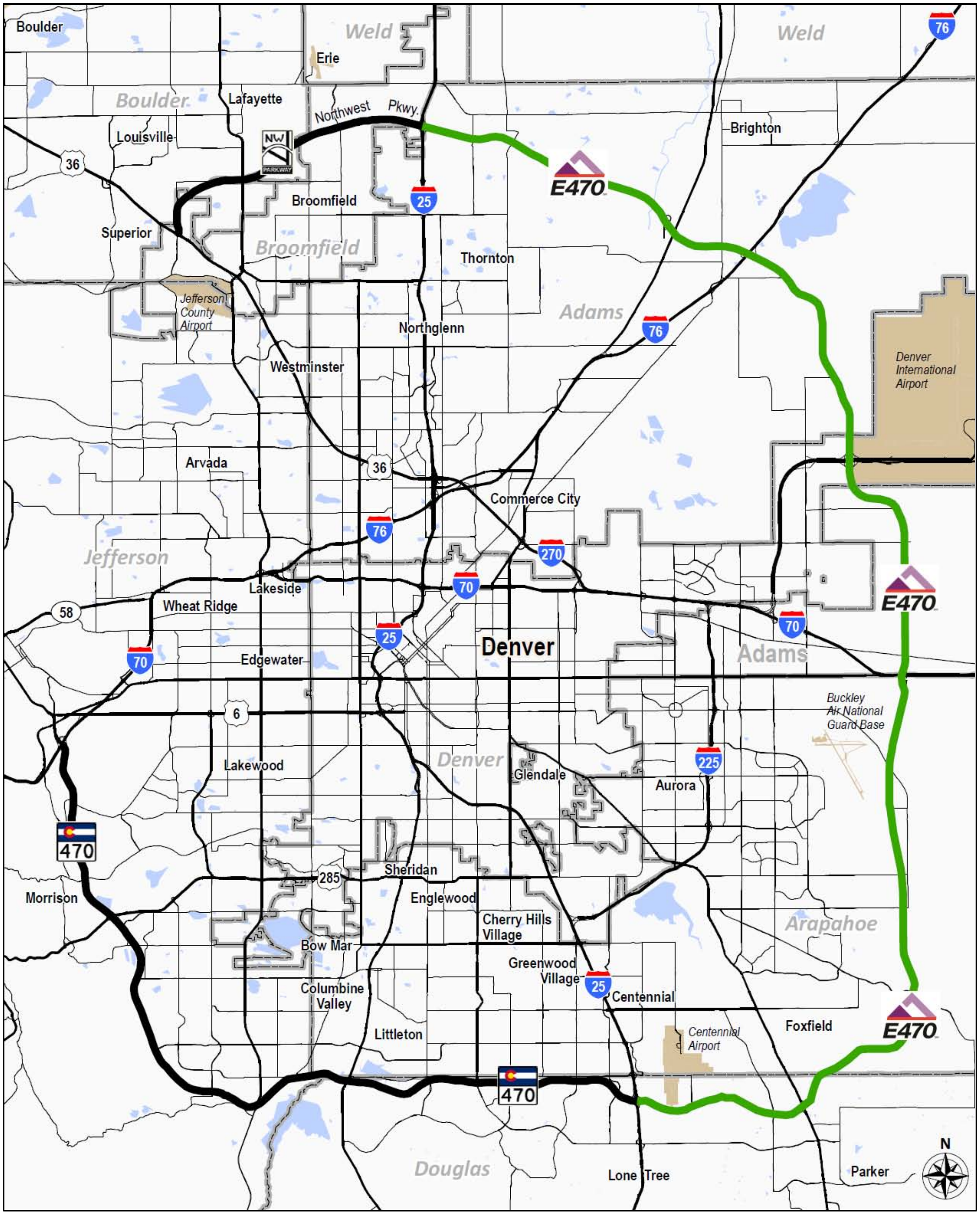


Figure 1-1
Location Map

Chronologically, the next planned construction will be two new full-access interchanges, one at 38th Avenue and the other at 88th Avenue are currently planned to open by 2024 and 2026, respectively. This will be followed by additional new full-access interchanges at 112th Avenue and Potomac Avenue are scheduled to open by 2031 and 2036, respectively.

New ramps are also planned at the I-70 and I-76 interchanges. At I-70, construction of an eastbound I-70 to southbound E-470 ramp is scheduled to open by 2023, while the remaining ramps, creating a full-access interchange with I-70, are scheduled to open to traffic by 2030. At I-76, ramps from northbound E-470 to westbound I-76 and westbound I-76 to northbound E-470 are scheduled to open to traffic by 2035 and 2040, respectively. Since the need for these new interchanges is driven by the pace of land development in their influence areas, market conditions could accelerate, or delay planned opening dates. These 28 interchanges are described in **Table 1-1**.

Toll Collection and Toll Rates

E-470 operates an all-electronic, closed-barrier system of toll collection, wherein no toll-free passage is permitted. All motorists pass through at least one mainline or ramp toll plaza where tolls are paid either by the ExpressToll or License Plate Toll (LPT) methods of toll payment. Under the all-electronic tolled (AET) system, customer vehicles not equipped with an ExpressToll transponder pay their toll via the LPT method. However, ExpressToll customers are charged a discounted toll compared to LPT customers. And, while neither the ExpressToll nor the LPT toll is the same at each of the five mainline gantries (refer to **Table 1-2**), the discount for an ExpressToll transaction of 37 percent is the same at each. In 2020 for example, passenger car ExpressToll customers pay a toll of $12.90 for a full-length, 47-mile trip which is $8.30, or 37 percent less than the $20.45 toll made by LPT customers for a comparable trip. Table 1-2 presents historical and current passenger car ExpressToll and LPT tolls from 2018 through 2020. As shown, mainline gantry tolls for ExpressToll customers remained unchanged, while LPT tolls increased by $0.15 in 2019. A $0.15 toll increase planned for LPT customers in 2020 was not made and tolls were retained at 2019 levels. Based on the ExpressToll versus LPT toll differential, the ExpressToll discount has risen modestly from 35 percent in 2018 to 37 percent in 2020. Prior to 2018, the ExpressToll discount was 20 percent.

The current toll collection system consists of 5 mainline toll gantries and 34 ramp toll gantries, along with 8 additional planned ramp toll gantries. Based on 2020 rates, an ExpressToll customer in a passenger car making a full-length trip pays $14.25, or approximately $0.30 per mile. However, as with any closed-barrier system of toll collection, motorists making relatively short trips will usually pay a higher per-mile toll because of the placement of the mainline and ramp toll gantries.

Figure 1-2 presents the passenger car per-mile toll rates for 57 U.S. all-electronic tolled (AET) highways, including E-470. The figure places the E-470 toll rate, shaded in dark green, into context by comparing it with toll rates charged on the other AET tolled highways. E-470's ExpressToll toll rate ranks among the highest 25 percent of the AET roads shown. However, while most toll facilities have increased toll rates, in November 2019, E-470's Board of Directors voted to reaffirm a freeze on the ExpressToll rate at 2017 levels through 2020. In addition to freezing ExpressToll rates, 2020 LPT tolls were also frozen at 2019 levels.

Table 1-1
Existing and Planned E-470 Interchanges

Interchange Number	Interchange Location	Milepost	Type (Toll/No Toll) and Tolled Direction (North/South)	Opening Year	
1	I-25 (South)	0.0	No Toll	1991	
2	Jamaica	0.5	No Toll	2004	
3	Peoria	1.7	Toll T/F South	1991	
	Toll Gantry A	2.5	**Mainline**	1991	
4	Chambers	3.5	Toll T/F North	2002/2004	(1)
5	Jordan	4.4	Toll T/F North	1991	
6	Parker	5.2	No Toll	1991/1998	(1)
7	Gartrell	8.6	Toll T/F South	2000	
8	Smoky Hill	10.4	Toll T/F South	1998/1999	(1)
9	Quincy	13.2	Toll T/F South	1999	
	Toll Gantry B	15.0	**Mainline**	1999	
10	Jewell	16.2	Toll T/F North	1999	
11	6th Parkway	19.0	Toll T/F North	1999	
12	I-70	20.3	No Toll	1999/2007/2023/2030	(2)
	Toll Gantry C	22.5	**Mainline**	1999	
13	38th Avenue	23.5	Toll T/F North	2024	
14	56th Avenue	24.3	Toll T/F North	1998/1999	(1)
15	64th Avenue	25.3	Toll T/F North	1998	
16	Pena Boulevard	27.6	No Toll	1998	
17	88th Avenue	28.7	Toll T/F South	2026	
	Toll Gantry D	30.0	**Mainline**	1998	
18	96th Avenue	30.2	Toll T/F North	1998	
19	104th Avenue	31.3	Toll T/F North	1998	
20	112th Avenue	32.3	Toll T/F North	2031	
21	120th Avenue	33.8	Toll T/F North	1998/2002	(1)
22	I-76	35.3	No Toll	2002/2035/2040	(1)
23	Potomac Street	36.7	Toll T/F South	2036	
24	U.S. 85	38.1	Toll T/F South	2002	
	Toll Gantry E	39.6	**Mainline**	2003	
25	Quebec	41.8	Toll T/F North	2014	
26	Colorado	43.5	Toll T/F North	2003	
27	York	44.5	Toll T/F North	2003	
28	I-25 (North)	46.1	No Toll	2003	

(1) Half of the interchange is opened in the first year indicated, with the additional movements completed and opened during the subsequent years shown.

(2) At-grade interchange constructed and opened in the first year indicated; an improved grade-separated "fly-by" interchange opened during the second year shown, including a new northbound E-470 to westbound I-70 fly-over ramp; a new eastbound I-70 to southbound E-470 ramp to be opened in the third year shown; and, direct connect ramps between I-70 and E-470 for all movements (interchange complete) in the fourth year shown.

T/F = to/from

Table 1-2
Historic and Current Roll Rates
Passenger Car Toll Rates

Interchange			Type (Toll/No Toll) and Tolled Direction	Passenger Car Toll Rates					
				2018		2019		2020	
Number	Location	Milepost	(North/South)	ExpressToll	LPT	ExpressToll	LPT	ExpressToll	LPT
1	I-25 (South)	0.0	No Toll	-	-	-	-	-	-
2	Jamaica	0.5	No Toll	-	-	-	-	-	-
3	Peoria	1.7	Toll T/F South	$ 1.25	$ 1.95	$ 1.25	$ 2.05	$ 1.25	$ 2.05
	Toll Gantry A	**2.5**	**Mainline**	**2.70**	**4.15**	**2.70**	**4.30**	**2.70**	**4.30**
4	Chambers	3.5	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
5	Jordan	4.4	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
6	Parker	5.2	No Toll	-	-	-	-	-	-
7	Gartrell	8.6	Toll T/F South	1.25	1.95	1.25	2.05	1.25	2.05
8	Smoky Hill	10.4	Toll T/F South	1.25	1.95	1.25	2.05	1.25	2.05
9	Quincy	13.2	Toll T/F South	1.25	1.95	1.25	2.05	1.25	2.05
	Toll Gantry B	**15.0**	**Mainline**	**2.95**	**4.50**	**2.95**	**4.65**	**2.95**	**4.65**
10	Jewell	16.2	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
11	6th Parkway	19.0	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
12	I-70	20.3	No Toll	-	-	-	-	-	-
	Toll Gantry C	**22.5**	**Mainline**	**2.70**	**4.15**	**2.70**	**4.30**	**2.70**	**4.30**
13	38th Avenue	23.5	Toll T/F North	-	-	-	-	-	-
14	56th Avenue	24.3	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
15	64th Avenue	25.3	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
16	Pena Boulevard	27.6	No Toll	-	-	-	-	-	-
17	88th Avenue	28.7	Toll T/F South	-	-	-	-	-	-
	Toll Gantry D	**30.0**	**Mainline**	**2.95**	**4.50**	**2.95**	**4.65**	**2.95**	**4.65**
18	96th Avenue	30.2	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
19	104th Avenue	31.3	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
20	112th Avenue	32.3	Toll T/F North	-	-	-	-	-	-
21	120th Avenue	33.8	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
22	I-76	35.3	No Toll	-	-	-	-	-	-
23	Potomac Street	36.7	Toll T/F South	-	-	-	-	-	-
24	U.S. 85	38.1	Toll T/F South	1.25	1.95	1.25	2.05	1.25	2.05
	Toll Gantry E	**39.6**	**Mainline**	**2.95**	**4.50**	**2.95**	**4.65**	**2.95**	**4.65**
25	Quebec	41.8	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
26	Colorado	43.5	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
27	York	44.5	Toll T/F North	1.25	1.95	1.25	2.05	1.25	2.05
28	I-25 (North)	46.1	No Toll	-	-	-	-	-	-

(1) Toll increases are assumed to be implemented on January 1.

T/F = to/from

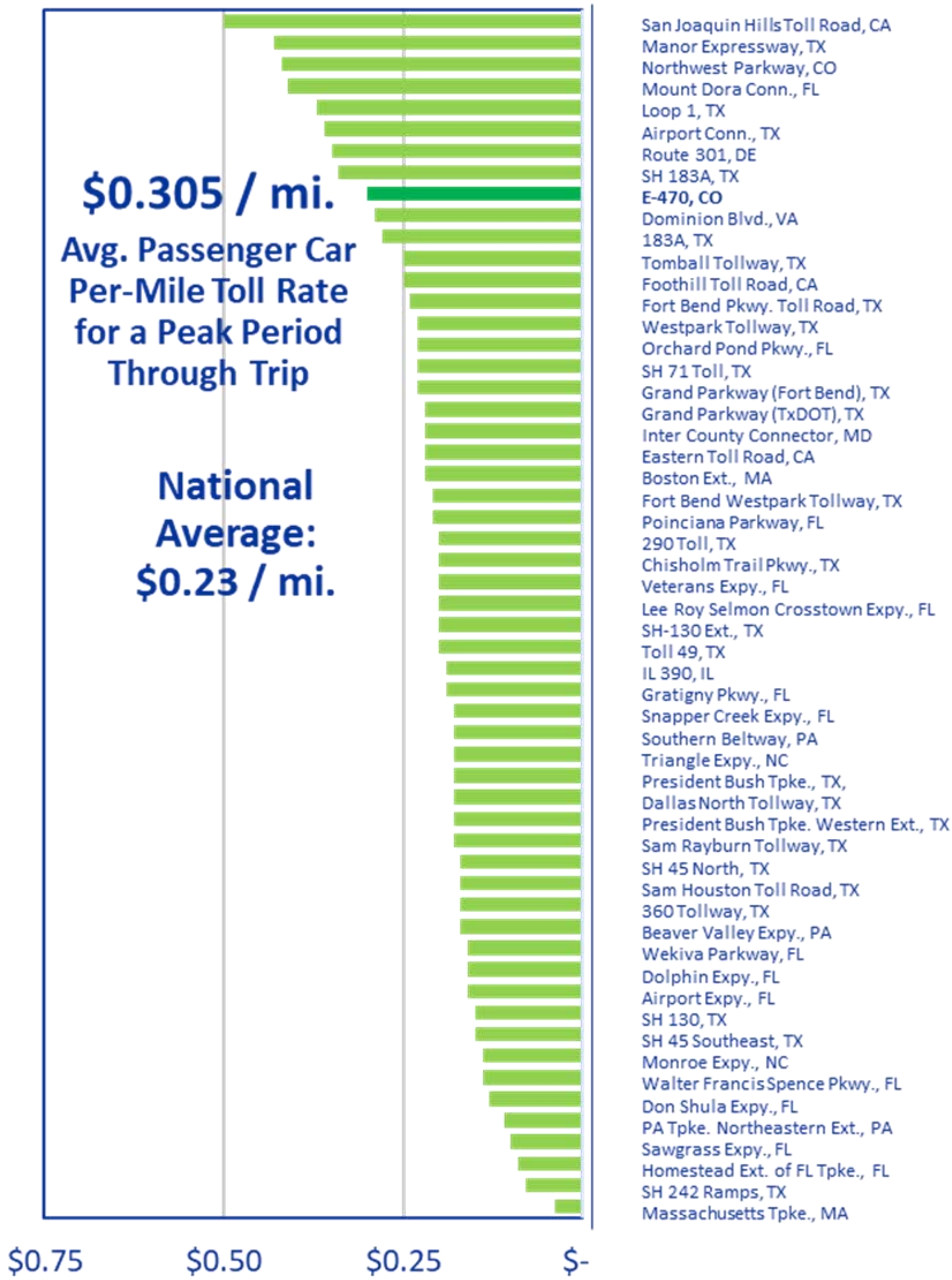


Figure 1-2
All Electronic Toll Facilities Toll Rate Comparison

Although ExpressToll rates have not increased since 2017, the historical toll rate increases of approximately 2.4 percent per annum for ExpressToll and 5.5 percent per annum for LPT between 2011 and 2019, coupled with traffic growth of more than 7.0 percent per annum during the same period, has resulted in revenue growth of 11.5 percent per annum. As a result of this growth in revenue and the potential for level-debt after 2020, the Authority's current plan is to retain the current toll rate structure through 2024, with a 2 percent rate increase in 2025 and every fifth year thereafter throughout the current forecast period ending in 2050. However, as is the prerogative of the Board, the toll rate structure may be reviewed annually. Given the likelihood of the implementation of this toll rate structure, the traffic and revenue forecasts developed in this study have been referred to as the "Preferred Toll Rate Scenario".

Study Team

CDM Smith (CDM) was the prime consultant with overall responsibility for successful completion of the study. In addition to overall project management and Study Team coordination responsibilities, CDM personnel were responsible for all traffic and revenue analyses, including modifications to the travel demand models, estimates of future toll transactions and revenue, and the preparation of all study documentation. CDM was assisted by three firms during the conduct of the current assignment. These three Study Team members were:

- **Economic & Planning Systems (EPS)** – EPS was responsible for performing a corridor growth assessment, specifically reviewing land development and socioeconomic/demographic growth assumptions made by the Denver Regional Council of Governments (DRCOG). EPS then prepared an alternative socioeconomic/demographic forecast based on their independent assessment of growth within the region at a Traffic Analysis Zone (TAZ) level used to adjust estimates of future trip-making in the regional travel demand model.

- **Felsburg Holt & Ullevig (FHU)** – FHU was responsible for working with the trip matrices developed by the DRCOG and checking them for reasonableness. FHU provided the EPS socioeconomic/demographic forecasts to the DRCOG and coordinated the DRCOG effort to develop updated future year trip matrices using their UrbanSim model. They were also tasked with updating traffic networks to reflect future-year improvements which were included in the fiscally constrained highway improvement program.

- **All Traffic Data Services (ATDS)** – ATDS was responsible for conducting 48-hour automatic traffic recorder counts at all non-tolled interchange ramps along E-470. The counts were conducted during internal weekdays (Tuesday through Thursday). Combined with traffic data at its mainline and ramp gantry locations, these counts permitted a traffic profile of existing conditions to be prepared. These were used as an aid in the traffic model calibration.

Report Structure

Chapter 2, **Traffic and Revenue Trends** provides a profile of historical trends and variations of traffic and revenue on E-470. The chapter also presents recent trends in transactions by method of toll payment, along with E-470 customer trip characteristics such as trip frequency and trip movements.

Chapter 3, **Corridor Growth Analysis** provides a summary of the methodology and forecasts developed by EPS which reflect local growth expectations and recent development activity. A copy of the EPS full report is included in Appendix A of this report.

Chapter 4, **Traffic and Revenue Analysis** provides a summary of the modeling methodology, future-year highway network assumptions and the underlying basic assumptions used in the modeling process. The chapter also includes documentation of the toll rate sensitivity analyses along with a 30-year forecasts of traffic and revenue for the Preferred Toll Rate Scenario.

Chapter 2

Traffic and Revenue Trends and Conditions

Annual and monthly toll transaction and revenue trends from January 2007 through March 2020 were assembled and reviewed. These trends are important in understanding driver reactions to construction activities on and off E-470, toll rate changes, motor fuel price increases, recessions, and non-recurring, one-time events such as inclement weather, accidents, sporting events, etc. Average daily and weekday traffic volume trends, hourly traffic variations, and trends in ExpressToll participation rates, along with data related to customer trip characteristics were also reviewed.

Annual and Monthly Transaction Trends

Transaction growth on E-470 over the past 10-year period from 2009 to 2019 is presented in **Table 2-1**, while more recent monthly trends for January 2017 through March 2020 are provided in **Table 2-2**. These trends are also depicted graphically on an average daily basis, which accounts for leap days, by mainline toll gantry in **Figure 2-1**.

Following a decline in transactions of 7.9 percent in 2009, influenced primarily by impacts of the Great Recession, transactions returned to consistent positive growth in 2010, increasing by 6.9 percent, even though weather-related events in January and February 2010 tempered the final annual increase. Continued growth occurred throughout 2011 and 2012, with total system-wide transactions increasing by 1.5 percent over 2010 and then by 3.6 percent over 2011. The 54.0 million transactions in 2012 fell only 176,000 transactions short of the 2007 pre-recession high of 54.1 million. Transactions in 2013 grew by 8.2 percent. This acceleration in growth compared to the 3.6 percent growth a year prior, actually began in July 2013. From July through December 2013, growth accelerated, averaging 10.6 percent. This double-digit, year-over-year transaction growth continued through 2015, likely due to continued economic recovery from the Great Recession and significant reductions in gasoline prices. Average gasoline prices decreased from $3.39 per gallon in 2014 to $2.40 in 2015, a drop of almost 30 percent. Based largely on these events, annual transaction growth in 2014 and 2015 was 13.6 percent and 12.4 percent, respectively. Transactions increased at a lower, but still robust 7.2 percent in 2016, reaching 80.0 million. Since 2015, monthly transaction growth has remained robust, although generally at slightly lower, single-digit rates. Annual transaction growth in 2016 and 2017 was 7.2 percent and 4.0 percent respectively.

Considering monthly trends moving forward, September 2017 represented the first year-over-year decrease in transactions in almost seven years on E-470 for a single month. In addition to an additional weekend day in September 2017 when compared to the prior year, the decrease was likely the result of gas price shocks resulting from the impacts of Hurricanes Harvey and Irma, both of which occurred that month. This is most evident at Gantry D, where months of robust double-digit growth related to ongoing development in the area were interrupted in September 2017 and the months that followed by the increased gas prices that followed Hurricanes Harvey and Irma. As gas prices stabilized and employment levels grew between 2017 and 2019, strong

Table 2-1
Annual Toll Transaction Trends by Mainline Toll Gantry
2009 - 2019

	Toll Gantry A		Toll Gantry B		Toll Gantry C		Toll Gantry D		Toll Gantry E		Ramp Gantries		Total	
Year	Transactions	Percent of Total E-470	Transactions	Percent of Total E-470	Transactions	Percent of Total E-470	Transactions	Percent of Total E-470	Transactions	Percent of Total E-470	Transactions	Percent of Total E-470	Transactions	Percent of Total E-470
2009 (2)(3)	12,540,655	26.1	7,722,296	16.1	5,259,855	11.0	6,638,569	13.8	5,225,893	10.9	10,585,445	22.1	47,972,713	100.0
AAPC	6.3		8.7		10.2		7.5		8.0		3.9		6.9	
2010	13,331,374	26.0	8,394,057	16.4	5,797,063	11.3	7,136,412	13.9	5,644,401	11.0	10,994,634	21.4	51,297,941	100.0
AAPC	(3.5)		4.1		4.8		4.3		4.2		0.8		1.5	
2011 (4)	12,863,902	24.7	8,738,007	16.8	6,075,209	11.7	7,440,510	14.3	5,878,725	11.3	11,084,033	21.3	52,080,386	100.0
AAPC	1.4		5.0		5.3		5.3		5.3		2.1		3.6	
2012 (1)(5)	13,048,995	24.2	9,176,916	17.0	6,395,155	11.9	7,838,432	14.5	6,188,263	11.5	11,318,055	21.0	53,965,816	100.0
AAPC	5.2		9.9		11.1		10.5		9.2		6.6		8.2	
2013 (6)	13,722,771	23.5	10,084,744	17.3	7,104,817	12.2	8,665,141	14.8	6,759,547	11.6	12,065,712	20.7	58,402,732	100.0
AAPC	11.9		10.1		16.4		17.9		16.5		12.3		13.6	
2014 (7)	15,355,232	23.1	11,105,675	16.7	8,266,721	12.5	10,218,284	15.4	7,873,978	11.9	13,545,148	20.4	66,365,038	100.0
AAPC	10.3		8.4		10.2		17.5		14.8		14.3		12.4	
2015 (8)	16,935,141	22.7	12,034,972	16.1	9,109,646	12.2	12,007,555	16.1	9,039,236	12.1	15,482,497	20.8	74,609,047	100.0
AAPC	3.2		7.7		5.6		11.5		7.4		8.7		7.2	
2016 (1)(9)(10)	17,475,732	21.9	12,964,435	16.2	9,618,852	12.0	13,384,776	16.7	9,704,115	12.1	16,827,325	21.0	79,975,235	100.0
AAPC	(0.4)		1.4		3.4		12.6		8.3		1.6		4.0	
2017 (11)(12)(13)	17,401,797	20.9	13,147,947	15.8	9,941,687	12.0	15,071,870	18.1	10,512,371	12.6	17,099,498	20.6	83,175,170	100.0
AAPC	0.0		9.0		7.2		4.1		7.7		4.8		5.0	
2018 (14)	17,407,286	19.9	14,329,661	16.4	10,659,821	12.2	15,694,590	18.0	11,324,130	13.0	17,923,312	20.5	87,338,800	100.0
AAPC	(0.6)		4.0		6.1		3.4		7.3		2.6		3.4	
2019 (15)	17,304,686	19.2	14,898,208	16.5	11,311,613	12.5	16,224,973	18.0	12,149,520	13.5	18,390,570	20.4	90,279,570	100.0
AVERAGE ANNUAL PERCENT CHANGE (AAPC)														
2009 - 2014	4.1		7.5		9.5		9.0		8.5		5.1		6.7	
2014 - 2019	2.4		6.1		6.5		9.7		9.1		6.3		6.3	
2009 - 2019	3.3		6.8		8.0		9.3		8.8		5.7		6.5	

Source: E-470 Public Highway Authority.

(1) Leap Year.

(2) On January 1, 2009, License Plate Tolling was introduced on the E-470 system, with a $0.25 toll differential over ExpressToll tolls at mainline toll gantries and $0.10 at ramp toll gantries. Cash toll collections continued until July 4, 2009, at which point the entire E-470 was converted to All-Electronic Tolling.

(3) ExpressToll tolls increased at Toll Gantry A from $1.75 to $2.00 and at Toll Gantries B, C, D and E from $2.00 to $2.25 on January 1, 2009. Ramp toll gantries increased to $0.90. Additionally, a toll differential of $0.25 between ExpressToll and License Plate Toll was introduced at all mainline toll gantries.

(4) Tolls increased at Toll Gantry A from $2.00 to $2.15 and at Toll Gantries B, C, D and E from $2.25 to $2.40 on January 1, 2011. Ramp toll gantries increased to $0.95. Additionally, the toll differential between ExpressToll and License Plate Toll was increased from $0.25 to 25 percent.

(5) Tolls increased at Toll Gantry A from $2.15 to $2.25 and at Toll Gantries B, C, D and E from $2.40 to $2.50 on January 1, 2012. Ramp toll gantries increased to $1.00.

(6) Tolls increased at Toll Gantry A from $2.25 to $2.35 and at Toll Gantries B, C, D and E from $2.50 to $2.60 on January 1, 2013. Ramp toll gantries increased to $1.05.

(7) Tolls increased at Toll Gantry A from $2.35 to $2.45 and at Toll Gantries B, C, D and E from $2.60 to $2.70 on January 1, 2014. Ramp toll gantries increased to $1.10.

(8) Tolls increased at Toll Gantry A from $2.45 to $2.50 and at Toll Gantries B, C, D and E from $2.70 to $2.75 on January 1, 2015. Ramp toll gantries increased to $1.15.

(9) Tolls increased at Toll Gantry A from $2.50 to $2.60 and at Toll Gantries B, C, D and E from $2.75 to $2.85 on January 1, 2016. Ramp toll gantries increased to $1.20.

(10) Construction began in spring of 2016 to add a third lane in each direction along an eight-mile stretch from Parker Road and Quincy Avenue.

(11) Tolls increased at Toll Gantry A from $2.60 to $2.70 and at Toll Gantries B, C, D and E from $2.85 to $2.95 on January 1, 2017. Ramp toll gantries increased to $1.25.

(12) Hurricane Harvey occurred in August 2017 and Hurricane Irma occurred in September 2017, leading to gasoline shortages and other national travel disruptions.

(13) Construction on the C-470 Express Lanes began September 2017.

(14) ExpressToll rates decreased at Toll Gantry C from $2.85 to $2.70 on January 1, 2018. Additionally, the toll differential between ExpressToll and License Plate Toll was increased to 53 percent.

(15) The toll differential between ExpressToll and License Plate Toll was increased to 58 percent on January 1, 2019.

Table 2-2
Monthly Toll Transaction Trends by Mainline Toll Gantry
2017 - 2020

		Gantry A		Gantry B		Gantry C		Gantry D		Gantry E		Toll Ramps		Total	
Year	Month	Monthly Transactions	Year/Year Pct. Change	Monthly Transactions	Year/Year Pct. Change	Monthly Transactions	Year/Year Pct. Change	Monthly Transactions	Year/Year Pct. Change	Monthly Transactions	Year/Year Pct. Change	Monthly Transactions	Year/Year Pct. Change	Monthly Transactions	Year/Year Pct. Change
2017	January (1)	1,307,354	(1.4)	941,371	4.6	665,510	2.6	1,041,823	17.6	693,664	5.9	1,281,342	1.7	5,931,064	4.5
	February	1,246,855	(3.6)	896,191	1.3	631,238	0.4	996,626	17.0	664,934	3.6	1,244,436	2.1	5,680,280	2.9
	March	1,439,931	2.4	1,064,097	5.2	773,076	4.5	1,200,206	19.8	816,517	9.9	1,412,324	5.5	6,706,151	7.5
	April	1,399,660	0.2	1,024,054	3.5	745,084	3.7	1,138,824	16.1	792,053	8.0	1,364,496	2.7	6,464,171	5.1
	May	1,565,948	1.5	1,202,699	5.5	899,249	6.6	1,329,915	17.6	931,081	9.7	1,494,193	2.4	7,423,085	6.6
	June	1,588,671	(0.7)	1,121,395	(7.8)	970,333	5.5	1,441,999	17.1	1,011,896	11.3	1,526,353	2.5	7,660,647	4.0
	July	1,508,731	(2.8)	1,174,800	(1.8)	950,609	2.3	1,427,498	14.3	993,547	8.7	1,454,150	(0.7)	7,509,335	2.8
	August	1,603,779	(1.3)	1,254,883	2.8	962,159	5.9	1,497,451	19.6	1,040,524	11.4	1,564,874	0.7	7,923,670	5.7
	September	1,462,082	(5.2)	1,129,027	(2.1)	851,442	(0.9)	1,248,555	4.4	912,173	6.7	1,455,066	(1.2)	7,058,345	(0.3)
	October	1,480,572	4.0	1,168,021	1.8	875,620	2.1	1,337,607	4.9	939,761	7.5	1,481,548	0.5	7,283,129	3.3
	November	1,400,457	2.8	1,108,146	4.1	830,635	4.8	1,259,233	5.1	884,687	8.4	1,413,249	2.6	6,896,407	4.3
	December	1,397,757	(0.6)	1,063,263	2.1	786,732	1.9	1,152,133	1.9	831,534	6.7	1,407,467	1.3	6,638,886	1.9
	Total	**17,401,797**	**(0.4)**	**13,147,947**	**1.4**	**9,941,687**	**3.4**	**15,071,870**	**12.6**	**10,512,371**	**8.3**	**17,099,498**	**1.6**	**83,175,170**	**4.0**
2018	January	1,328,637	1.6	1,008,755	7.2	710,202	6.7	1,078,011	3.5	762,886	10.0	1,335,902	4.3	6,224,393	4.9
	February	1,231,391	(1.2)	940,023	4.9	660,794	4.7	997,727	0.1	712,886	7.2	1,250,270	0.5	5,793,091	2.0
	March	1,457,267	1.2	1,141,403	7.3	832,305	7.7	1,246,651	3.9	888,797	8.9	1,463,940	3.7	7,030,363	4.8
	April	1,446,085	3.3	1,125,620	9.9	816,034	9.5	1,200,451	5.4	864,931	9.2	1,448,708	6.2	6,901,829	6.8
	May	1,598,880	2.1	1,299,850	8.1	959,520	6.7	1,401,794	5.4	1,014,858	9.0	1,604,768	7.4	7,879,670	6.2
	June	1,583,432	(0.3)	1,331,564	18.7	1,020,304	5.1	1,471,504	2.0	1,063,007	5.1	1,578,910	3.4	8,048,721	5.1
	July	1,537,290	1.9	1,312,155	11.7	1,028,633	8.2	1,492,665	4.6	1,078,164	8.5	1,559,077	7.2	8,007,984	6.6
	August	1,631,897	1.8	1,368,970	9.1	1,038,750	8.0	1,554,494	3.8	1,116,802	7.3	1,675,797	7.1	8,386,710	5.8
	September	1,469,662	0.5	1,224,553	8.5	919,249	8.0	1,369,313	9.7	979,194	7.3	1,523,504	4.7	7,485,475	6.1
	October	1,357,009	(8.3)	1,283,081	9.9	966,072	10.3	1,423,232	6.4	1,027,823	9.4	1,571,857	6.1	7,629,074	4.7
	November	1,402,552	0.1	1,186,796	7.1	887,606	6.9	1,287,474	2.2	945,001	6.8	1,460,644	3.4	7,170,073	4.0
	December	1,363,184	(2.5)	1,106,891	4.1	820,352	4.3	1,171,274	1.7	869,781	4.6	1,449,935	3.0	6,781,417	2.1
	Total	**17,407,286**	**0.0**	**14,329,661**	**9.0**	**10,659,821**	**7.2**	**15,694,590**	**4.1**	**11,324,130**	**7.7**	**17,923,312**	**4.8**	**87,338,800**	**5.0**
2019	January	1,306,004	(1.7)	1,054,974	4.6	749,281	5.5	1,090,431	1.2	801,596	5.1	1,367,363	2.4	6,369,649	2.3
	February	1,258,160	2.2	1,012,012	7.7	722,505	9.3	1,041,245	4.4	765,914	7.4	1,303,797	4.3	6,103,633	5.4
	March	1,344,394	(7.7)	1,133,409	(0.7)	845,978	1.6	1,219,135	(2.2)	907,664	2.1	1,416,968	(3.2)	6,867,548	(2.3)
	April	1,462,501	1.1	1,206,313	7.2	882,999	8.2	1,279,975	6.6	953,867	10.3	1,531,255	5.7	7,316,910	6.0
	May	1,568,042	(1.9)	1,355,541	4.3	1,026,142	6.9	1,456,005	3.9	1,091,564	7.6	1,639,318	2.2	8,136,612	3.3
	June	1,501,484	(5.2)	1,341,551	0.8	1,056,247	3.5	1,492,875	1.5	1,112,042	4.6	1,580,298	0.1	8,084,497	0.4
	July	1,559,410	1.4	1,419,918	8.2	1,133,688	10.2	1,613,417	8.1	1,202,532	11.5	1,652,307	6.0	8,581,272	7.2
	August	1,596,703	(2.2)	1,406,999	2.8	1,085,945	4.5	1,574,558	1.3	1,181,192	5.8	1,703,541	1.7	8,548,938	1.9
	September	1,489,578	1.4	1,285,948	5.0	993,434	8.1	1,441,267	5.3	1,080,021	10.3	1,594,472	4.7	7,884,720	5.3
	October	1,479,394	9.0	1,297,625	1.1	1,007,764	4.3	1,444,440	1.5	1,094,205	6.5	1,586,588	0.9	7,910,016	3.7
	November	1,338,399	(4.6)	1,174,461	(1.0)	890,402	0.3	1,273,992	(1.0)	966,403	2.3	1,471,657	0.8	7,115,314	(0.8)
	December	1,400,617	2.7	1,209,457	9.3	917,228	11.8	1,297,633	10.8	992,520	14.1	1,543,006	6.4	7,360,461	8.5
	Total	**17,304,686**	**(0.6)**	**14,898,208**	**4.0**	**11,311,613**	**6.1**	**16,224,973**	**3.4**	**12,149,520**	**7.3**	**18,390,570**	**2.6**	**90,279,570**	**3.4**
2020	January	1,339,565	2.6	1,110,907	5.3	794,646	6.1	1,156,677	6.1	869,143	8.4	1,482,808	8.4	6,753,746	6.0
	February	1,228,859	(2.3)	1,019,296	0.7	735,864	1.8	1,059,938	1.8	790,395	3.2	1,356,796	4.1	6,191,148	1.4
	March (2)	918,543	(31.7)	764,282	(32.6)	537,017	(36.5)	786,942	(35.5)	572,292	(36.9)	1,086,954	(23.3)	4,666,030	(32.1)
	Year-to-Date	**3,486,967**	**(10.8)**	**2,894,485**	**(9.6)**	**2,067,527**	**(10.8)**	**3,003,557**	**(10.4)**	**2,231,830**	**(9.8)**	**3,926,558**	**(4.0)**	**17,610,924**	**(8.9)**

(1) Tolls increased at Toll Gantry A from $2.60 to $2.70 and at Toll Gantries B, C, D and E from $2.85 to $2.95 on January 1, 2017. Ramp toll gantries increased to $1.25.

(2) Travel reductions, closure of public spaces and activites, and reduced economic activity resulting from the COVID-19 outbreak began in mid-March 2020.

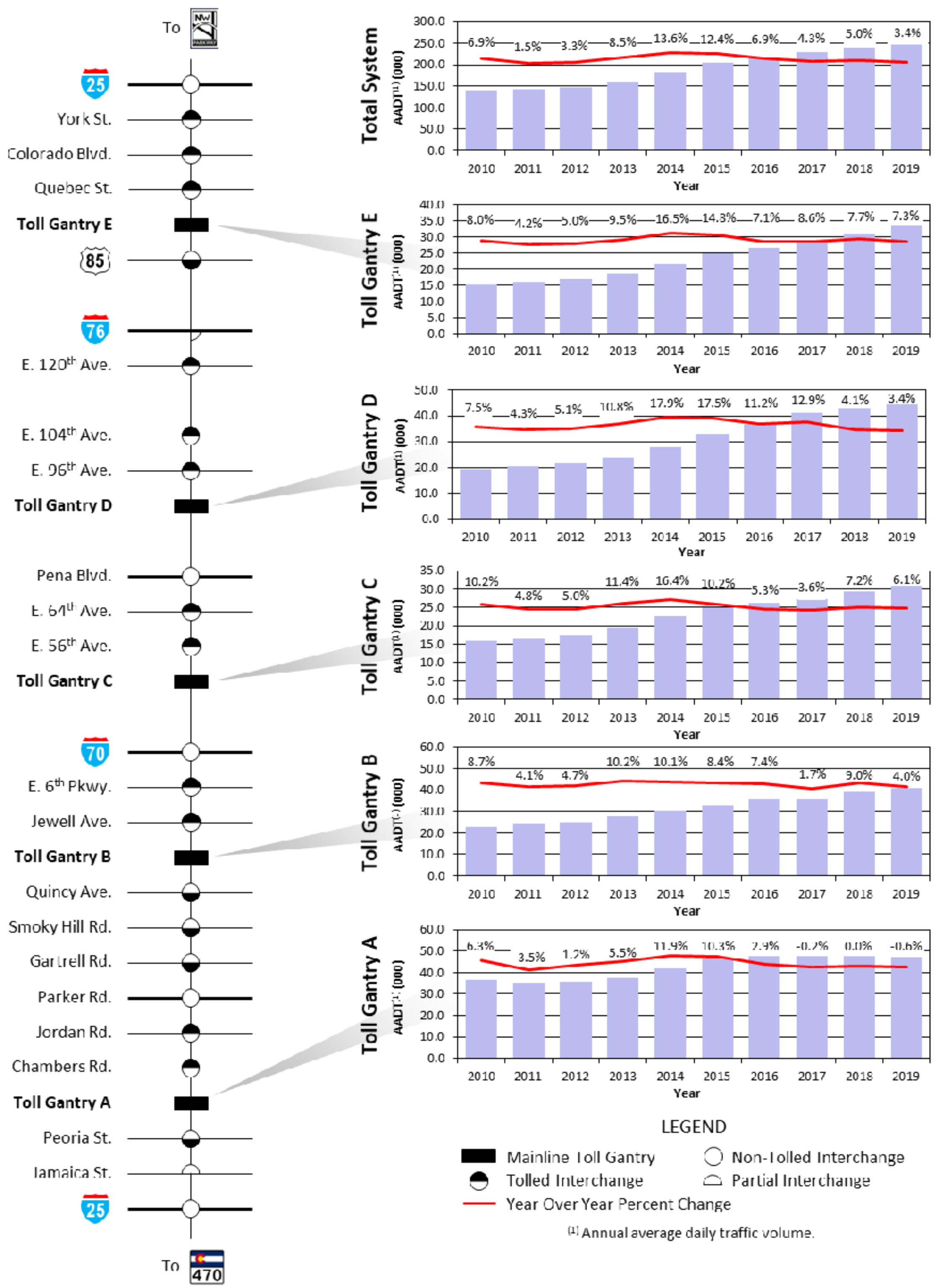


Figure 2-1
Historical Annual Average Daily Traffic by Mainline Toll Locations

transaction growth continued on E-470. Year-over year growth rates in 2018 and 2019 were 5.0 percent and 3.4 percent, respectively, with year-over-year growth rates by month falling relatively close to the annual average. Monthly transaction trends are also presented in **Figure 2-2**.

Comparing the gantries one against the other, transaction growth at Toll Gantry A has fallen significantly behind other E-470 toll locations, with a number of years of zero or negative transaction growth. This is due to the ongoing impacts related to construction of the C-470 Express Lanes. Prior to construction on C-470, Gantry A transactions were growing year-over-year at rates of 11.9 percent (2014), 10.3 percent (2015) and 3.2 percent (2016 thru beginning of C-470 construction in Oct.). C-470 construction began in late 2016, meaning 2017 was the first full "year over year" impact, with Gantry A transactions coming in 0.4 percent lower that year than in 2016. Based on historical growth trends, normal growth at Gantry A was likely about 3.5 percent in 2017, meaning that the negative impact of the C-470 Express Lane construction at Gantry A was likely around 4.0 percent. As the project continued into 2018, actual growth at Toll Gantry A was 0.0 percent, representing a level of normal growth constrained by the ongoing construction. In 2019, there was a ramp up in construction activity, leading to an increase in impacts at Toll Gantry A. Assuming a 1.0 percent normal growth rate under the constrained construction conditions, it is likely that the construction impacts increased at Gantry A in 2019 an additional 2.25 percent. Thus, the estimated the total construction impact currently being experienced at Toll Gantry A is roughly 6.25 percent or 3,400 transactions per weekday. It is anticipated that when construction on C-470 ends in Spring 2020, the facility will experience a return of some of that traffic, plus an extra bump from the impacts of the project itself.

Lastly, it is worth noting the significant year-over-year decrease in transactions in March 2020. This is due to the public space closures, event cancellations, stay-at-home orders, and reduced economic activity resulting from the COVID-19 outbreak, which began mid-month. CDM Smith continues to monitor these impacts on a daily basis to assess the short-term and potential long-term impacts. The effects of COVID-19 to E-470 traffic are discussed later in this chapter and their potential impacts on future traffic and revenue are discussed in greater detail in **Chapter 4** of this report.

Annual Revenue Trends

Annual system-wide revenue trends from 2009 through 2019 by method of payment are presented in **Table 2-3**. Despite lower transactions in 2009 due to the Great Recession, the conversion to AET in 2009 and the increase in toll rates led to an increase in toll revenue over 2008 (not shown). ExpressToll revenue increased by 11.4 percent, the result of the $0.25 toll differential between ExpressToll and License Plate Toll rates at mainline gantry locations. The share of toll revenue resulting from ExpressToll transactions increased as well from 70 percent in 2008 to 72.3 percent in 2009. Net toll revenues, which include adjustments for unbillable and unpaid toll transactions, differed from gross toll revenues in 2009 by 1.2 percent as a result of the new License Plate Toll payment option. The shift to ExpressToll continued into 2010, as License Plate Toll revenues decreased by 8.0 percent over the prior year. As a result, the ExpressToll market share peaked at 75.6 percent of total revenue.

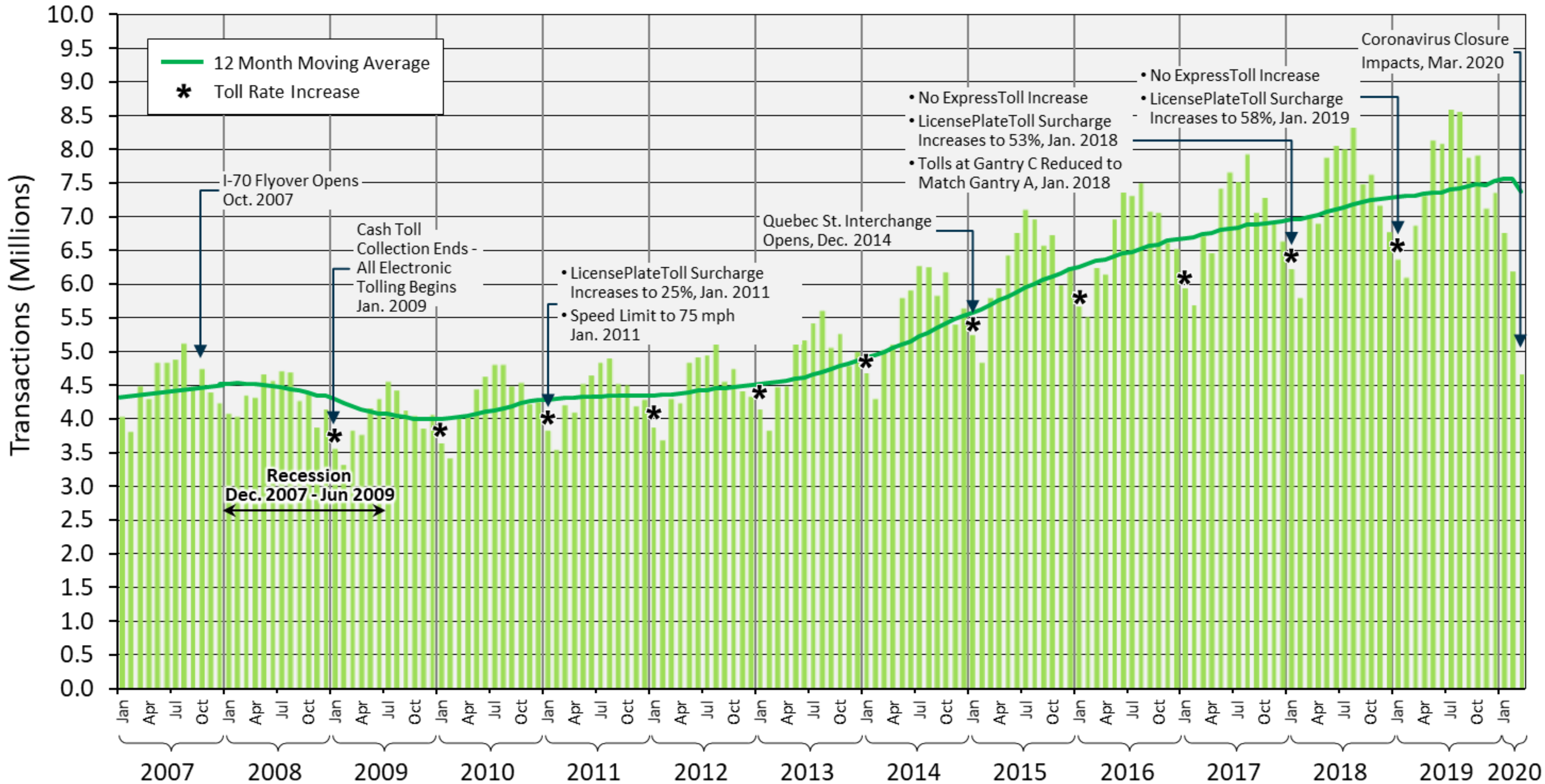


Figure 2-2
Monthly Transaction Trends

Table 2-3
Annual Systemwide Toll Revenue Trends
2009 - 2019

Year	Gross Toll Revenues (1): ExpressToll Revenue	ExpressToll Average Toll	ExpressToll Percent of Total E-470	Cash / License Plate Toll Revenue	Cash / License Plate Toll Average Toll	Cash / License Plate Toll Percent of Total E-470	Total Revenue	Total Average Toll	Total Percent of Total E-470	Net Toll Revenues (2) Revenue	Net Toll Revenues (2) Average Toll
2009 (5)(6)	$ 67,712,188	$ 1.95	72.3	$ 25,887,184	$ 3.13	27.7	$ 93,599,372	$ 1.95	100.0	$ 92,442,683	$ 1.93
AAPC	8.9			(8.0)			4.2			2.0	
2010	$ 73,708,570	$ 1.98	75.6	$ 23,815,212	$ 1.69	24.4	$ 97,523,782	$ 1.90	100.0	$ 94,309,891	$ 1.84
AAPC	7.5			32.1			13.5			14.2	
2011 (7)	$ 79,209,778	$ 2.10	71.6	$ 31,459,634	$ 2.20	28.4	$ 110,669,412	$ 2.12	100.0	$ 107,722,486	$ 2.07
AAPC	8.2			9.9			8.7			8.4	
2012 (3)(8)	$ 85,693,927	$ 2.21	71.3	$ 34,567,673	$ 2.26	28.7	$ 120,261,600	$ 2.23	100.0	$ 116,744,889	$ 2.16
AAPC	11.3			14.1			12.1			10.7	
2013 (9)	$ 95,367,587	$ 2.32	70.8	$ 39,425,861	$ 2.28	29.2	$ 134,793,448	$ 2.31	100.0	$ 129,181,918	$ 2.21
AAPC	15.4			20.1			16.8			16.4	
2014 (10)	$ 110,080,820	$ 2.44	69.9	$ 47,364,845	$ 2.23	30.1	$ 157,445,664	$ 2.37	100.0	$ 150,404,512	$ 2.27
AAPC	14.5			16.0			15.0			15.0	
2015 (11)	$ 126,058,057	$ 2.51	69.6	$ 54,933,992	$ 2.26	30.4	$ 180,992,049	$ 2.43	100.0	$ 173,039,512	$ 2.32
AAPC	15.1			6.7			12.5			11.4	
2016 (3)(12)(13)	$ 145,091,716	$ 2.62	71.2	$ 58,609,418	$ 2.38	28.8	$ 203,701,135	$ 2.55	100.0	$ 192,810,649	$ 2.41
AAPC	12.5			9.0			11.5			10.9	
2017 (14)(15)(16)	$ 163,299,992	$ 2.75	71.9	$ 63,896,754	$ 2.70	28.1	$ 227,196,746	$ 2.73	100.0	$ 213,765,649	$ 2.57
AAPC	7.7			15.7			9.9			9.0	
2018 (17)	$ 175,816,969	$ 2.74	70.4	$ 73,956,549	$ 3.20	29.6	$ 249,773,518	$ 2.86	100.0	$ 233,088,327	$ 2.67
AAPC	3.2			13.1			6.1			6.8	
2019 (18)	$ 181,436,249	$ 2.76	68.4	$ 83,634,020	$ 3.42	31.6	$ 265,070,269	$ 2.94	100.0	$ 249,013,096	$ 2.76
AVERAGE ANNUAL PERCENT CHANGE (AAPC)											
2009 - 2014	10.2			12.8			11.0	4.0		10.2	
2014 - 2019	10.5			12.0			11.0	4.4		10.6	
2009 - 2019	10.4			12.4			11.0	4.2		10.4	

Source: E-470 Public Highway Authority, 2017.

(1) Gross Toll Revenues do not include adjustments for uncollectible revenues (non-revenue vehicles, bad license plate images, etc...) or unpaid transactions.

(2) Net Toll Revenues include adjustments for uncollectible revenues (non-revenue vehicles, bad license plate images, etc...) and unpaid transactions.

(3) Leap Year.

(4) Tolls increased at Toll Gantry A from $1.50 to $1.75 and at Toll Gantry B, C, D and E from $1.75 to $2.00 on January 1, 2006. Increases of $0.25 at several ramp plazas.

(5) On January 1, 2009, License Plate Tolling was introduced on the E-470 system, with a $0.25 toll differential over ExpressToll tolls at mainline toll gantries and $0.10 at ramp toll gantries. Cash toll collections continued until July 4, 2009, at which point the entire E-470 was converted to All-Electronic Tolling.

(6) ExpressToll tolls increased at Toll Gantry A from $1.75 to $2.00 and at Toll Gantries B, C, D and E from $2.00 to $2.25 on January 1, 2009. Ramp toll gantries increased to $0.90. Additionally, a toll differential of $0.25 between ExpressToll and License Plate Toll was introduced.

(7) Tolls increased at Toll Gantry A from $2.00 to $2.15 and at Toll Gantries B, C, D and E from $2.25 to $2.40 on January 1, 2011. Ramp toll gantries increased to $0.95. Additionally, the toll differential between ExpressToll and License Plate Toll was increased from $0.25 to 25 percent.

(8) Tolls increased at Toll Gantry A from $2.15 to $2.25 and at Toll Gantries B, C, D and E from $2.40 to $2.50 on January 1, 2012. Ramp toll gantries increased to $1.00.

(9) Tolls increased at Toll Gantry A from $2.25 to $2.35 and at Toll Gantries B, C, D and E from $2.50 to $2.60 on January 1, 2013. Ramp toll gantries increased to $1.05.

(10) Tolls increased at Toll Gantry A from $2.35 to $2.45 and at Toll Gantries B, C, D and E from $2.60 to $2.70 on January 1, 2014. Ramp toll gantries increased to $1.10.

(11) Tolls increased at Toll Gantry A from $2.45 to $2.50 and at Toll Gantries B, C, D and E from $2.70 to $2.75 on January 1, 2015. Ramp toll gantries increased to $1.15.

(12) Tolls increased at Toll Gantry A from $2.50 to $2.60 and at Toll Gantries B, C, D and E from $2.75 to $2.85 on January 1, 2016. Ramp toll gantries increased to $1.20.

(13) Construction began in spring of 2016 to add a third lane in each direction along an eight-mile stretch from Parker Road and Quincy Avenue.

(14) Tolls increased at Toll Gantry A from $2.60 to $2.70 and at Toll Gantries B, C, D and E from $2.85 to $2.95 on January 1, 2017. Ramp toll gantries increased to $1.25.

(15) Hurricane Harvey occurred in August 2017 and Hurricane Irma occurred in September 2017, leading to gasoline shortages and other national travel disruptions.

(16) Construction on the C-470 Express Lanes began September 2017.

(17) ExpressToll rates decreased at Toll Gantry C from $2.85 to $2.70 on January 1, 2018. Additionally, the toll differential between ExpressToll and License Plate Toll was increased to 53 percent.

(18) The toll differential between ExpressToll and License Plate Toll was increased to 58 percent on January 1, 2019.

In 2011, the Authority increased toll rates for ExpressToll transactions at the mainline toll gantries by $0.15 and at the toll ramps by $0.05 and increased the toll differential between ExpressToll and License Plate Toll. This increased the average toll rate by 11.8 percent in 2011, as compared to 2010. As a result of the toll increase and normal growth, gross toll revenue increased by 13.5 percent in 2011 over 2010. Much of this increase was the result of the increased toll rate differential between ExpressToll and License Plate Toll transactions. The toll rate differential between the two payment methods was increased from $0.25 to 25 percent, effectively doubling the differential between ExpressToll and License Plate Toll methods of payment. Due to this change, toll revenues collected from License Plate Toll transactions increased by 32.1 percent in 2011.

From 2011 through 2017, the Authority has implemented annual toll increases. Despite the resultant traffic diversions from E-470 following these increases, gross toll revenue increased by 8.7 percent in 2012 and 12.1 percent in 2013. These increases were led by growth in License Plate Toll revenue, which grew an average of 12.0 percent per year between 2011 and 2013. Moreover, while License Plate Toll revenue represented only about 29 percent of total gross toll revenue between 2011 and 2013, the growth in License Plate Toll revenue represented 33 percent of the total growth during that period. This may have been the result of new system users coming from the developing areas in Aurora and Adams County who had yet to register for ExpressToll, in addition to the return of some of the less frequent non-resident, recreational or discretionary customers lost during the recession.

Coupled with annual toll increases and robust traffic growth, gross toll revenue increased by 16.8 percent, 15.0 percent, and 12.5 percent in 2014, 2015 and 2016, respectively. These systemwide increases were the product of comparable average revenue growth rates for both ExpressToll and LicensePlateToll between 2013 and 2016. ExpressToll revenue grew at an average rate of 13.7 percent over the three-year period, while License Plate Toll revenue grew by 16.7 percent.

While annual growth in gross ExpressToll revenue fell to 7.7 percent in 2018 and 3.2 percent in 2019, annual growth in gross LicensePlateToll revenue increased back to double digits (15.7 percent in 2018 and 13.1 percent in 2019). As a result, the share of ExpressToll revenue fell below 69 percent in 2019, for the first time in over 10 years. Likely, the increase in LicensePlateToll customers was due to new residents in the region using E-470 infrequently and who had not yet registered for an ExpressToll account. Total annual gross toll revenues grew in 2018 by 9.9 percent and in 2019 by 6.1 percent. Due to modest gains in toll collection rates, 2019 net toll revenues grew slightly more, by 6.8 percent.

Overall growth in systemwide gross toll revenues between 2009 and 2019 has averaged 11.0 percent per year, while net toll revenues have increased by 10.4 percent over the same 10-year period. During that time, system-wide gross toll revenue has more than doubled, from $93.6 million to $265.1 million. This is largely due to an average annual toll rate increase of 4.2 percent over that 10-year period. Total net toll revenue was $249.0 million in 2019, representing a leakage rate of 6.1 percent.

2019 Average Weekday Traffic Volumes

The regional travel demand model used in the traffic and revenue forecasting process is based on annual average weekday traffic (AWDT) volumes. As an aid in the model calibration process, traffic counts were obtained from Colorado Department of Transportation (CDOT) and from the Denver Regional Council of Governments (DRCOG) for major arterial roadways within the project corridor along five screenlines. These screenlines were developed to intercept traffic flows along major east and west or north and south roadways parallel to the mainline tolling locations on E-470. Additional traffic counts were collected along these screenlines in September 2019 by All Traffic Data Services (ATDS). The screenline counts and cross-street counts were useful to calculating the total volume of traffic potential to E-470, to estimate the current E-470 market share of traffic and to aid in the calibration of the regional travel demand model.

In addition, a balanced traffic profile of 2019 AWDT volumes for each E-470 ramp and mainline section was developed as part of the model calibration process in order to compare the model's traffic assignment output with actual traffic volumes. The complete mainline and ramp traffic profile was developed using count data at the existing toll locations provided by the Authority in conjunction with 48-hour machine counts of traffic conducted on internal weekdays in September 2019 by ATDS at all non-tolled ramp locations.

Project Screenlines

One assessment of the reasonableness of the results of the tolled traffic assignments is whether the total volume crossing a group of parallel routes, called a screenline, compares well with actual traffic volumes. The variation in the traffic assignments from the travel demand model versus the actual traffic counts may differ on individual roads; however, if the total assigned volumes crossing the screenlines are reasonably close to the counts, then this is an indication that volumes, congestion levels, and travel patterns are being reasonably simulated by the model.

CDM Smith developed five screenlines to assist in the calibration of the travel demand model, illustrated in **Figure 2-3**. CDM Smith obtained available traffic counts for the roadways along these screenlines from CDOT, DRCOG and ATDS. These counts were generally conducted between 2016 and 2019. Based on historical traffic growth trends and monthly factors developed from the data provided by the Authority and from continuous counter information obtained from CDOT, the traffic counts were adjusted to 2019 AWDT levels. The resulting 2019 AWDT volumes along the five screenlines are provided in **Table 2-4**.

As expected, based on the available count data, the share of screenline traffic on E-470 varies by location. The share of traffic using E-470 at Screenline A is 7.6 percent. The share of traffic on E-470 at screenlines B and C are 6.9 percent and 4.7 percent, respectively. These shares would probably be higher were it not for the proximity of several major competing toll-free parallel roads, including I-25, I-225, Pena Boulevard and Tower Road. Of the five screenlines, Screenlines D and E have the greatest share of traffic using E-470, with market shares of 13.2 percent and 11.4 percent, respectively. It should be noted that the overall E-470 market share at Screenline D and E are a minimum of 50 percent greater than those of Screenlines A, B and C. This may be due to the lack of competing parallel facilities at these locations. For example, E-470 serves as one of only seven crossings of the South Platt River in the ten miles between E 160th Avenue and E 88th Avenue.

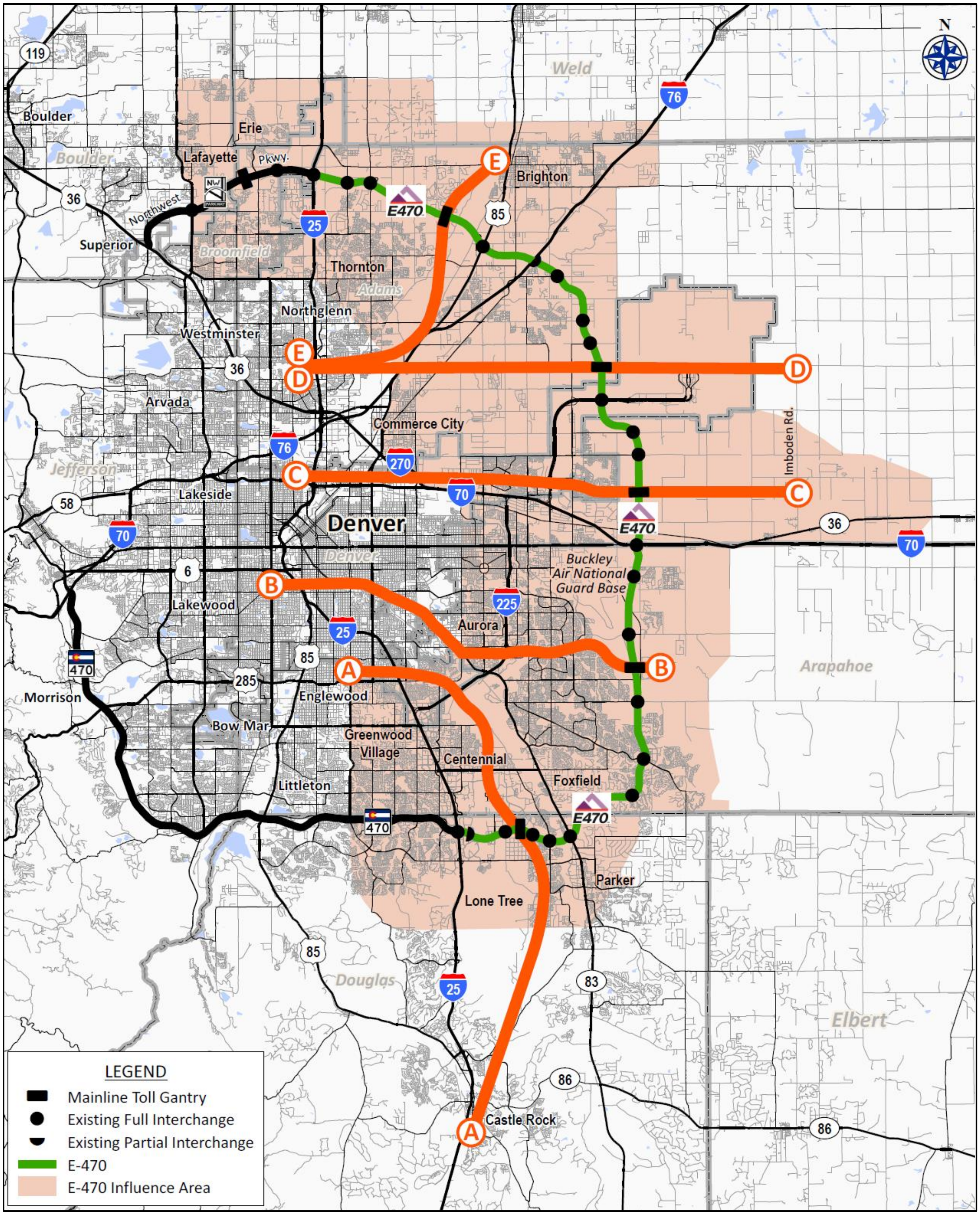


Figure 2-3
Project Screenlines

CDM Smith

Table 2-4
2019 Annual Average Weekday Traffic Volumes at Screenline Locations

		Annual Average Weekday Traffic (AWDT)		
Street Name	**Location**	Northbound	Southbound	Total
Screenline A				
I-25	North of SH 30 / E Hampden Ave.	125,480	132,770	258,250
SH 30	South of E Dartmouth Ave.	22,920	23,070	45,990
I-225	Southwest of SH 83 / Parker Rd.	78,520	76,810	155,330
Dam Rd.	Southwest of SH 83 / Parker Rd.	6,070	4,890	10,960
SH 88 / E Arapahoe Rd.	East of S Peroia St.	36,280	37,650	73,930
E Broncos Pkwy.	West of S Potomac St.	12,620	12,180	24,800
E County Line Rd.	East of Concord Center Dr.	4,870	5,400	10,270
Compark Blvd.	East of Concord Center Dr.	3,230	3,360	6,590
E-470	**Toll Gantry A**	**25,780**	**28,070**	**53,850**
E Lincoln Ave.	East of S Peoria St.	21,520	20,720	42,240
Ridgegate Pkwy.	East of S Peoria St.	9,440	9,650	19,090
Hess Rd.	East of S Havana St.	5,060	4,670	9,730
Total Screenline Traffic Volumes		**351,790**	**359,240**	**711,030**
Percent E-470 Market Share for Screeline		7.3	7.8	7.6
Screenline B				
I-25	South of SH 6 / 6th Ave.	117,260	127,460	244,720
SH 2 / S Colorado Blvd.	South of E 1st Ave.	28,360	27,500	55,860
SH 30 / S Havana St.	North of SH 83 / S Parker Rd.	16,550	16,940	33,490
S Peoria St.	South of E Iliff Ave.	12,500	12,070	24,570
I-225	North of SH 83 / S Parker Rd.	76,050	69,330	145,380
S Chambers Blvd.	South of E Iliff Ave.	16,650	18,320	34,970
S Buckley Rd.	South of E Iliff Ave.	15,480	15,370	30,850
S Tower Rd.	South of E Iliff Ave.	14,400	13,890	28,290
S Dunkirk St.	South of E Iliff Ave.	2,780	2,430	5,210
E-470	**Toll Gantry B**	**22,800**	**23,470**	**46,270**
SH 30 / S Gun Club Rd.	South of E Jewell Ave.	11,400	10,700	22,100
Total Screenline Traffic Volumes		**334,230**	**337,480**	**671,710**
Percent E-470 Market Share for Screeline		6.8	7.0	6.9
Screenline C				
I-25	North of I-70	120,000	114,850	234,850
SH 265 / Brighton Blvd.	South of York St.	3,670	3,460	7,130
SH 6 / Vasquez Blvd.	North of I-70	9,560	13,950	23,510
SH 2 / Colorado Blvd.	North of I-70	18,330	17,090	35,420
I-270	North of I-70	44,430	45,430	89,860
Central Park Blvd.	North of I-70	17,440	14,550	31,990
Havana St.	North of I-70	16,760	14,660	31,420
Peoria St.	North of I-70	24,380	18,170	42,550
Chambers Rd.	North of E 40th Ave.	18,210	20,910	39,120
Pena Blvd.	North of E 40th Ave.	65,760	60,860	126,620
Tower Rd.	South of Green Valley Ranch Blvd.	12,190	13,470	25,660
Picadilly Rd.	South of Green Valley Ranch Blvd.	2,320	2,520	4,840
E-470	**Toll Gantry C**	**17,500**	**16,750**	**34,250**
Mohegan Rd.	South of E 56th Ave	450	490	940
Total Screenline Traffic Volumes		**371,000**	**357,160**	**728,160**
Percent E-470 Market Share for Screeline		4.7	4.7	4.7
Screenline D				
I-25	South of E 88th Ave.	85,150	90,160	175,310
I-76	South of E 88th Ave.	46,610	45,240	91,850
Brighton Rd.	South of E 88th Ave.	2,370	2,430	4,800
Rosemary St.	South of E 88th Ave.	6,080	6,840	12,920
SH 2	South of E 88th Ave.	550	950	1,500
Tower Rd.	South of E 88th Ave.	18,370	18,160	36,530
E-470	**Toll Gantry D**	**24,330**	**25,230**	**49,560**
Total Screenline Traffic Volumes		**183,460**	**189,010**	**372,470**
Percent E-470 Market Share for Screeline		13.3	13.3	13.3
Screenline E				
I-25	South of E 88th Ave.	85,150	90,160	175,310
E 88th Ave.	at South Platte River	12,190	11,530	23,720
McKay Rd.	at South Platte River	9,230	9,320	18,550
SH 44 / E 104th Ave.	at South Platte River	8,230	8,070	16,300
E 120th Ave.	at South Platte River	9,860	10,450	20,310
Henderson Rd.	at South Platte River	3,610	4,070	7,680
E-470	**Toll Gantry E**	**18,310**	**18,480**	**36,790**
SH 7 / E 160th Ave.	at South Platte River	8,680	8,850	17,530
E 168th Ave.	at South Platte River	2,840	2,630	5,470
Total Screenline Traffic Volumes		**158,100**	**163,560**	**321,660**
Percent E-470 Market Share for Screeline		11.6	11.3	11.4

Balanced E-470 Traffic Profile

A complete profile of 2019 AWDT volumes on E-470 is provided in **Figure 2-4**. Actual average weekday traffic at the mainline and ramp toll gantries was obtained from count information provided by the Authority. To develop the complete mainline and ramp traffic profile, CDM Smith subcontracted with ATDS to obtain 48-hour machine traffic counts at all non-tolled ramp locations. The counts were conducted on internal weekdays (Tuesday – Thursday) in September 2019. Based on historical traffic growth trends and monthly factors developed from the data provided by the Authority, these counts were adjusted to 2019 AWDT levels. Together with control volumes at the mainline toll gantries, balanced AWDT volumes from I-25 south to I-25 north were estimated.

This data was an important basic input to the traffic and revenue forecasting process, as it was used as an aid in the calibration of the regional travel demand model. It also provided a firm basis for estimating when future widening might be required, since peak mainline traffic load points occur at locations other than mainline toll gantries.

At the south end of E-470, immediately north of I-25, the 2019 AWDT volume was 52,440. The peak load point was, however, one interchange north, between Jamaica Street and Peoria Street ramps. Traffic at this location reached 57,030. Volumes remained in excess of 50,000 over the entire 8.6-mile section of E-470 between I-25 and Gartrell Road. Growth along this segment of roadway has been low in recent years, relative to the rest of E-470, primarily due to ongoing construction activities associated with the C-470 Express Lanes. North of Gartrell Road, weekday volumes gradually drop from less than 48,000 to less than 45,000 between Gartrell Road and I-70. Between I-70 and Pena Boulevard, AWDT volumes are generally in the range of 33,000 to 34,000. North of Pena Boulevard to I-76, AWDT's range between 46,000 to just under 50,000. North of I-76 to the I-25 interchange, the AWDT's are in the range of 37,000 to 38,000 vehicles.

The heaviest interchange volumes include Parker Road, Smoky Hill Road, Pena Boulevard and I-70. The original ramps constructed along the southern most portion of E-470 all carry relatively high volumes of traffic. Parker Road also has relatively high ramp volumes in both travel directions, with 15,200 vehicles per day entering and exiting to and from the south and 14,500 vehicles per day entering and exiting to/from the north. At the I-70 Interchange, traffic tends to be much heavier to and from the south with AWDTs in excess of 15,200. At Pena Boulevard, the combined ramps to/from the south average 15,000 vehicles per weekday, while the combined ramp volumes to/from the north average 31,100 vehicles per weekday. Based on these volumes, over 46,000 vehicles per day used E-470 to access Pena Boulevard, with the roughly two thirds of these oriented to/from Denver International Airport (DIA). Based on the ramp volumes in the balanced profile, 29.7 percent of E-470 trips are to/from the Pena Boulevard Interchange and 21.8 percent of all E-470 trips are to/from DIA.

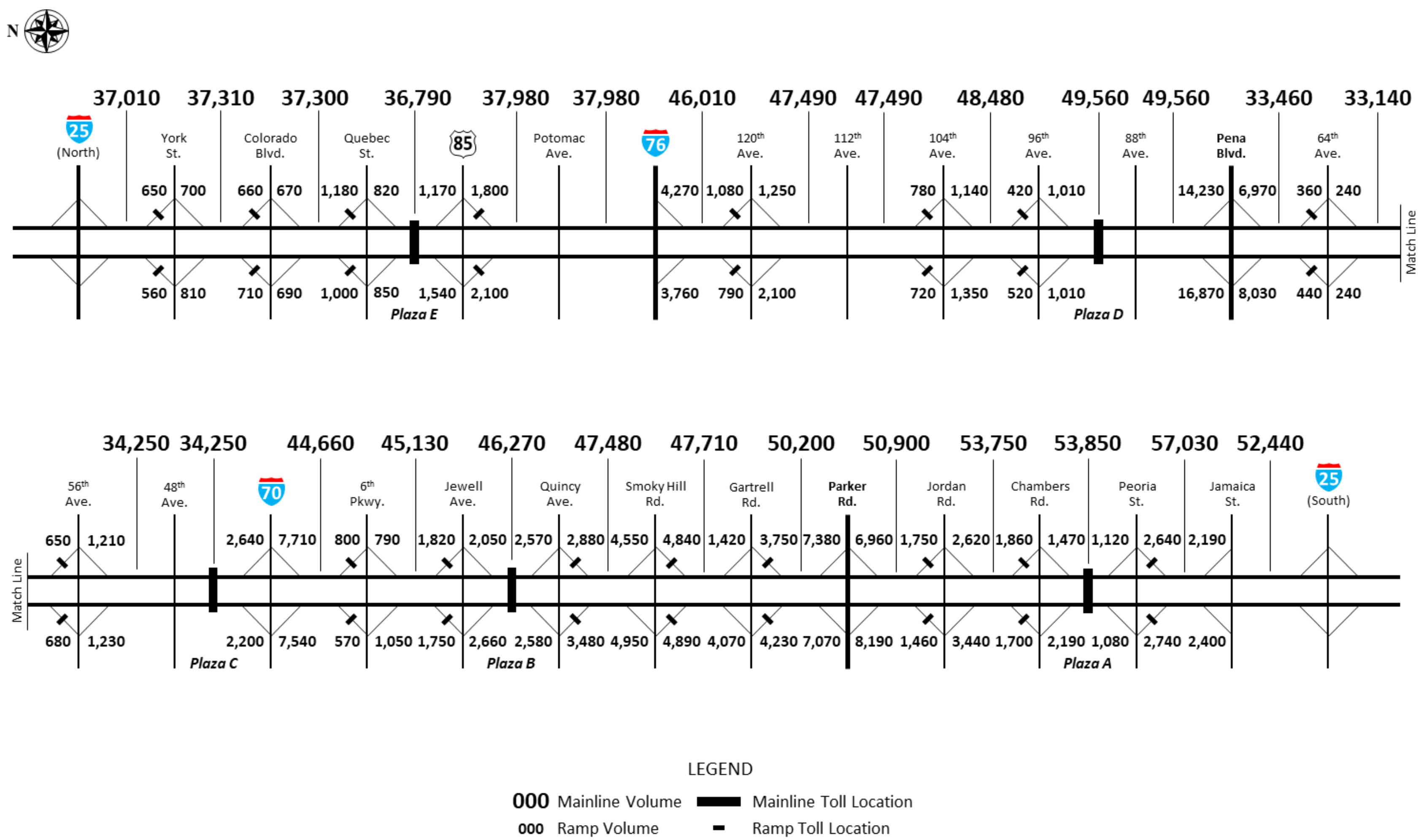


Figure 2-4
E-470 Balanced Traffic Profile – 2019 Average Weekday Transactions

Several of the interchanges have relatively low volumes. Many of these were constructed in areas that have yet to experience significant local development, but for which future development is planned. Examples of this include 6th Parkway, 56th Avenue, 64th Avenue, 96th Avenue and 104th Avenue.

Based on the actual ramp and mainline traffic volumes presented in **Figure 2-4**, it was estimated that on an average weekday in 2019, 155,390 trips were made. Dividing the 276,980 transactions which occurred on an average weekday in 2019, the average number of transactions per trip was estimated at 1.8. The average number of transactions per trip on E-470 has historically remained relatively constant, with 1.8 transactions per trip observed during in the prior 2017 and 2013 balanced profiles.

Monthly Traffic Variations

Figure 2-5 provides an index of 2019 monthly traffic variations by mainline toll location and for the total system. The dashed horizontal line reflects a typical average month, or an index value of 1.00. In general, average December through April traffic volumes were below the average month, while May through November were above the average. For all toll locations, January represented the lowest month in terms of average traffic volumes, about 17 percent below the average month, while July and August represented the highest months with traffic approximately 12 percent above the average month, respectively.

Daily Traffic Variations

Figure 2-6 provides a summary of 2019 daily traffic variations at each mainline toll location and for the total system for a typical week. The index value of 1.0 represents an average day. As with most urban toll facilities, weekend traffic tends to be considerably lower than weekday volumes. All five weekdays produce traffic volumes above the average at all mainline tolling locations, while Saturday and Sunday volumes are generally in the range of 60 to 75 percent of the average day, depending on tolling location. The peak days are Thursday and Friday, based on the sample data provided by the Authority. These patterns are consistent for all five mainline toll locations.

Hourly Traffic Variations

Table 2-5 provides a summary of typical hourly traffic volumes at the five mainline toll gantry locations based on an average of hourly data for a typical week in 2019. The data is also shown graphically in **Figure 2-7**.

Considerable peaking occurred at Toll Gantries A and D, where peak hour, peak direction volumes come closest to reaching Level-of-Service (LOS) C capacity. At Toll Gantry A, the peak hour directional volume exceeded 4,000 vehicles in the morning and over 3,450 in the evening. This was substantially higher than midday and off-peak hours, most of which tended to average between 1,000 to 1,500 vehicles or less per direction per hour. Peak hour, peak direction volumes at Toll Gantry D approached 2,750 vehicles in the morning and 2,800 in the evening. Toll Gantry B exhibited similar peak hour volumes, ranging between 2,500 to 2,900 vehicles per hour per direction. Peak-hour volumes at Toll Gantries C and E were generally lower than at the other three mainline toll gantries.

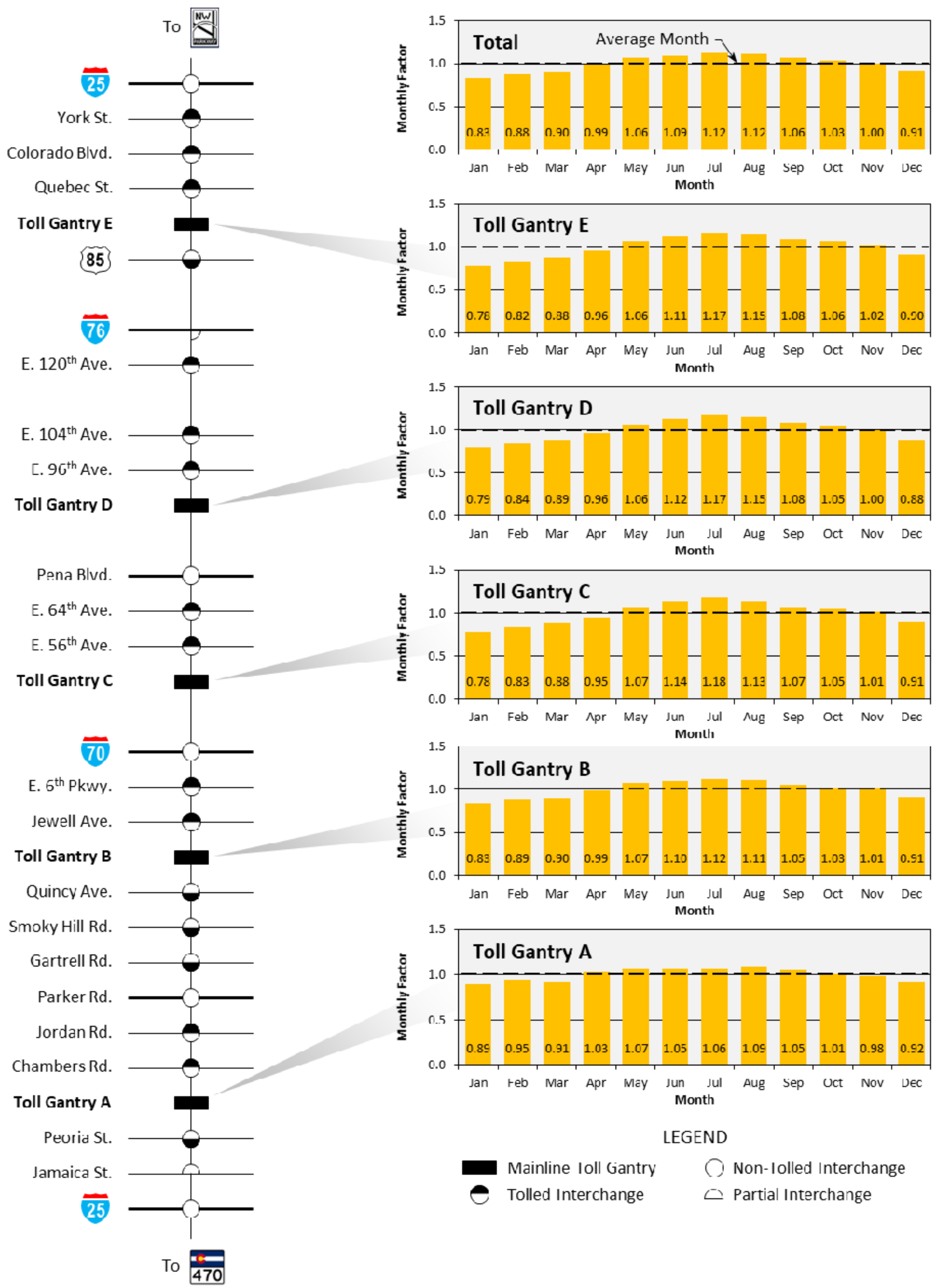


Figure 2-5
2019 Average Monthly Traffic Variations by Mainline Toll Location

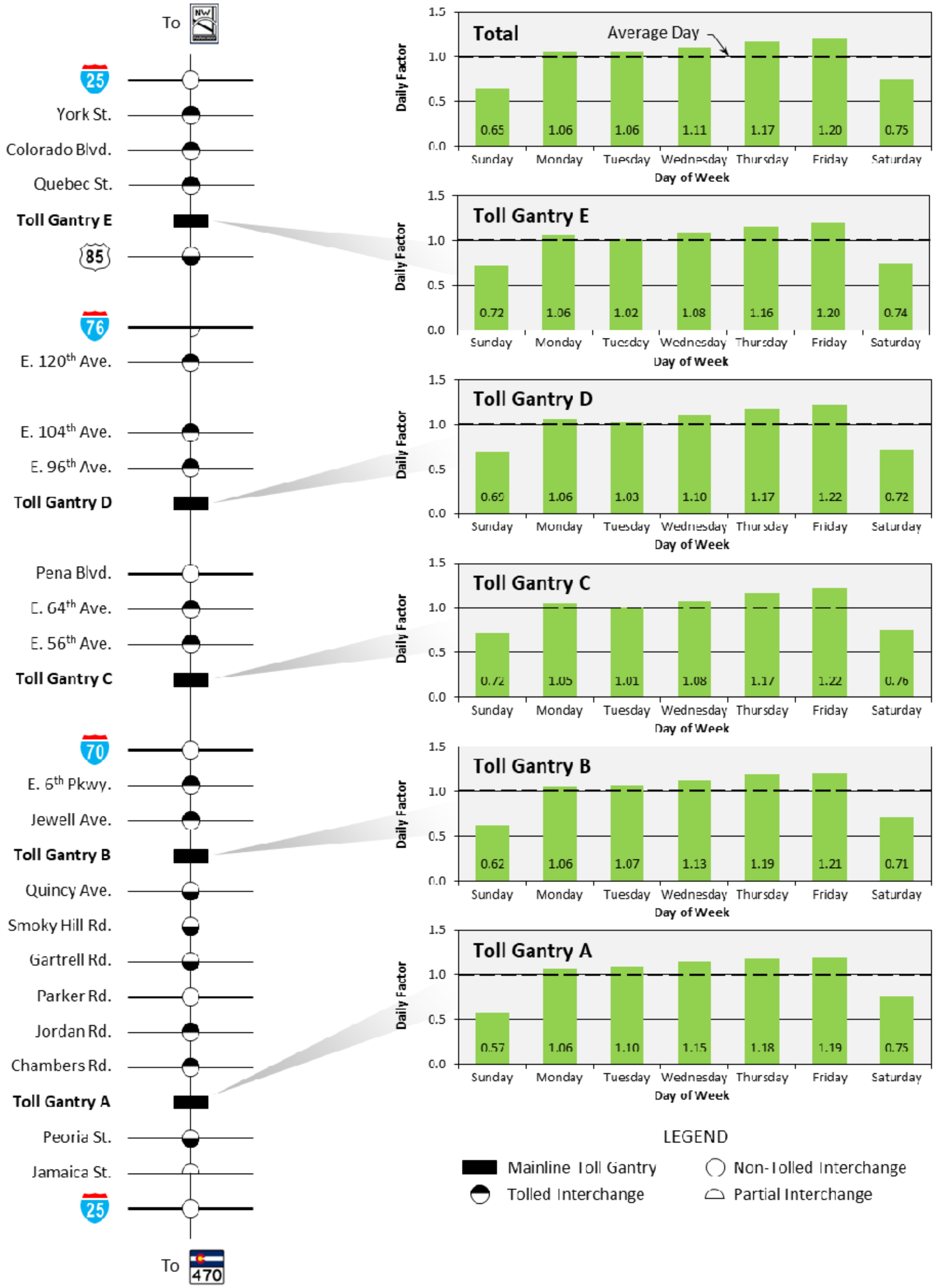


Figure 2-6
2019 Average Daily Traffic Variations by Mainline Toll Location

Table 2-5
2019 Average Weekday Hourly Traffic Volumes by Mainline Toll Gantry

Hour Beginning	Toll Gantry A Northbound	Toll Gantry A Southbound	Toll Gantry A Two-Way	Toll Gantry B Northbound	Toll Gantry B Southbound	Toll Gantry B Two-Way	Toll Gantry C Northbound	Toll Gantry C Southbound	Toll Gantry C Two-Way	Toll Gantry D Northbound	Toll Gantry D Southbound	Toll Gantry D Two-Way	Toll Gantry E Northbound	Toll Gantry E Southbound	Toll Gantry E Two-Way
	Hourly Traffic Volumes [1]														
Midnight	65	103	168	49	201	250	50	190	240	282	80	362	268	51	319
1:00	33	52	85	30	93	123	30	86	116	133	46	179	123	28	152
2:00	31	29	61	42	46	88	41	41	83	64	58	121	53	42	94
3:00	78	37	116	168	41	208	160	42	202	71	212	284	45	199	244
4:00	139	125	264	359	106	464	339	117	456	176	463	638	111	368	478
5:00	385	558	942	890	287	1,177	648	272	920	384	949	1,333	239	730	969
6:00	941	2,137	3,079	1,890	1,010	2,900	1,242	813	2,055	906	2,179	3,086	652	1,502	2,154
7:00	1,370	**4,005**	**5,375**	**2,533**	1,814	4,346	1,511	1,254	2,765	1,389	**2,749**	4,138	1,119	**1,848**	2,967
8:00	1,278	3,554	4,832	2,023	1,611	3,634	1,449	1,127	2,576	1,433	2,277	3,711	1,148	1,551	2,698
9:00	1,074	1,989	3,063	1,296	1,042	2,338	1,034	791	1,825	1,178	1,443	2,620	917	1,018	1,935
10:00	1,021	1,503	2,525	976	882	1,858	778	695	1,473	1,100	1,096	2,196	826	811	1,637
11:00	1,176	1,422	2,599	959	896	1,855	780	664	1,444	1,059	1,092	2,151	810	832	1,643
Noon	1,257	1,315	2,572	950	913	1,863	759	681	1,440	1,083	1,081	2,164	801	814	1,615
13:00	1,378	1,272	2,649	1,015	1,031	2,047	834	784	1,618	1,203	1,189	2,392	891	906	1,796
14:00	1,745	1,318	3,063	1,177	1,283	2,460	990	925	1,915	1,469	1,395	2,864	1,003	1,066	2,069
15:00	2,530	1,621	4,151	1,625	2,034	3,659	1,359	1,367	2,726	2,212	1,755	3,967	1,464	1,350	2,815
16:00	**3,455**	1,837	5,292	2,075	2,801	4,876	**1,686**	1,674	**3,360**	**2,796**	2,009	**4,805**	1,894	**1,552**	**3,446**
17:00	3,433	1,853	5,286	2,018	**2,909**	**4,927**	1,553	**1,701**	3,255	2,610	1,901	4,511	**1,953**	1,405	3,358
18:00	1,851	1,292	3,143	1,152	1,657	2,809	892	1,146	2,037	1,553	1,219	2,772	1,242	895	2,137
19:00	919	749	1,668	577	875	1,451	477	676	1,153	887	689	1,575	725	509	1,233
20:00	668	509	1,177	403	664	1,067	340	548	888	724	499	1,223	622	381	1,003
21:00	504	353	857	292	518	810	260	459	719	633	388	1,021	528	294	822
22:00	288	268	556	190	450	640	178	403	580	559	282	842	508	209	716
23:00	166	165	332	109	311	420	112	289	401	423	179	602	366	124	490
Total Day	25,785	28,068	53,853	22,797	23,475	46,272	17,502	16,745	34,247	24,328	25,229	49,557	18,307	18,483	36,790

- Indicates the AM peak hour. (blue shading)
- Indicates the PM peak hour. (red shading)

000 - Indicates the peak hour for the total day.

[1] Based on actual hourly data January through October 2019 and estimated hourly data for November and December 2019 (based on actual 2018 data and historical growth trends).

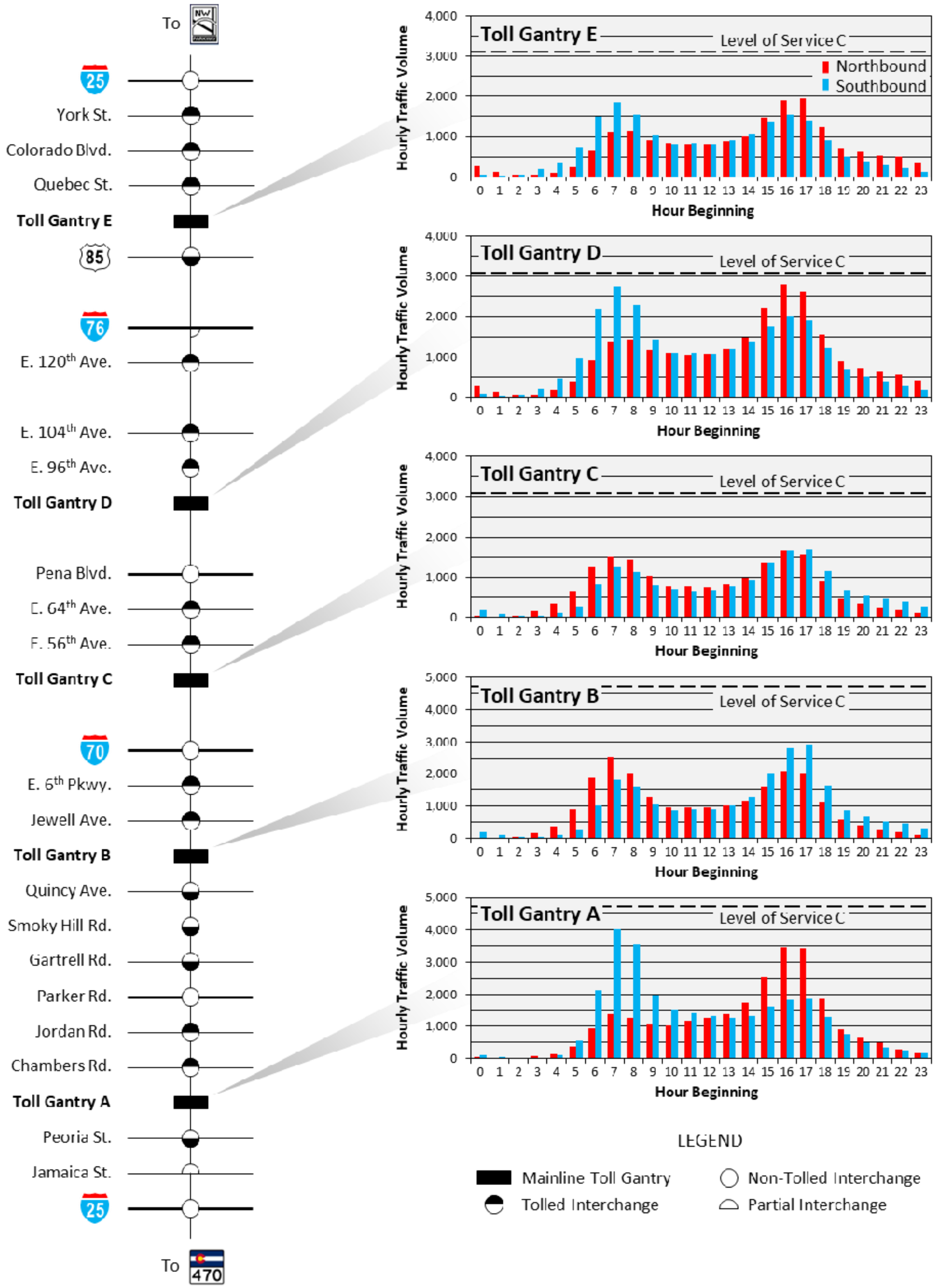


Figure 2-7
2019 Average Hourly Traffic Variations by Mainline Toll Location

There was also a relatively similar directional traffic distribution in both the AM and PM Peak hours, generally in the range of 60/40 at Toll Gantries B, D and E. Toll Gantry A exhibited a more pronounced directional distribution of traffic during both the morning and evening peak hours. During the AM Peak Hour, 75 percent of the traffic traveled in the southbound direction (25 percent traveled northbound), while during the PM Peak Hour, 65 percent traveled in the northbound direction (35 percent traveled southbound). Toll Gantry C was more atypical, having had a relatively even directional distributions of traffic in the range of 50/45 to 55/45 during the PM and AM Peak hours, respectively. This was to some extent likely related to travel demand patterns associated with DIA.

The potential for continued free-flow travel on E-470, at least in the near-term, based on current traffic volumes and mainline Level of Service C capacity is also shown. At each of the mainline toll locations, Level of Service C capacity per direction is indicated by the dashed horizontal line. Level of Service C indicates stable operation and relatively satisfactory operating speeds. As illustrated by the figure, 2019 volumes remain below LOS C capacity, although traffic growth between 2016 and 2019 has been substantial, and has all but eroded the considerable excess capacity previously available at Toll Gantries A and D. This means that in the vicinity of these gantries E-470 will have less ability to absorb future increases in peak hour traffic volumes if LOS C travel conditions are to be retained.

Trends in Method of Toll Payment

Table 2-6 provides a concise summary of ExpressToll market share percentages by toll location over the last five years. As shown, ExpressToll traffic accounted for between 67.4 and 73.5 percent of all transactions on E-470 between 2014 and 2019. It is interesting to note that the heaviest ExpressToll percentages are found at Toll Gantries A and B, which also have the heaviest concentration of commuter traffic based on a review of hourly traffic variations and responses

Table 2-6
ExpressToll Market Share Percentages
2014 - 2019

Toll Gantry	2014	Change	2015	Change	2016	Change	2017	Change	2018	Change	2019
A	64.7	(0.5)	64.2	1.5	65.7	8.4	74.1	1.8	75.9	(0.2)	75.7
B	62.1	(0.7)	61.4	2.8	64.2	8.0	72.2	1.9	74.1	(0.5)	73.6
C	65.0	(0.1)	64.9	2.8	67.7	0.4	68.1	2.1	70.2	(0.3)	69.9
D	66.7	(0.5)	66.2	1.8	68.0	(1.1)	66.9	2.4	69.3	(0.3)	69.0
E	72.0	0.2	72.2	0.8	73.0	(2.6)	70.4	2.2	72.6	(0.5)	72.1
All Mainline Gantries	66.7	(0.5)	66.2	1.8	68.0	2.6	70.6	2.0	72.6	(0.4)	72.2
Ramp Gantries	70.3	(0.4)	69.9	1.5	71.4	3.7	75.1	1.7	76.8	(1.2)	75.6
All Gantries	68.0	(0.6)	67.4	1.8	69.2	2.3	71.5	2.0	73.5	(0.6)	72.9

Source: E-470 Public Highway Authority.

from the 2017 travel pattern and trip characteristics survey of E-470 customers. The lowest market shares have historically been experienced at Toll Gantries C, D and, to a lesser extent, E, although market shares which had been close to 65 percent in 2014 and 2015, have increased to nearly 70 percent or higher in the last two years.

While pre-2014 market share percentages are not provided in **Table 2-6**, ExpressToll percentages declined from 70 to 72 percent between 2010 and 2013 to 68 percent and 67 percent in 2014 and 2015, respectively. This was primarily because LPT transactions were growing at a faster rate than ExpressToll transactions. These declines occurred despite an increase in the toll differential between ExpressToll and LPT and several overall toll increases. The faster growth in LPT transactions was speculated to be the result of new system users coming from the developing areas in Aurora and Adams County who had yet to register for ExpressToll, in addition to the return of some of the less frequent non-resident, recreational or discretionary customers lost during the recession. However, the ExpressToll market share increased by 1.8 percent in 2016 to 69.2 percent and by 2.3 percent in 2017 to 71.5 percent. It believed that the expansion of the managed lane concept in the Denver region was a contributing factor for the increase. The share of ExpressToll transactions increased by 2.0 percent in 2018 to 73.5 percent. It is believed that the toll rate changes adopted in 2018 which increased the LPT surcharge, along with the continued expansion of the managed lane concept in the Denver region, contributed to the continued rise in the ExpressToll market share. During 2019, the ExpressToll market share decreased by 0.6 percent to 72.9 percent. Declines were relatively consistent at the mainline toll gantries averaging 0.4 percent, and ranging from 0.2 percent at Toll Gantry A to 0.5 percent at Toll Gantries B and E. The greatest percent declines of 1.2 percent occurred at the ramp toll gantries, accounting for slightly more than 20 percent of E-470 transactions in 2019.

Commercial Vehicle Traffic Distribution

Table 2-7 presents the percentage of transactions by method of toll payment and vehicle class at the mainline toll gantries in 2019. Overall, two-axle vehicles, which include passenger cars, motorcycles, vans and SUVs, accounted for 96.3 percent of all transactions. Vehicles with three-or-more axles accounted for 3.7 percent of total transactions, consistent with historically observed percentages and were used in the forecasts of transactions and revenue presented in Chapter 4.

In 2019, 72.9 percent of all transactions were ExpressToll. Disaggregating the ExpressToll market participation rates by vehicle type, shows that a higher proportion of passenger vehicles transactions, 73.1 percent, were ExpressToll compared with 67.4 percent for vehicles with three-or-more-axles. Use of ExpressToll also varied within the three-or-more-axle vehicle category. ExpressToll was lowest among five-or-more-axle vehicles, which are generally 18-wheel tractor trailer trucks and other heavy commercial vehicles. ExpressToll participation by five-or-more-axle vehicles was 61.7 percent. Three-axle vehicles, which include delivery trucks, motor homes and other light commercial vehicles, had an ExpressToll participation rate of 78.0 percent.

Table 2-7
2019 Vehicle Class and Method of Payment Distributions

	Method of Payment			Total
Vehicle Class	ExpressToll	LPT	Total	**Transactions**
Two Axles	**73.1%**	**26.9%**	**100.0%**	**96.3%**
Three Axles	78.0%	22.0%	100.0%	0.9%
Four Axles	67.6%	32.4%	100.0%	0.9%
Five-Or-More Axles	61.7%	38.3%	100.0%	1.9%
Three-Or-More Axles	**67.4%**	**32.6%**	**100.0%**	**3.7%**
Total	**72.9%**	**27.1%**	**100.0%**	**100.0%**

E-470 Customer Trip Characteristics

CDM Smith also obtained and reviewed detailed E-470 transaction records. The purpose of this effort was to provide a better understanding of the E-470 customer base, their usage patterns, trip distributions, frequency of usage, geographical distribution, origins and destinations patterns, and demographic characteristics such as income, household size, or rates of car ownership. Towards those ends, a full year of 2018 transaction data (which was the most recent full year available at the time this analysis was conducted) by anonymous account numbers and actual ZIP codes including the toll gantry was obtained. As described in this section, the transaction data was analyzed and summarized at the individual toll gantry level to develop gantry-specific trip patterns and frequency of E-470 usage. Additionally, this information was combined with other readily available data sources such as Census, American Community Survey and Longitudinal Employer Household Dynamics (LEHD).

Data Summarization Methodology

In order to process the large volume of individual transaction records involved, CDM Smith set up an Extract-Transform-Load (ETL) pipeline to bring the 2018 E-470 transaction data for the full year into a database hosted on an Amazon Web Services (AWS) SQL cloud-based server.

The database was queried using anonymized masked transponder numbers to develop trip frequency and trip distribution information for the facility. If a transponder recorded multiple transactions at consecutive toll locations within a designated time window, those transactions were considered to be a single trip, or trip chain. Vehicle fleets were excluded from the analysis due to their sharing transponders among many hundreds of vehicles. Further rules were set up to distinguish between chain trips, data based on time of travel such as peak, off-peak and other such categories.

The trip chain data was then used to generate trip frequency by payment type statistics, as well as analysis of gantry-to-gantry movements. Setting up portioning in SQL scripts allowed a quick analysis to extract movement profiles and frequency information for transactions and trips at mainline and ramp toll gantries from the 2018 dataset.

Additionally, since each masked transponder number was associated with a customer's home ZIP code, CDM Smith created a profile of a representative E-470 customer based on US Census demographic data weighted by transaction frequency. ZIP codes with a higher share of overall transactions were weighted proportionally higher. Once generated, the weighted customer profile was also compared to demographics from the eight E-470 model area counties: Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson and Weld Counties.

Trip Frequency

CDM Smith used trip chain information to analyze average trips per week for all weeks of the year in 2018 and averaged the results to develop an estimate of transaction frequency on E-470 for the "Typical Week". The results of this analysis are presented in **Figure 2-8**. Customers making one trip per week represented 40.2 percent of total customers, while those making two trips per week represented 27.6 percent. Thus, roughly two-thirds of E-470 customers make 2 trips or less per week. Customers making 5 or more trips per week represented 16.0 percent of total customers. On average, E-470 customers made 2.77 trips per week in 2018.

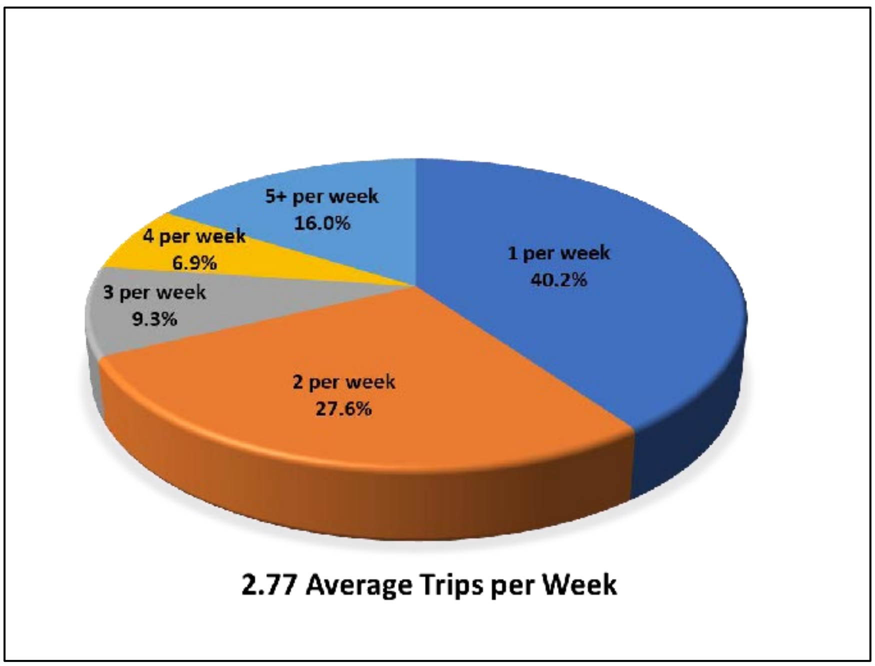


Figure 2-8
Trip Frequency Distribution for a Typical Week

Trip Movement Characteristics

Table 2-8
Average 2018 Transactions per Trip
By Mainline Toll Gantry and Payment Type

Plaza	Average Transactions per Trip
Gantry A	1.60
Gantry B	1.53
Gantry C	2.05
Gantry D	1.75
Gantry E	1.92
ExpressToll	1.77
License Plate Toll	1.82
Total System	**1.78**

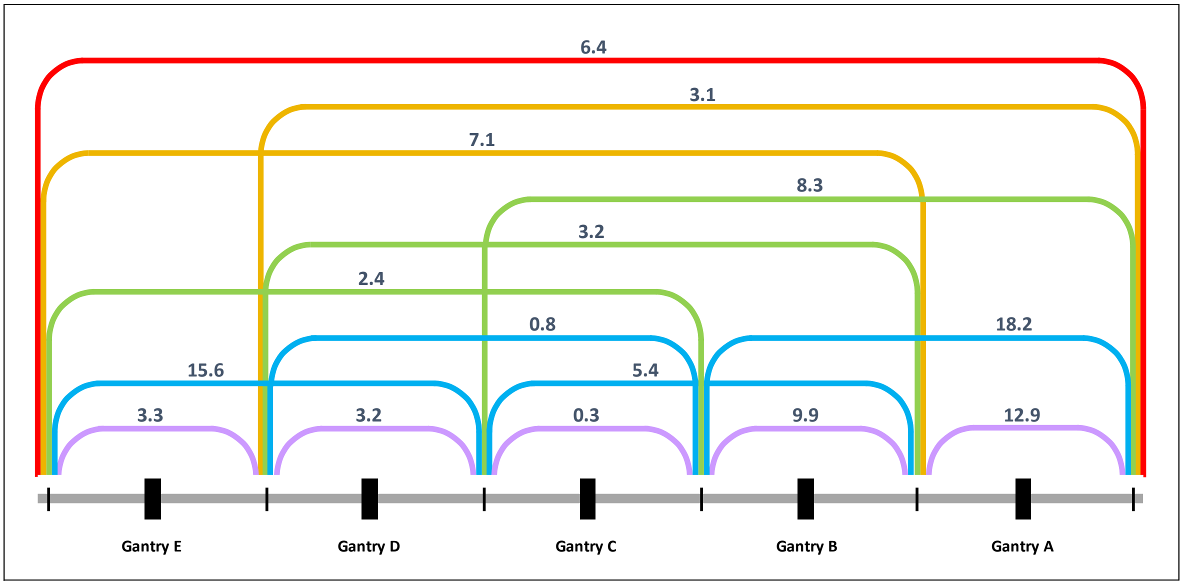
The detailed transaction data and the trip identification process also allowed for the analysis of E-470 trips based on their movements across the system. Average transactions per trip were developed by mainline toll gantry, as provided in **Table 2-8**. In general, E-470 customers make shorter trips on the system, averaging 1.8 transactions per trip. This relationship between transactions and trips has historically been relatively consistent, as previously noted. ExpressToll customers made slightly less transactions per trip than LPT customers, which may be due in part to the differences in trip patterns between the two methods of payment. Additionally, trips through Gantries C and D made the most transactions per trip. This suggests that trips on the northern segments of E-470 are more "through" in nature than "local". By contrast, trips through Gantries A and B had the lowest average transactions per trip in 2018.

The relationship between transactions and trips is primarily dependent on trip length. The longer the trip, the more toll transactions included in each trip. **Figure 2-9** illustrates the percent of E-470 trips traveling through the various E-470 "tolling segments," which are based on the location of the major free interchanges on the E-470 system. For each tolling segment, a customer will pass through only one tolling point, whether it is a mainline or ramp toll gantry. The E-470 tolling segments are:

- Tolling Segment A: I-25 (South End) to Parker Road
- Tolling Segment B: Parker Road to I-70
- Tolling Segment C: I-70 to Pena Boulevard
- Tolling Segment D: Pena Boulevard to I-76
- Tolling Segment E: I-76 to I-25 (North End)

As indicated in **Figure 2-9**, 6.4 percent of E-470 trips pass through all five tolling segments. 18.2 percent of E-470 trips make a movement through (only) Segments A and B. A significant share of E-470 trips occur on the southern portion of the facility. In total, almost three quarters (74.6 percent) of E-470 trips pass through either Segment A or Segment B. Another significant movement passes through (only) Segments D and E. This movement represents trips between Broomfield, I-25, Brighton and the Denver International Airport. As previously noted, 29.7 percent of E-470 trips are to or from the Pena Boulevard Interchange, and 21.8 percent of all E-470 trips are to or from the Denver International Airport. Trips through only segment C represent the smallest share of E-470 trips (0.3 percent), likely due to the number of parallel toll-

Figure 2-9
Distribution of 2018 Average Weekday Trips by Trip Tolling Segments
Percent of Total E-470 Trips



free facilities in this area. **Table 2-9** provides the same information by time of day and by method of payment.CDM Smith also reviewed travel patterns based on the mainline toll gantries included in each trip. This is shown in **Table 2-10**. The average daily estimates in the table represent only trips traveling through any of the mainline toll gantries, and exclude trips traveling only through ramp toll gantries. Trips traveling through a combination of mainline and ramp toll gantries are included but are only shown in terms of the mainlines through which they travelled. The data presented are a more detailed version of that presented in **Table 2-9**, indicating that the major movements on E-470 include movements through Gantry A and/or Gantry B, as well as movements through both Gantries D and E.

Customer Characteristics

Total Trips on the E-470 System by ZIP Code

The detailed transaction data, the trip identification process and ZIP code information associated with anonymized transponders was used to calculate trips by registered ZIP code. ZIP codes having at least one percent of total 2018 transactions are shown highlighted in **Figure 2-10**, with the lighter colors representing lower trips and the dark blue color representing higher number of trips. ZIP codes 80016, 80134 and 80015 in the southeast corner of the map in the city of Aurora, Douglas County and Arapahoe County, respectively, are the top three trip-generating ZIP codes based on E-470 customer data. These three ZIP codes account for 23.6 percent of all E-470 trips with the top ZIP code (80016) accounting for 10.6 percent of all the trips.

Table 2-9
Distribution of 2018 Average Weekday Trips by Trip Tolling Segments
Percent of Total E-470 Trips by Time of Day and Method of Payment

	Percent of Total Trips by Time Period				Percent of Total Daily Trips by Method of Payment		
Tolling Segments Included in Trip	AM Peak 6:30 - 9:00 AM	Midday 9:00 - 3:00 PM	PM Peak 3:00 - 7:00 PM	Nighttime 7:00 - 6:30 AM	ExpressToll	LPT	**Total Trips**
A	14.1	14.7	12.0	9.9	12.8	13.1	12.9
AB	20.7	18.3	18.9	13.7	18.8	16.5	18.2
ABC	7.1	8.0	7.0	12.5	8.3	8.3	8.3
ABCD	3.5	2.9	3.5	2.1	3.0	3.3	3.1
ABCDE	7.4	5.0	9.2	2.2	6.6	5.8	6.4
B	9.5	10.4	10.1	9.1	9.6	10.7	9.9
BC	3.8	5.1	4.1	10.1	5.6	4.9	5.4
BCD	3.1	3.1	3.5	2.9	3.0	3.7	3.2
BCDE	6.8	7.1	8.3	5.3	7.3	6.6	7.1
C	0.3	0.4	0.3	0.6	0.2	0.7	0.3
CD	0.8	0.9	0.8	0.8	0.7	1.2	0.8
CDE	2.2	2.6	2.4	2.3	2.3	2.9	2.4
D	3.7	2.8	3.0	3.6	2.8	4.1	3.2
DE	13.5	15.2	13.7	22.2	15.9	14.5	15.6
E	3.5	3.7	3.1	2.8	3.1	3.8	3.3
Grand Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Average Age by ZIP Code

The detailed transaction data was used to also calculate the average age of E-470 users. ZIP codes having at least one percent of total 2018 transactions are highlighted in **Figure 2-11**, with the lighter colors representing lower age and the darker colors representing higher age. While the weighted average age for the 8-county region is 37 years, the average age for major ZIP codes contributing most of the trips is higher at 46 years. This suggests that E-470 users are older compared to travelers on other facilities in the Denver region. ZIP code 80016, which accounts for 10.6 percent of all E-470 trips, has an average age of 42 years. The average age for the top three trip-generating zip codes is slightly higher at 43 years.

Education Level by ZIP Code

ZIP codes having at least one percent of total 2018 transactions are highlighted in **Figure 2-12** in terms of the percent with some college education or more. The lighter colors represent a lower percentage of college education and the darker colors represent a higher level of college education. While the weighted average share of population with some college or higher for the 8-county was 71 percent, the average share for major ZIP codes contributing most of the trips was higher at 78 percent. It implies that E-470 users have a higher education level, as compared to all the roadway users in the Denver metropolitan area.

Table 2-10
Distribution of 2018 Average Weekday Trips by Trip Tolling Segments
Percent of Trips by Mainline Gantry, by Direction and by Time of Day

Gantry	Dir.	Gantries Passed	Percent Distribution by Gantry by Direction: AM Peak (6:30-9AM)	Midday (9-3PM)	PM Peak (3-7PM)	Night (7-6:30AM)	Total Day
Gantry A	NB	A-NB	40.1	64.6	65.1	59.1	**61.1**
		AB	14.1	6.3	8.3	6.9	**8.2**
		ABC	28.5	15.3	6.9	26.1	**14.8**
		ABCD	7.1	6.8	7.5	5.1	**6.9**
		ABCDE	10.2	7.0	12.3	2.8	**9.1**
	SB	A-SB	73.3	70.8	47.7	58.0	**64.3**
		BA	8.8	7.5	15.7	5.9	**9.6**
		CBA	3.3	9.5	16.5	26.1	**11.6**
		DCBA	6.4	6.3	7.6	6.4	**6.7**
		EDCBA	8.2	5.9	12.6	3.6	**7.9**
Gantry B	NB	AB	8.0	7.5	13.6	6.4	**9.3**
		ABC	16.1	18.3	11.3	24.1	**16.7**
		ABCD	4.0	8.2	12.2	4.7	**7.8**
		ABCDE	5.8	8.4	20.1	2.6	**10.2**
		B-NB	32.4	20.3	14.5	21.7	**21.7**
		BC	10.5	10.5	4.9	22.2	**10.9**
		BCD	7.2	10.3	9.4	8.6	**9.0**
		BCDE	16.0	16.5	14.0	9.8	**14.5**
	SB	B-SB	16.6	22.4	31.5	17.2	**24.2**
		BA	19.4	10.9	11.0	5.8	**11.4**
		CB	3.5	9.5	7.9	21.7	**10.0**
		CBA	7.2	13.9	11.5	25.5	**13.9**
		DCB	9.6	10.7	8.0	9.3	**9.2**
		DCBA	14.0	9.2	5.3	6.3	**7.9**
		EDCB	11.9	14.8	16.0	10.6	**14.0**
		EDCBA	17.9	8.6	8.9	3.6	**9.4**
Gantry C	NB	ABC	24.2	22.0	13.8	29.2	**21.2**
		ABCD	6.0	9.8	14.9	5.7	**9.9**
		ABCDE	8.6	10.1	24.5	3.2	**13.0**
		BC	15.7	12.6	6.0	27.0	**13.8**
		BCD	10.7	12.3	11.5	10.4	**11.4**
		BCDE	24.0	19.8	17.1	11.9	**18.4**
		C-NB	0.8	1.0	0.6	2.0	**1.0**
		CD	2.9	4.4	4.4	4.3	**4.1**
		CDE	7.0	7.9	7.2	6.4	**7.2**
	SB	C-SB	0.5	0.9	0.5	2.1	**1.0**
		CB	4.8	12.3	12.2	24.5	**13.6**
		CBA	9.9	18.0	18.0	28.9	**18.9**
		DC	4.6	4.6	3.2	4.6	**4.1**
		DCB	13.2	14.0	12.4	10.6	**12.6**
		DCBA	19.2	12.0	8.3	7.1	**10.9**
		EDC	6.8	7.8	6.8	6.1	**6.9**
		EDCB	16.3	19.2	24.8	12.0	**19.2**
		EDCBA	24.7	11.2	13.8	4.0	**12.8**
Gantry D	NB	ABCDE	9.5	7.4	14.8	2.2	**9.4**
		ABCD	6.6	7.2	9.0	3.9	**7.2**
		BCD	11.8	9.1	6.9	7.1	**8.3**
		BCDE	26.5	14.6	10.3	8.2	**13.3**
		CD	3.2	3.3	2.6	2.9	**3.0**
		CDE	7.7	5.8	4.4	4.4	**5.2**
		D-NB	12.1	15.7	15.7	14.1	**14.9**
		DE	22.5	36.9	36.2	57.2	**38.7**
	SB	D-SB	21.0	15.0	11.7	17.3	**16.0**
		DC	2.1	2.9	2.8	3.3	**2.7**
		DCB	6.0	8.8	10.7	7.6	**8.4**
		DCBA	8.8	7.5	7.1	5.1	**7.3**
		ED	40.0	41.9	28.5	50.6	**39.5**
		EDC	3.1	4.9	5.9	4.4	**4.6**
		EDCB	7.5	12.1	21.4	8.7	**12.8**
		EDCBA	11.3	7.0	11.9	2.9	**8.6**
Gantry E	NB	ABCDE	11.9	9.9	20.5	2.6	**12.4**
		BCDE	33.2	19.6	14.3	9.9	**17.6**
		CDE	9.7	7.8	6.1	5.3	**6.9**
		DE	28.2	49.4	50.3	69.4	**51.0**
		E-NB	17.1	13.3	8.8	12.7	**12.1**
	SB	E-SB	9.3	12.5	11.2	11.6	**11.2**
		ED	58.5	55.7	37.4	67.2	**53.5**
		EDC	4.6	6.5	7.7	5.8	**6.3**
		EDCB	11.0	16.0	28.1	11.5	**17.4**
		EDCBA	16.6	9.3	15.6	3.9	**11.6**

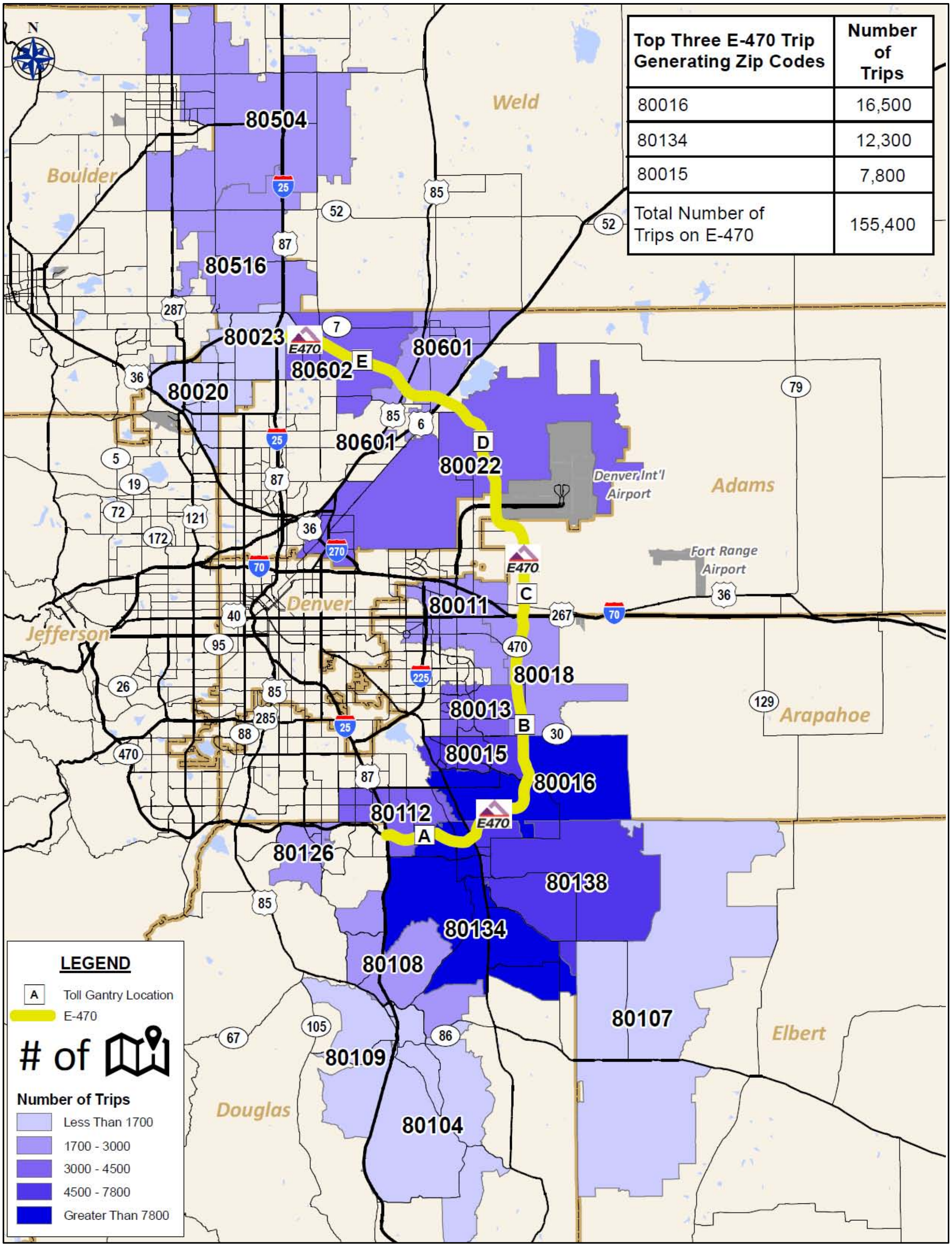


Figure 2-10
Distribution of 2018 Total Trips by ZIP Code

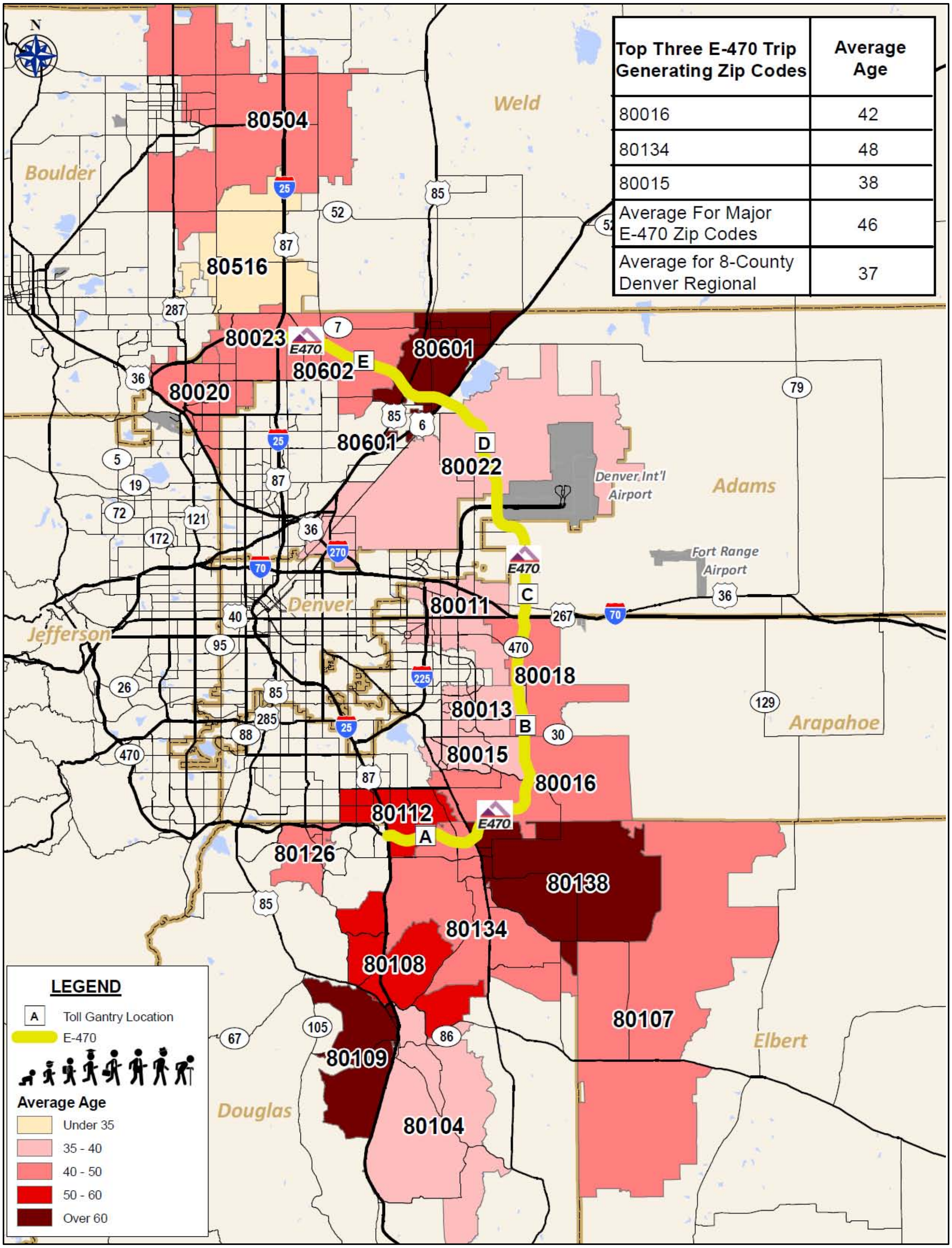
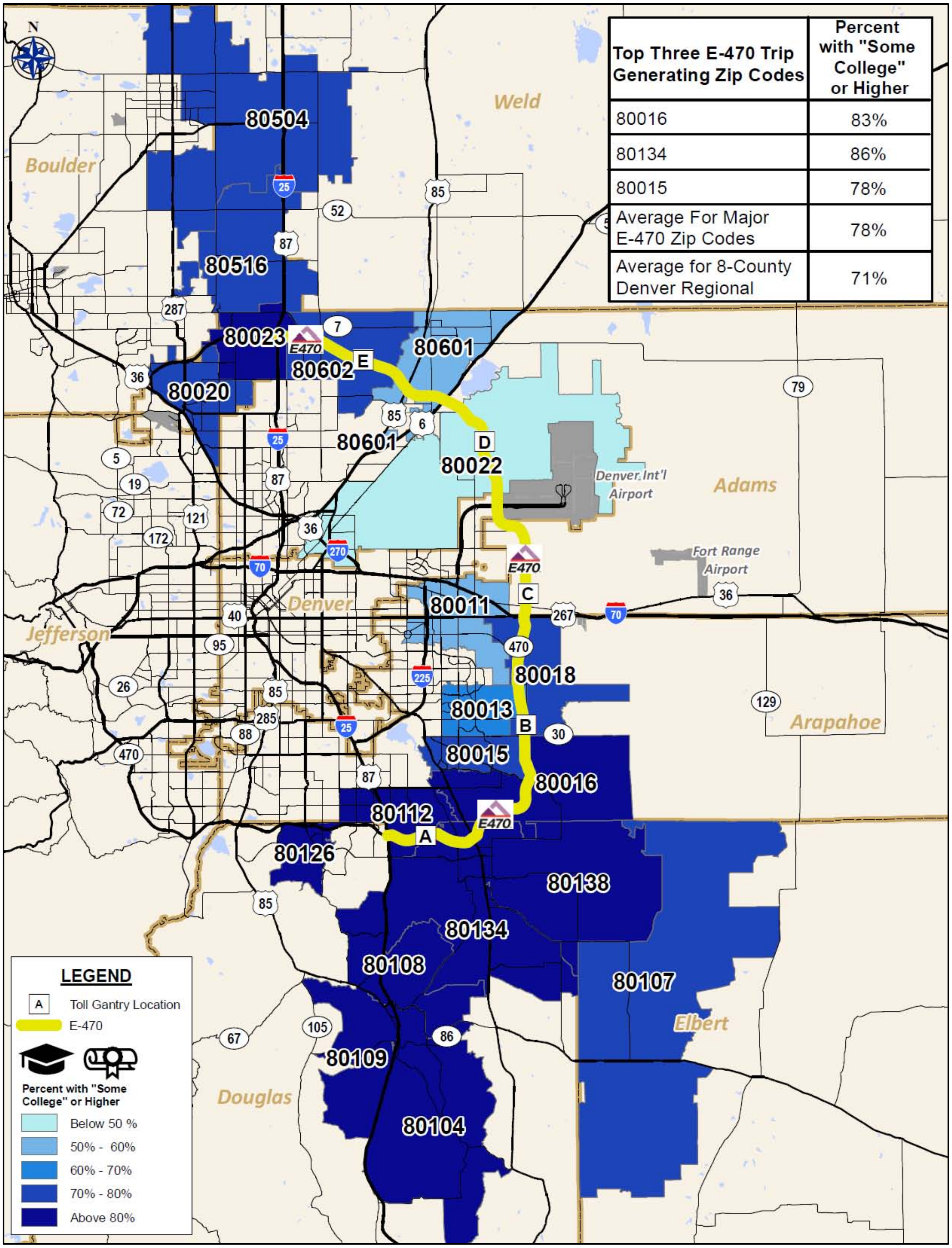


Figure 2-11
Distribution of 2018 Average Age by ZIP Code



Top Three E-470 Trip Generating Zip Codes	Percent with "Some College" or Higher
80016	83%
80134	86%
80015	78%
Average For Major E-470 Zip Codes	78%
Average for 8-County Denver Regional	71%

Figure 2-12
Distribution of 2018 Average Share of Population with Educational Attainment of Some College or Higher by ZIP Code

Median Household Income by ZIP Code

ZIP codes having at least one percent of total 2018 transactions are highlighted in **Figure 2-13**, with the lighter colors representing lower median household incomes and the darker color representing higher median household incomes. While the weighted average 2018 median household income for 8-county region was $72,130, the average share for major ZIP codes contributing most of the E-470 trips is 43 percent higher at $110,713 per year in 2018. ZIP code 80016, which accounts for 10.6 percent of all the trips, has median household income of $116,940 while the top three trip-generating zip codes have average median household income of $110,713. The data suggest that E-470 users on average have a higher median household income, as compared to general roadway users in the Denver metropolitan area. One reason this may be the case is that higher income households are better able to afford the cost of tolls and may even view their commute or other travel time as more valuable. This relationship between income and the willingness to pay tolls is generally reflected in the Value of Time assumption, discussed further in **Chapter 4**.

Average People per Household by ZIP Code

Figure 2-14 shows a geographical distribution of the average people per household along the E-470 corridor. While the weighted average household size for 8-county region was 2.5 people in 2018, the average household size for major ZIP codes contributing most of the trips was 2.8 people. The top trip-generating ZIP code for E-470 (80016) has household size of 3.0 people, as compared to the top three trip-generating zip codes that have an average household size of 2.9 people. The data suggest that E-470 users have slightly larger household sizes, as compared to the general roadway users in Denver metropolitan area. This may be the result of the types of housing available along the E-470 corridor, which is generally single-family housing. As a result of these local development patterns, those living close to E-470 would more likely be families, as opposed to single individuals or couples without children.

Average Vehicles per Household by ZIP Code

The geographical distribution of vehicles per household of E-470 users in 2018 is highlighted in **Figure 2-15**, with the lighter colors representing lower average vehicles per household and the darker colors representing a greater average number of vehicles per household. The average vehicles per household of E-470 users seem comparable to the average vehicles per household for all the roadway users in the Denver metropolitan area.

Average Vehicle Occupancy by ZIP Code

The average vehicle occupancy distribution for 2018 is shown in **Figure 2-16**, based on means of travel to work data obtained from the U.S. Census. The lighter colors representing a lower average vehicle occupancy (i.e., a higher percentage of Single Occupant Vehicles) and the darker colors representing a higher vehicle occupancy. While the weighted average vehicle occupancy during commutes for the 8-county region was 1.12, the average vehicle occupancy for major ZIP codes contributing most of the trips was 1.05. Vehicle occupancy for top three E-470 trip-generating zip codes was 1.04. This suggests that E-470 customers are slightly less likely to carpool than general roadway users in the Denver metropolitan area.

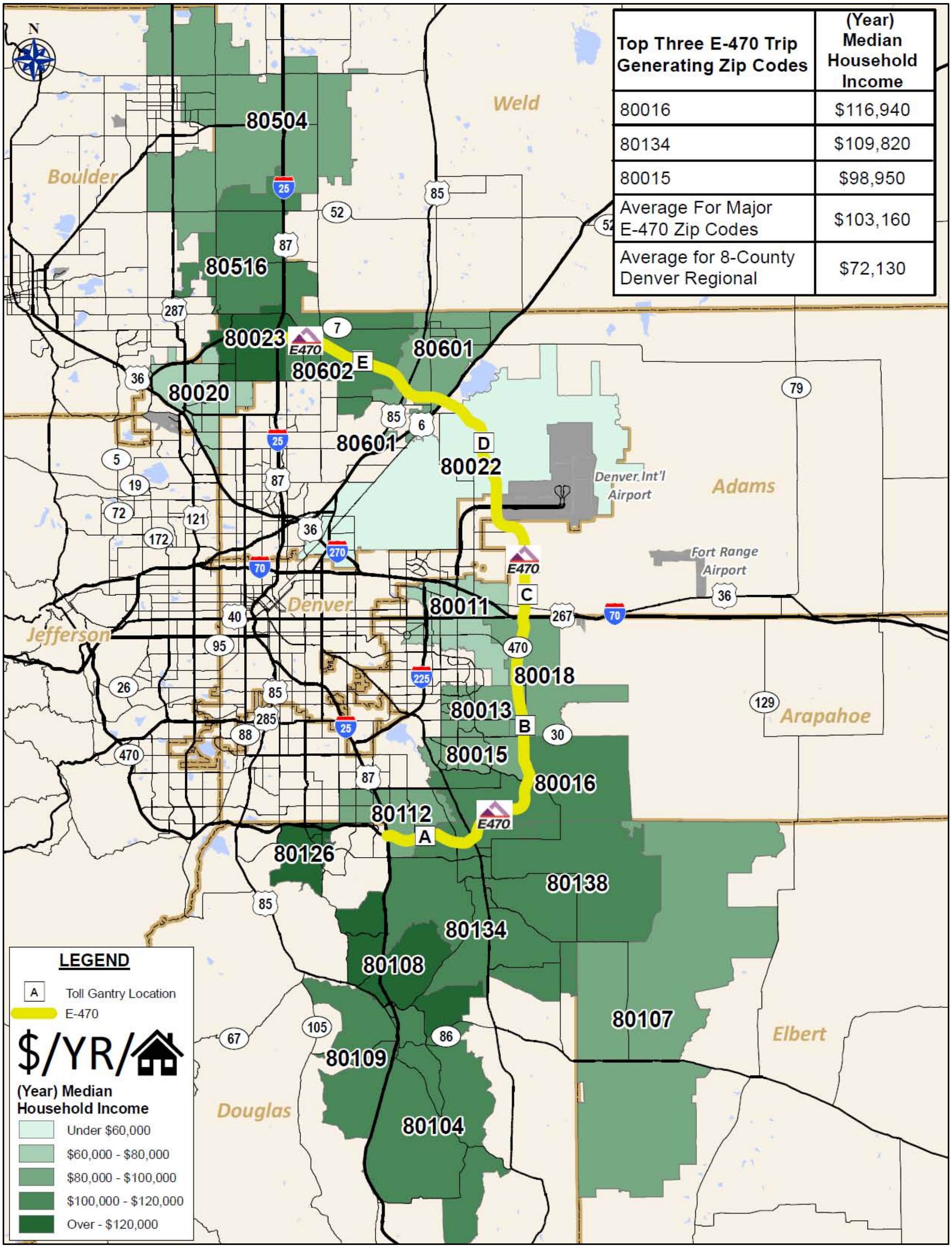
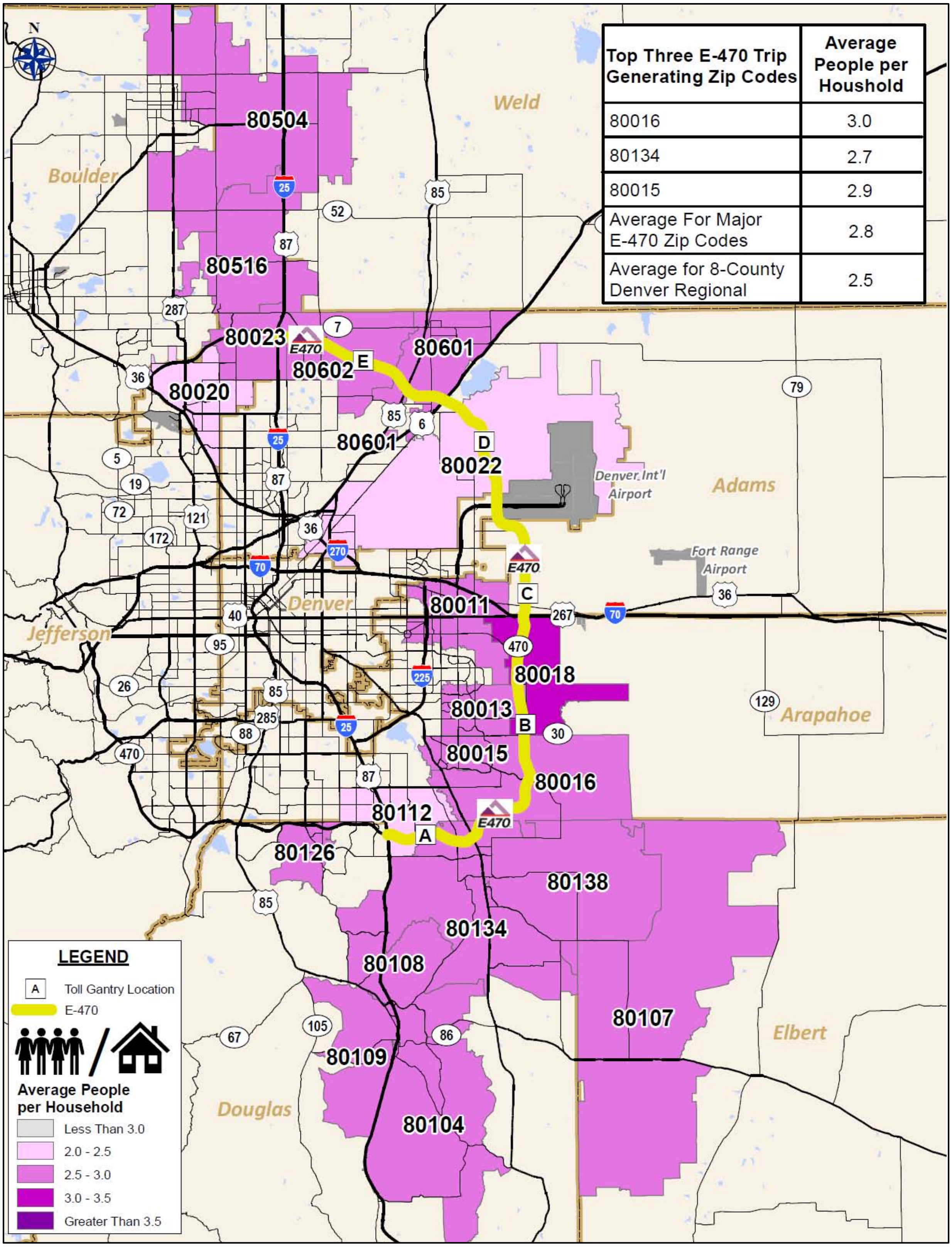
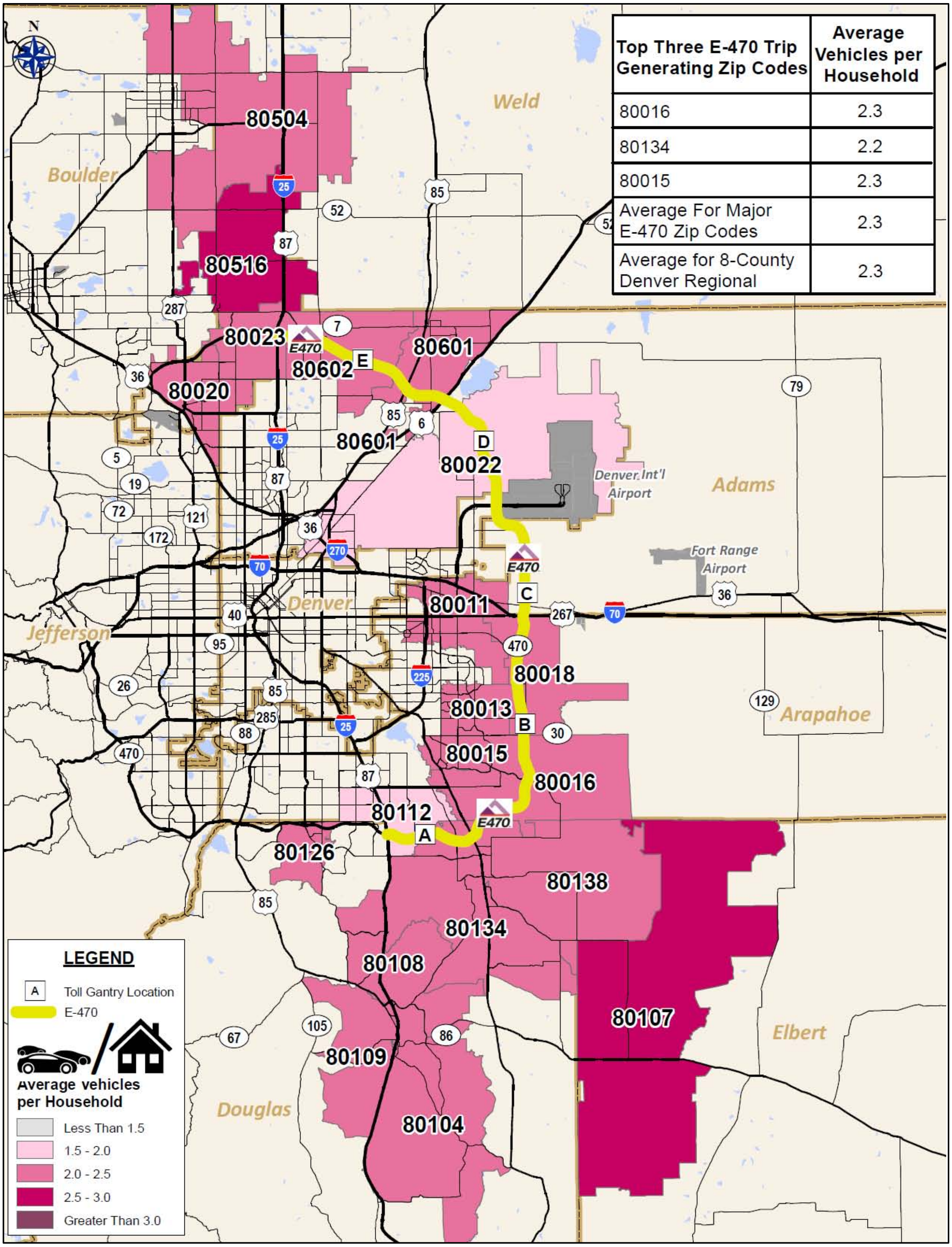


Figure 2-13
Distribution of 2018 Median Household Income by ZIP Code



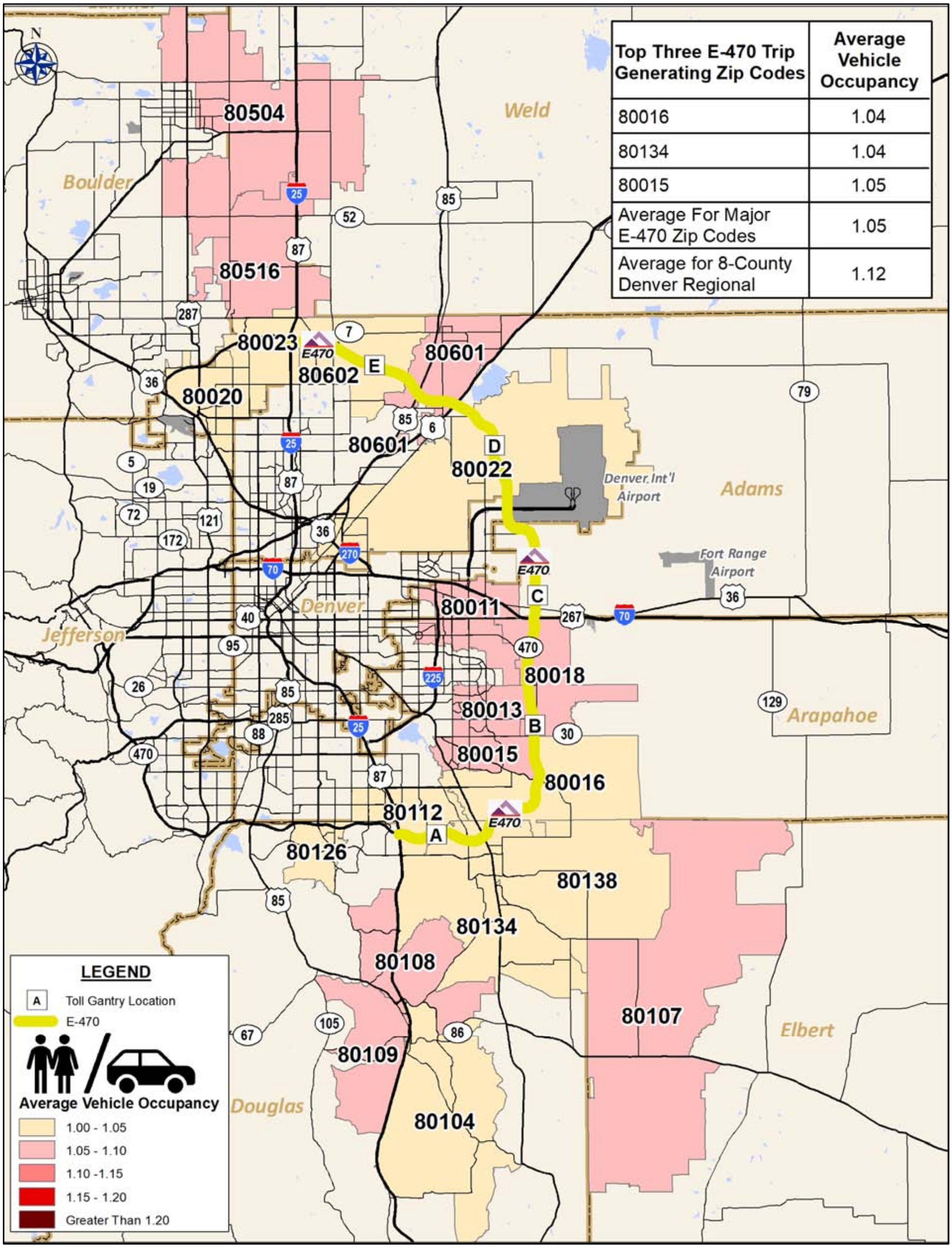
Top Three E-470 Trip Generating Zip Codes	Average People per Houshold
80016	3.0
80134	2.7
80015	2.9
Average For Major E-470 Zip Codes	2.8
Average for 8-County Denver Regional	2.5

Figure 2-14
Distribution of 2018 Average People per Household by ZIP Code



Top Three E-470 Trip Generating Zip Codes	Average Vehicles per Household
80016	2.3
80134	2.2
80015	2.3
Average For Major E-470 Zip Codes	2.3
Average for 8-County Denver Regional	2.3

Figure 2-15
Distribution of 2018 Average Vehicles per Household by ZIP Code



Top Three E-470 Trip Generating Zip Codes	Average Vehicle Occupancy
80016	1.04
80134	1.04
80015	1.05
Average For Major E-470 Zip Codes	1.05
Average for 8-County Denver Regional	1.12

Figure 2-16
Distribution of 2018 Average Vehicle Occupancy by ZIP Code

Recent Trends Related to COVID-19

In March 2020, traffic impacts related to the Coronavirus (COVID-19) began as many states and localities began implanting stay-at-home orders, public space closures, social distancing orders and other restrictions in an effort to reduce the spread of the virus based on guidelines from the Center for Disease Control (CDC) and the Federal Government. On March 11, 2020, Governor Polis issued an emergency declaration due to COVID-19. This was followed by an order on March 18, 2020 to suspend in-person instruction at Colorado schools and a March 25, 2020 stay-at-home order. Following several prior extensions by the Governor, the current statewide stay-at-home order is set to expire on April 24, 2020. Denver Mayor Hancock issued a similar stay-at-home order on March 23, 2020, which has recently been extended to May 8, 2020. As of April 24, 2020, there have been over 10,400 confirmed cases of COVID-19 in Colorado, with almost 500 deaths. Within the 8-County Denver Metro area, there have been over 8,000 confirmed cases and almost 400 deaths, or roughly 80 percent of the total statewide impact.

These restrictions have significantly impacted regional traffic patterns. Moreover, since congestion on alternative roadways, such as I-25, I-70 and even local arterials, has been almost eliminated, E-470 no longer offers the same travel time savings to motorists as it did prior to the COVID-19 outbreak. As a result, E-470 has been particularly hard hit. Additionally, since more than 20 percent of E-470 traffic originates from or is destined for DIA, reductions in air travel and tourism related to the COVID-19 outbreak would also have impacted E-470 to a greater extent than other facilities in the region.

Figure 2-17 illustrates total daily transactions on E-470 between March 1 and April 16, 2020 (the latest available data at the time of this report). During the first week of March, prior to the major traffic impacts of COVID-19, average weekday transactions on the E-470 system were roughly 250,000 per day. These were reduced slightly during the second week of March as the national and international travel was reduced in anticipation of major COVID-19 infections and deaths. The major impacts to E-470 began on March 17th and 18th with the suspension of in-person

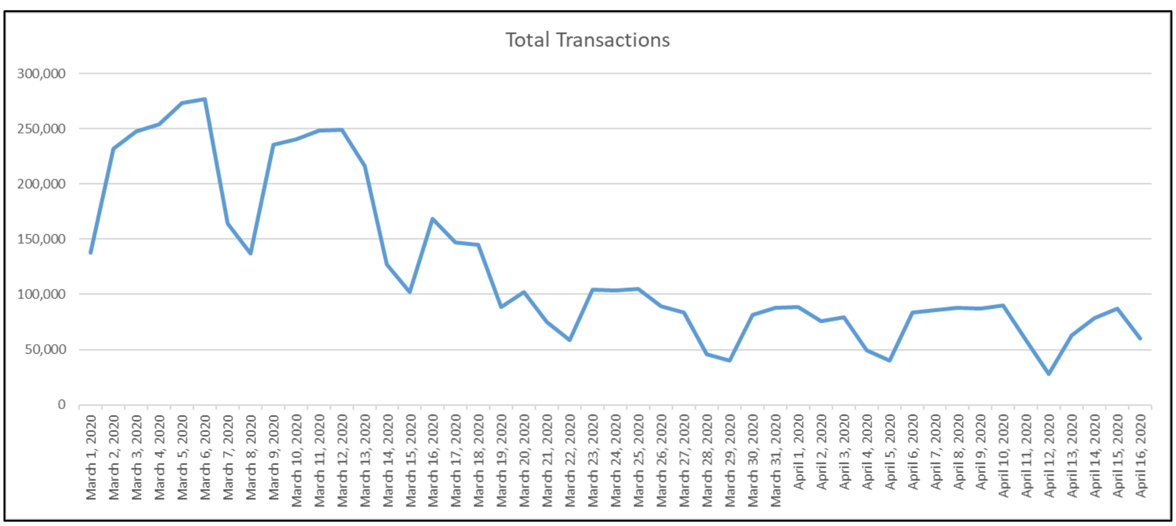


Figure 2-17
Total E-470 Transactions by Day
March 1, 2020 to April 16, 2020

instructions in Colorado schools. Transaction levels continued to fall until the March 25th and 26th, when the Governor's stay-at-home order was implemented. Systemwide E-470 transactions have averaged less than 100,000 on an average weekday since late March, a reduction of over 60 percent compared to normal levels.

Figure 2-18 illustrates the reduction in total weekly E-470 transactions, as compared with the first week of March prior to the major COVID-19 impacts. As previously indicated, some impacts were observed during the second week of March, with transactions falling roughly 10 percent week-over-week. However, the major impacts began during the third week and deepened to a reduction of more than 65 percent during the last week of March. There has been a slight increase in transactions during the first week of April, but it is unclear if this represents the beginning of a return to normal trends or simply fluctuations related to the Easter and Passover holidays. Likely, continued traffic impacts will be related to the length of government stay-at-home orders, public space and school closures, and other travel restrictions. Estimates of the continued traffic impacts related to COVID-19 are discussed further in **Chapter 4**.

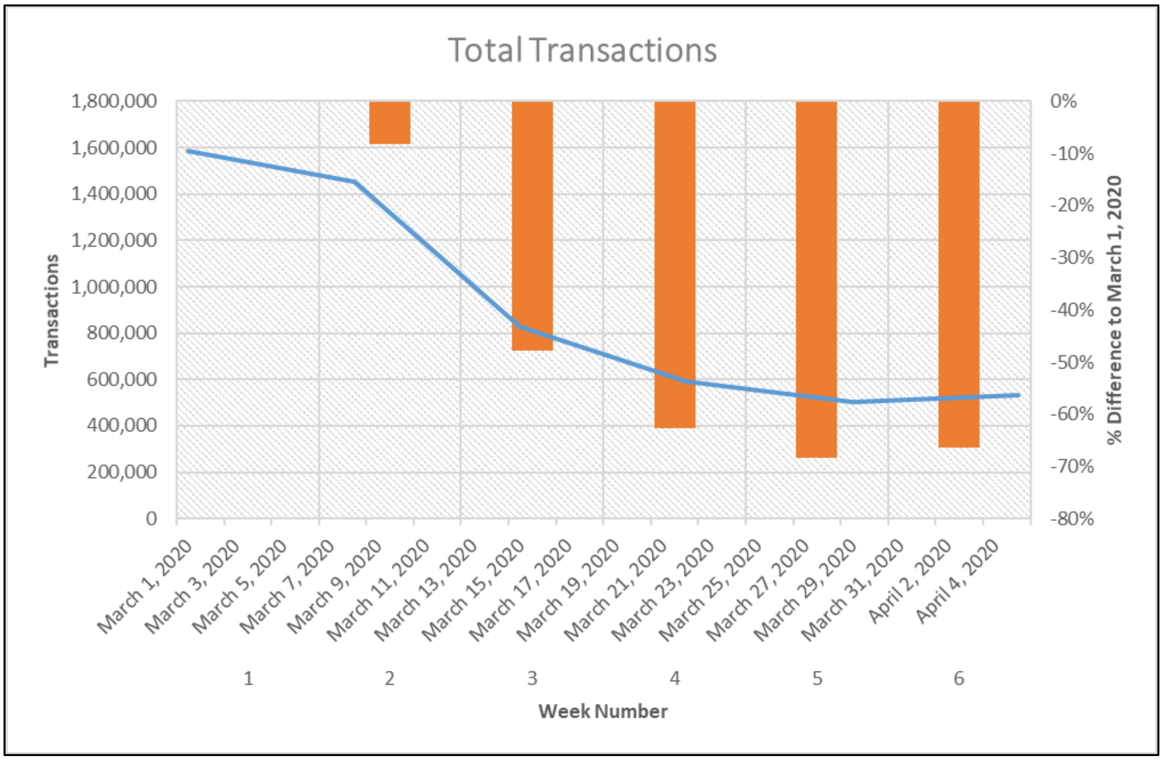


Figure 2-18
Week-over-Week Impacts of COVID-19 on E-470 Transactions
March 2020 to April 2020

One significant factor of the recent COVID-19 related traffic trends is the disparate impacts to E-470 transactions by vehicle class. Given the nature of the stay-at-home orders, daily commutes have largely stopped, while food and goods deliveries have continued. As a result, passenger car traffic has been affected much more than commercial vehicle traffic to date. **Figure 2-19** compares E-470 transactions week-over-week by vehicle class. While E-470 passenger car transactions are down by almost 70 percent compared to the first week of March, commercial vehicle transactions are down by just over 20 percent. This matches trends observed nationally on other toll facilities. It's clear that this reduction is contingent upon continued supply chain stability and by the ability of consumers to afford food and other basic supplies. Long-term unemployment or other supply chain disruptions could produce further decreases in commercial vehicle transactions. This is discussed further as part of the traffic and revenue forecasts in **Chapter 4**.

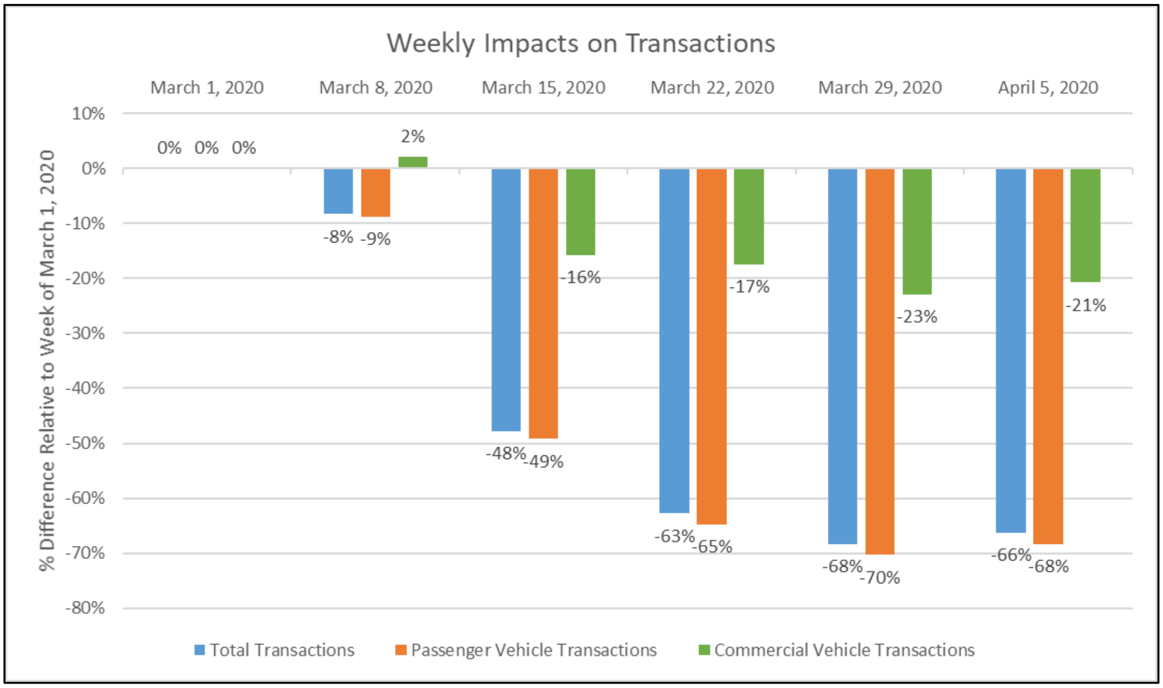


Figure 2-19
Week-over-Week Impacts of COVID-19 on E-470 Transactions by Vehicle Class
March 2020 to April 2020

Figures 2-20 and 2-21 provide the same information for weekdays and weekends specifically. Comparing the two figures, weekend transactions on E-470 have been slightly more impacted than the weekdays. This may be due to the closure of public spaces and recreational facilities, as well as a reduction in air travel and tourism within the region.

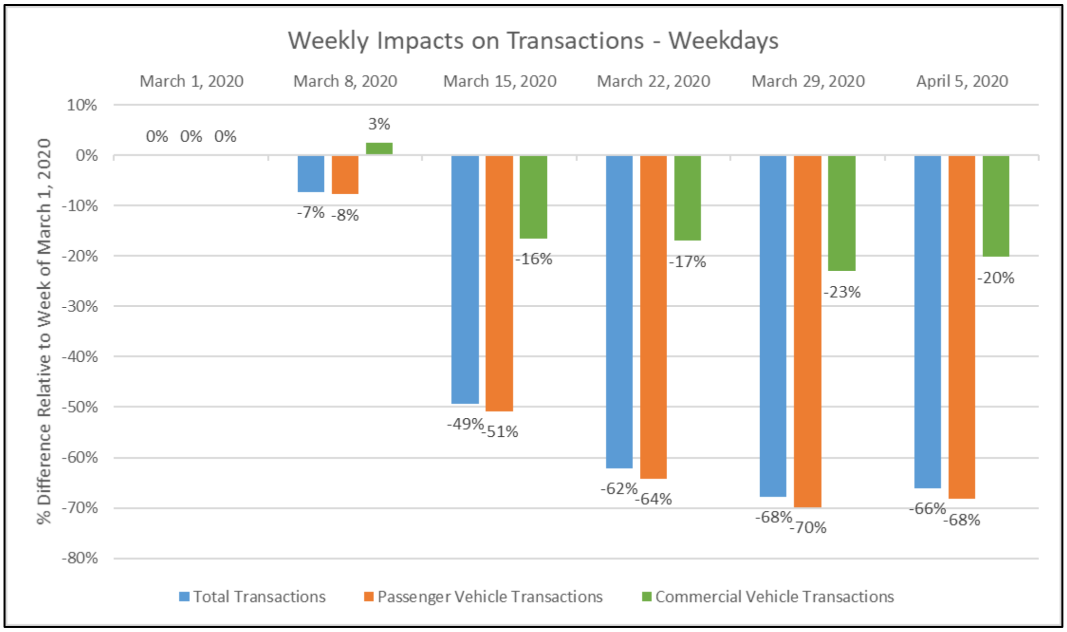


Figure 2-20
Week-over-Week Impacts of COVID-19 on E-470 Weekday Transactions by Vehicle Class
March 2020 to April 2020

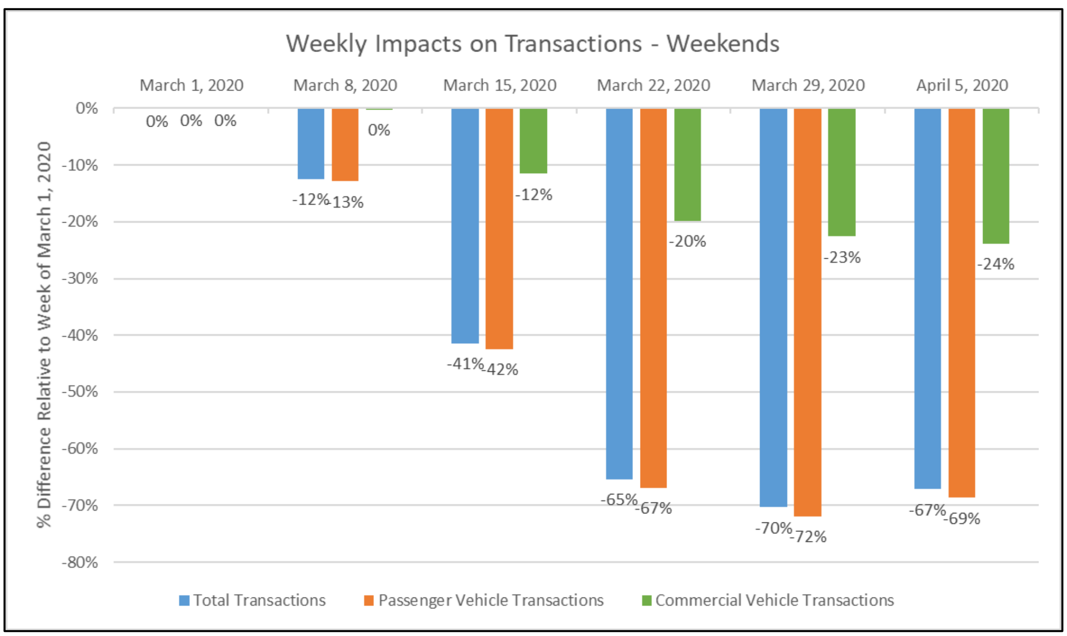


Figure 2-21
Week-over-Week Impacts of COVID-19 on E-470 Weekend Transactions by Vehicle Class
March 2020 to April 2020

Chapter 3

Corridor Growth Analysis

Presented below is an overview of the work performed to make geospatial adjustments to the 2015 to 2040 employment, population, and household projections of the Denver Regional Council of Governments (DRCOG). The findings from this work were used as a basic input to the travel demand model which, in turn, aided in the forecasting of the traffic and revenue potential for E-470.

This work, performed by Economic & Planning Systems (EPS), provided independent economic growth projections throughout the Denver Metro Area. Growth forecasts are typically prepared by the metropolitan planning organization, DRCOG, but economic conditions and major development plans, which could influence traffic demand, have been meticulously reviewed and accounted for in this assessment. Motivation for this independent review was to account for economic and demographic conditions in a dynamic regional market that continues to change and expand.

Overview

While it was beyond the scope of this analysis to recreate a sophisticated geospatial modeling methodology, it is believed that a review and recalibration of DRCOG's data and projections are justified if: a) its base year does not align with observed data at a regional, county, or municipal level; b) its growth projections are calculated off an incorrect base and appear to result in what could be characterized as overly optimistic rates of growth; and, c) it is determined that TAZ level data within the E-470 influence area contains too much, too little, or is missing socioeconomic data related to future land uses and major development plans researched in the influence area.

Purpose

This analysis documents the independent assessment of corridor growth forecasts produced by DRCOG. The primary output of this effort is an adjusted socioeconomic dataset at the TAZ level for the DRCOG Planning Area [(1)]. The analysis that follows aligns with DRCOG's 11-county planning area boundary, as illustrated in **Figure 3-1**. It also contains an analysis of the Denver Metropolitan Statistical Area (MSA), a 7-county subset consisting of Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, and Jefferson counties, which excludes Clear Creek, Elbert, Gilpin, and Weld counties.

Influence Area

The E-470 corridor influence area, as illustrated in **Figure 3-2**, is the primary focus, in which 199 major developments were evaluated, as well as the regional review of base year (2015) socioeconomic conditions and macro-level growth rate calibrations were performed.

[(1)] For the purposes of this study only, the terms "Denver region" and "DRCOG Planning Area", are synonymous. They include 11 counties: Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Denver, Douglas, Elbert, Gilpin, Jefferson, and Weld.

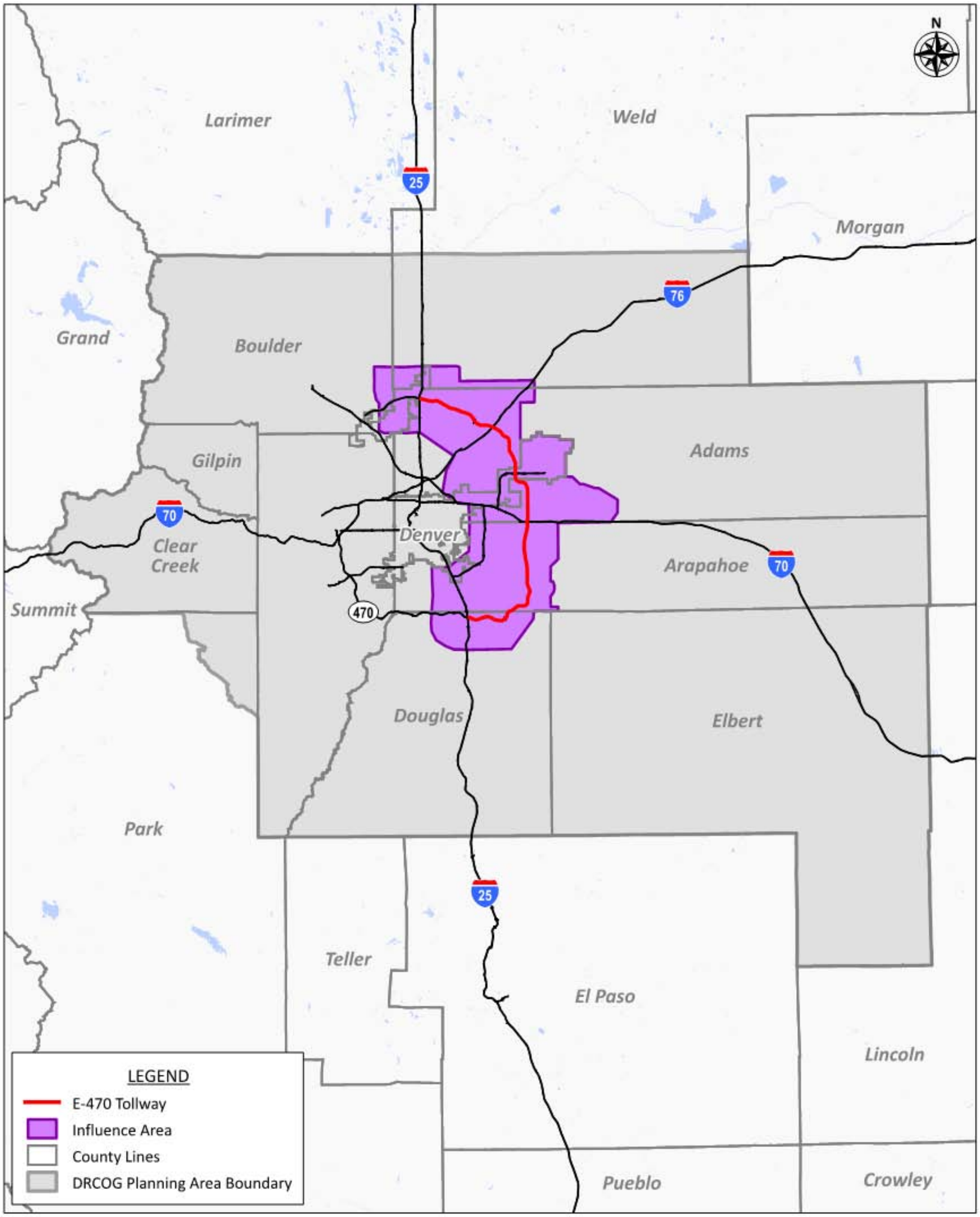


Figure 3-1
DRCOG Planning Area Boundary

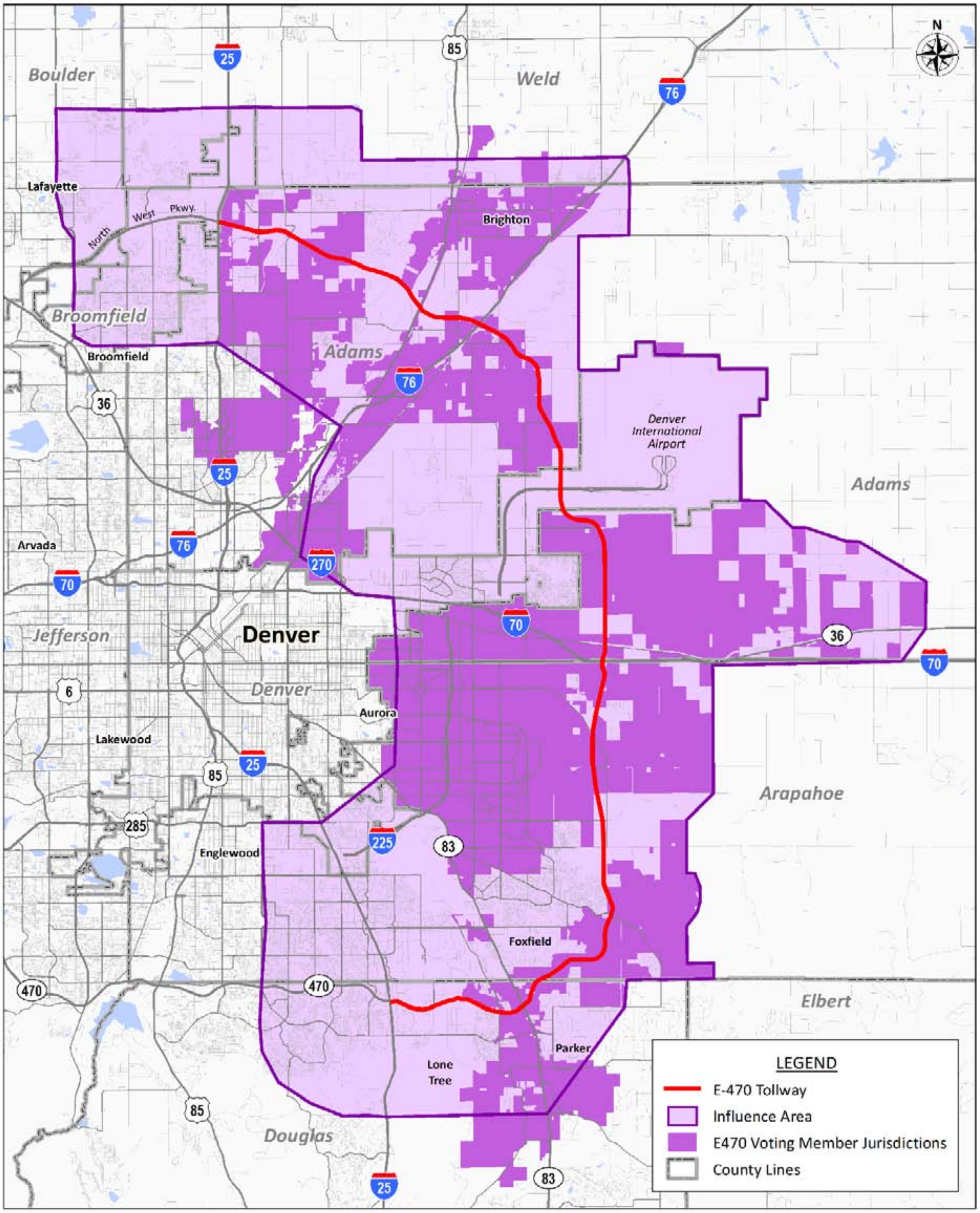


Figure 3-2
Voting Member Jurisdictions

E-470's member jurisdictions include Adams, Arapahoe, and Douglas counties, as well as the municipalities of Aurora, Brighton, Commerce City, Thornton, and Parker. There are also affiliate, non-voting members, including Arvada, Greeley, Lone Tree, Broomfield, and Weld County. As such, the influence area boundaries are drawn to reflect Board membership as well as the generally-accepted travel shed from which travel demand on E-470 is generated.

Methodology

The methodology for this growth assessment incorporates three components within the context of two principal approaches. The two approaches are a review and analysis of data at the 1) macroscopic and 2) microscopic perspectives. The three components within, as described in greater detail below, include: 1) a review of the base year 2015 population, household, and employment numbers; 2) a review and independent analysis of regional and sub-regional projections; and, 3) a review of the TAZ level data in light of research of major development plans throughout the E-470 corridor influence area. Overall, this approach provides an independent reassessment of growth patterns and expectations based on observed data, analysis and forecasting, and anticipated development patterns grounded in an understanding of real estate development potentials. [2] The following approach to adjust DRCOG's forecasts at a geospatial level was used.

- Understanding DRCOG forecasts: Meetings were held with DRCOG's regional modeling manager and chief economist who oversee the land use and travel demand forecasting processes. The purpose was to become acquainted with and to identify any changes or issues of relevance with the process, inputs, assumptions, and outputs of the new UrbanSim land use model, and to make more informed adjustments of the TAZ level data.
- Macroscopic geographic analysis: The analysis of top-down economic and demographic trends includes all 11 counties in DRCOG's planning area. Growth patterns at the national, state, county, and municipal levels using records of secondary data, such as the U.S. Census, Colorado Department of Local Affairs, U.S. Bureau of Labor Statistics (BLS), and the U.S. Bureau of Economic Analysis were reviewed.
- Independent regional forecast: An employment-based population projection for the 11-county region, assuming likely trajectories for relevant intermediary socioeconomic relationships, such as in- and out-commuting, unemployment, proprietorships, underemployment, group quarters populations, and populations under 16 and over 65 was structured. Control totals from this forecast were used as a reference and to ultimately recalibrate (in proper proportion to account for the exclusion of a majority of Weld County employment and population from DRCOG's Planning Area) DRCOG's forecasts.
- Microscopic geographic analysis: The bottom-up economic and demographic growth potentials analysis focused on research and evaluation of major development plans at the

[2] It should be noted that while DRCOG's Planning Area touches 11 counties, it does not contain the entirety of Weld County. For the purposes of this study, the region will be referred to as the 11-county region, but much of the analysis, unless otherwise specified, will reference data relevant to the 11-county portion of the total 11 counties. (The DRCOG Planning Area generally has accounted for approximately 94 percent of the 11-county population, household, and employment totals.)

TAZ (i.e., site-specific) level. In this analysis, the E-470 influence area, illustrated in Figure 3-1, was the focus.

- Market research: The research and analysis of major development plans involved documentation of the location, scale, types of projects, status, and timing of projects. These growth potentials were also evaluated against historical trends in regional and sub-regional capture of new office, industrial, retail, and residential development.

- Adjustments: Each of these analytical steps was incorporated into a recalibration of all TAZ data within the DRCOG planning area. In terms of the general approach to adjusting of DRCOG's TAZ data, because it is generally understood that analysis of small areas (i.e. TAZs) produce results with varying degrees of accuracy, the approach was taken that makes TAZ adjustments only when market information and research provides a clear basis to do so and/or when underlying TAZ forecasts deviate significantly from findings of the research and analysis performed.

Step 1) Base Year 2015 Review

DRCOG's regional projections were reviewed multiple times by EPS for a variety of studies. EPS has also spoken with DRCOG's modeling staff and chief economist on a variety of different occasions to understand and gain a more robust appreciation for their methodologies and assumptions. It has been EPS' understanding that the casualty of a modeling and vetting process that frequently takes one to two years is that data used to calibrate the model's "base" year population, households, and employment are never "observed" at the time of calibration, rather they are estimates. Furthermore, observed data on population, households, and employment are frequently available around the time or soon after projections are released. As a result, the first task in this process is to ensure that the model's base year is adjusted to observed population, household, and employment data.

Step 2) Independent Regional Forecast

This component of the analysis includes a review and analysis of historical population and employment trends at the regional and sub-regional levels, as well as a comparison of third-party forecasts. The purpose is to structure an independent employment-based population and household forecast, using a series of standard forecasting assumptions, such as wage and salary employment, in- and out-commuting patterns, unemployment rates, proprietorships, group quarters population, population by age, average household size, and vacancy rates.

The process begins with a regional shift-share analysis, benchmarking the first 10 years with data from the BLS 10-year national forecast of employment by industry, to produce a 2040 employment control total. Each of the subordinate economic and demographic variables are accounted for and aligned with, for example, the State Demographer's forecasts of population by age by county. (3)

(3) While it is known that DRCOG has recently begun aligning its base year estimates more closely, albeit not exactly, with the Department of Local Affairs State Demographer's Office, DRCOG's control totals of population are independent of the SDO's work.

Forecast Methodology

The following is an overview of the methodology employed not only for reviewing DRCOG's regional forecasts, but also producing independent control total forecasts of population, households, and employment for the geo-spatial apportionment modeling. The methodology provides a clear path commonly used by demographers to trace the relationship between wage and salary employment, un- and under-employment, group quarters, population by age, households, and housing inventory. It also provides points at which population and household counts may be vetted against observed data points. Each component and their sources for the 11-county region are as follows:

- Wage & salary employment: the employment totals identified here have been sourced from the BLS Quarterly Census of Employment and Wages (QCEW) data series. (4)
- Commuting patterns: the in- and out-commuting patterns were sourced from the U.S. Census Longitudinal Employer-Household Dynamics data series. (5) The removal of in-commuters and addition of out-commuters estimated for 2000 and 2015 results in the number of job-holding residents of the geography.
- Unemployment: unemployment statistics have been sourced from the BLS Local Area Unemployment Statistics U-3 "total unemployed" series. (6) This calculation nets the potential wage and salary labor force, i.e. those employed or "actively seeking employment".
- Proprietors: data on sole proprietors has been sourced from the U.S. Census Nonemployer Statistics data series. (7) This adds persons self-employed in the geography and yields a fuller labor force number.
- Group quarters and "underemployed persons", age 16 to 65: this adds the portion of institutionalized persons aged 16 to 65, as well as the portion of population aged 16 to 65 that would be considered in the U-4, U-5, and U-6 measures of labor utilization published by the BLS (8), netting the total population of non-institutionalized persons aged 16 to 65.
- Persons aged under 16 and over 65: this adds the total population under 16 and over 65, including group quarters, resulting in total population.

With the preceding factors traced from wage and salary employment to total population, the following few steps trace population to households and housing inventory:

- Group quarters: this removes the total population in group quarters, resulting in population in households.

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(4) https://www.bls.gov/cew/datatoc.htm
(5) https://onthemap.ces.census.gov/
(6) https://www.bls.gov/lau/
(7) https://www.census.gov/econ/nonemployer/
(8) https://www.bls.gov/lau/stalt.htm

- Average household size: using the weighted average household size from U.S. Census data for the geography, total households are derived.
- Vacancy rate: using occupancy and vacancy status data from the U.S. Census, total inventory of housing is determined.

Step 3) TAZ-Level E-470 Corridor Land Use Review

The final component of the review and analysis process is a microscopic analysis of TAZ-level socioeconomic land-use data. The analysis leverages area-, site-, and development-specific research, along with future land use plans and land availability. Information and data are collected through interviews with local planners and developers regarding all major development plans. A “major development plan” is defined as a residential, non-residential, or mixed-use development that is in the process of being built, in the final plan approval process, early stage of platting, or even in the conceptual planning phase. Although not rigidly followed in all cases, a residential development is generally considered a major development plan if larger than approximately 50 units, and a non-residential development is generally considered a major development plan if it is generally larger than a single-tenant space.

The primary objective in completing this level of market research is to document uses, magnitudes, timing, status, risk, and likelihood of these major development plans. The synthesis of these approaches yields adjustments of TAZ-level socioeconomic data for the base year (though infrequently) and forecast years (2025 through 2040). It also incorporates a review of office, industrial, retail, and residential market conditions and potentials, focusing particularly in the E-470 influence area. (9)

And while described in greater detail below, the purpose of such an analysis of the construction trends and occupancy characteristics of non-residential space is instructive for the interpretation and assessment of whether and to what extent the rates of growth contained in DRCOG’s most recent set of growth projections reflect any short-term anchoring bias (as compared to previous versions of DRCOG’s forecasts). These conditions are also particularly instructive for understanding the market risks associated with near-term major development plans that incorporate non-residential uses.

Major Development Plans

It is generally understood that an analysis of projections at a subarea or TAZ level produces results with a generally high degree of specificity and uncertainty. Moreover, DRCOG has often cautioned users against placing great reliance on TAZ level totals, as forecasting growth in such small geographic areas is difficult. As such, the approach to making adjustments at the TAZ level is to do so only when market information and research provides a clear basis for such adjustments. In general, however, the TAZ-level data was adjusted when the difference between what was likely to materialize in terms of land use developments and what was reported at the TAZ level was significantly different from each other (e.g., more than a 10 percent difference in

(9) The E-470 Influence Area is illustrated at a high level in Figure 3-1 and with more detail in Figure 3-2.

magnitude). The following factors concerning market information and research were used to make these decisions with a clear basis.

- Development Plans
- Entitlement Process and Municipal Growth Policies
- Physical Area Attributes
- Existing Market Studies
- Development Pressure
- Proximity to Transportation Facilities
- Proximity to Employment Clusters
- Capital Improvements
- Ownership Patterns

As a result, when upward adjustments to TAZ-level data are made - which is generally the case for population and household data - population and household counts in TAZs in the respective municipality are reduced proportionally to ensure that control totals remain fixed. On the other hand, when downward adjustments to TAZ-level data are made, which is frequently the case for employment data in the influence area, employment counts in TAZs in the respective municipality are reduced proportionally to ensure that control totals remain fixed. **Figure 3-3** illustrates the location of the 199 major developments evaluated in this process. As mentioned previously, the primary objective here is to document the uses, magnitudes, timing, status, risk, and likelihood of these plans materializing over the next 20 years. [10]

Historical Demand Trends

Population

As illustrated in **Figure 3-4**, the 7-county Denver MSA has added an average of 42,200 persons per year since 1969. This graphic, using U.S. Census data, also illustrates when the MSA has experienced either above- or below-average population growth. For example, since 2010 (inclusive), the region has added approximately 54,200 people per year, well above the historical average since 1969.

Also relevant is that the region has captured large shares of the state's population growth. Since 1970, for example, the 7-county area has captured an average of 36 percent of the state's population growth, as illustrated in **Figure 3-5**. During the 2000s, it captured an average of 59 percent, and since 2010, it has captured an average of 67 percent. While such a perspective seems to indicate that state population growth is increasingly likely to occur within the MSA, recent trends have pointed toward moderation of this trend. As this relates to the adjusted population forecasts, EPS chose not to model this acceleration of state population growth capture and chose instead to model a more conservative population growth scenario for the sake of not over-estimating future travel demand in the influence area.

[10] Descriptions of each major development project evaluated and the conclusions drawn from our research and interviews regarding the scale, timing, and probability of development during the 2020 to 2040 timeframe are provided in detail in EPS' full technical report, as are specific adjustments to each major development plan in Appendix Table A1 through Table A4.

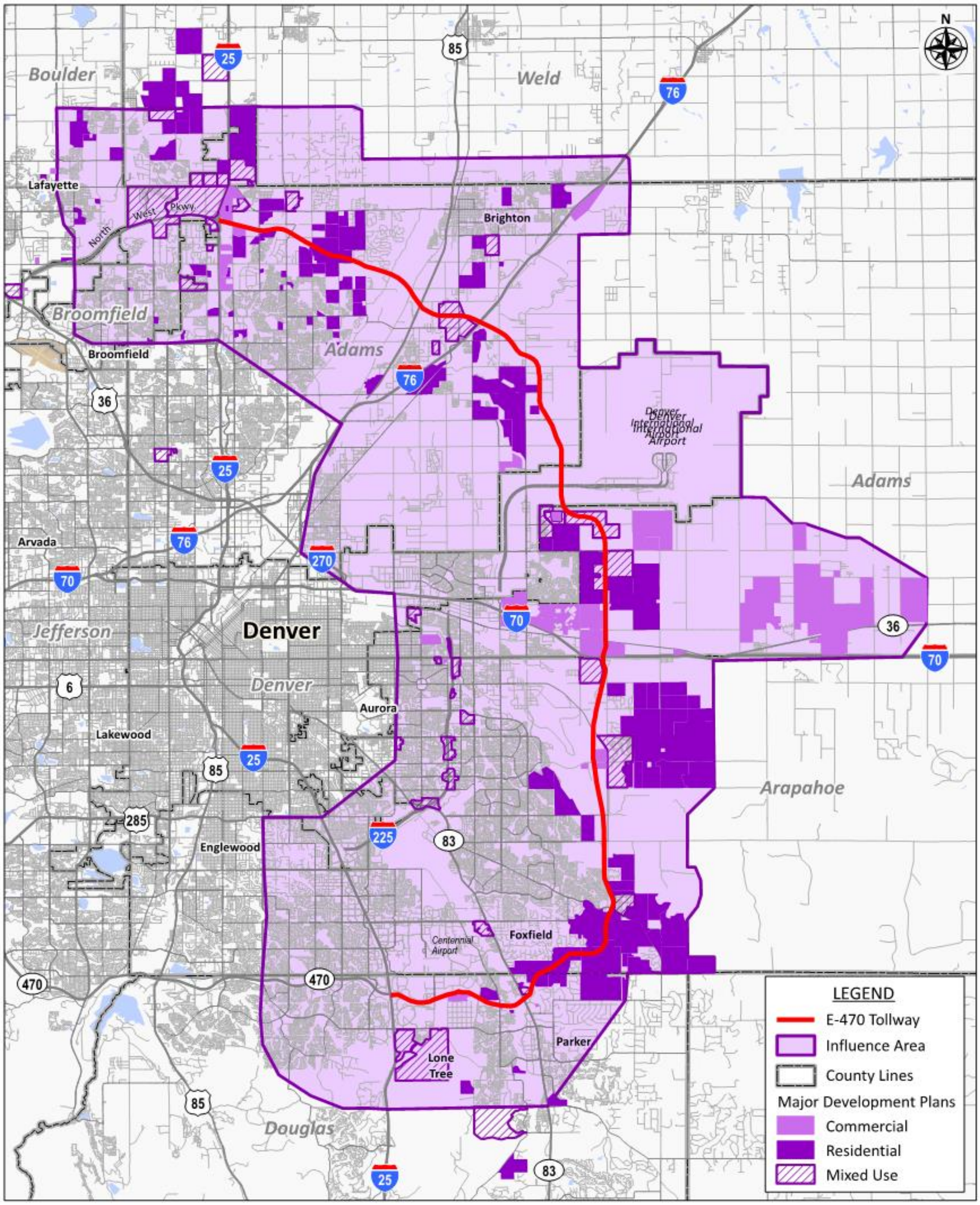


Figure 3-3
E-470 Influence Area and Major Development Plans

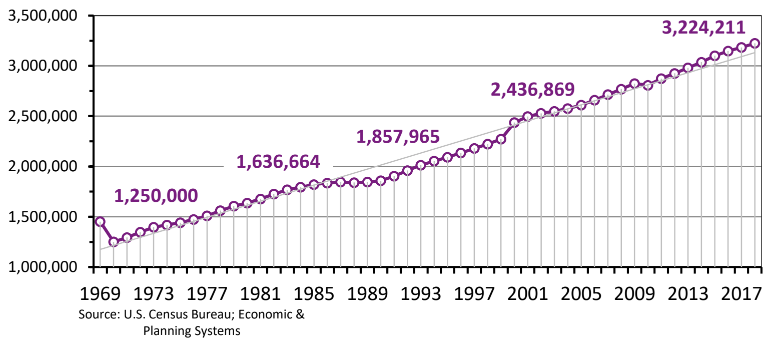


FIGURE 3-4

POPULATION GROWTH IN THE 7-COUNTY DENVER MSA 1969-2018

As indicated in **Figure 3-4**, the Metro Area lost population only twice in the past 50 years, approximately 4,700 in 1988 and approximately 17,000 in 2010. But, as shown in **Table 3-1**, the 7-county area experienced varying levels of population growth: between 1969 and 1975, population increased by approximately 36,200; between 1976 and 1987, population grew by an annual average of approximately 33,300; an annual average of approximately 43,200 between 1988 and 2003; an annual average of 36,700 between 2004 and 2010, and between 2011 and 2018 grew by an annual average of approximately 51,700 per year.[11]

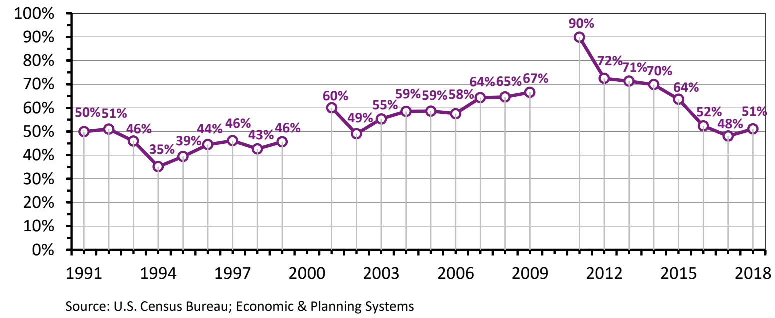


FIGURE 3-5

7-COUNTY POPULATION GROWTH AS PERCENT OF STATE GROWTH 1991-2018

Table 3-1
Population Growth Rate Shifts By County

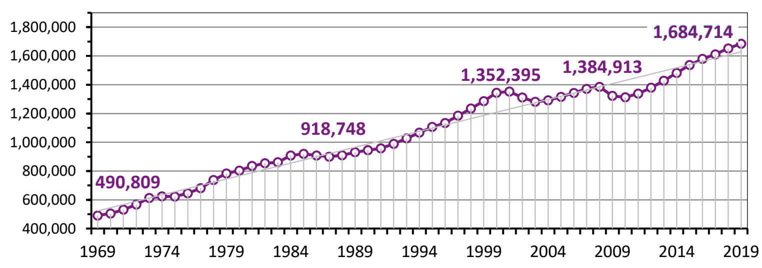
	Average Annual Growth During Cycles					
County	1969-1975	1976-1987	1988-2003	2004-2010	2011-2018	Overall
Adams	6,027	4,139	6,894	8,974	8,783	6,719
Arapahoe	10,485	13,509	8,271	8,228	9,902	10,085
Boulder	6,182	4,280	4,006	1,777	3,939	4,010
Broomfield	-	-	2,819	1,542	1,672	1,414
Denver	(1,775)	(713)	4,144	5,972	14,542	4,189
Douglas	1,143	2,675	10,944	9,070	7,164	6,834
Jefferson	14,121	9,450	6,110	1,160	5,711	7,137
Total	**36,184**	**33,340**	**43,187**	**36,723**	**51,713**	**40,386**

Source: U.S. Census; Economic & Planning Systems

[11] One purpose of this historical evaluation is to provide a juxtaposition of DRCOG's population forecasts against levels of historic activity for the sake of assessing whether the Denver region is likely to achieve such growth again in the future.

Employment

Since 1969, the 7-county area has grown by an average of 23,900 jobs per year, as illustrated in **Figure 3-6**. This graphic, using Bureau of Economic Analysis and BLS data, also illustrates when the area has experienced either above- or below-average population growth. An observation that characterizes a general concern regarding increasing economic instability is that during the previous two periods of job losses, which coincide with NBER's designations of contractions in economic activity, the percent of job losses as a percent of total jobs has been increasing, relative to previous economic contractions in employment in the region.



Source: U.S. Bureau of Economic Analysis; BLS; Economic & Planning Systems

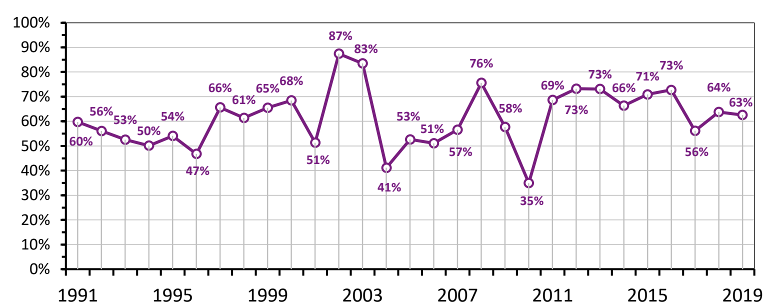
FIGURE 3-6

EMPLOYMENT GROWTH IN THE 7-COUNTY DENVER MSA 1969-2019

- 1975: 700 jobs (0.1 percent of total jobs) were lost
- 1986 to 1987: an average of 9,600 jobs (1.0 percent of total jobs) were lost per year
- 2002 to 2003: an average of 35,500 jobs (2.6 percent of total jobs) were lost per year
- 2009 to 2010: an average of 36,200 jobs (2.6 percent of total jobs) were lost per year

As a portion of the state's growth, the MSA captured an average of 60 percent of wage and salary jobs between 1991 and 2019, as illustrated in **Figure 3-7**.

During the 1990s, it captured 57 percent, whereas during the 2000s, it captured 63 percent. And during the past nine years (since 2010), it has captured an average of 68 percent of the state's total wage and salary job growth. Again, for the purposes of this study, it appears increasingly likely that state employment growth materializes in the Denver Region. As this relates to the current adjusted employment forecasts, this type of heightened rate of growth was not modeled. Instead a more conservative employment growth scenario was modeled to avoid over-estimating future travel demand.



Source: BEA; BLS; Economic & Planning Systems

FIGURE 3-7

7-COUNTY EMPLOYMENT GROWTH AS PERCENT OF STATE GROWTH 1991-2019

As shown in **Table 3-2**, the 7-county area has experienced varying levels of employment growth: between 1969 and 1975, employment increased by approximately 22,000; between 1976 and

1987, it grew by an annual average of approximately 23,000; an annual average of approximately 23,800 between 1988 and 2003; an annual average of 4,700 between 2004 and 2010 and is currently growing by an annual average of approximately 41,300 per year. [12]

Table 3-2
Employment Growth Rate Shifts By County

	Average Annual Growth in Economic Cycles					
County	1969-1975	1976-1987	1988-2003	2004-2010	2011-2019	Overall
Adams	3,599	2,144	3,556	1,143	8,440	3,764
Arapahoe	5,719	6,909	7,204	(17)	7,038	5,914
Boulder	3,139	3,785	2,844	220	3,926	2,933
Broomfield	-	-	372	581	1,182	811
Denver	3,437	3,812	2,050	(741)	11,772	3,998
Douglas	251	573	3,449	3,547	4,478	2,574
Jefferson	5,896	5,816	3,106	(85)	4,438	3,884
Total	**22,041**	**23,040**	**23,825**	**4,646**	**41,274**	**23,878**

Source: U.S. Census; Economic & Planning Systems

Historical Supply Trends

This section details supply conditions, specifically, the market's response to meeting growing population demand through residential unit construction, and the market's response to meeting growing employment demand through the construction of new non-residential inventory such as office, industrial, and retail space. Identifying these trends has two purposes:

- Illustrate where in the respective cycles these types of residential and non-residential land uses are. For example, high net absorption rates in non-residential land uses indicate market growth, and low vacancy rates signal pressure for new space development. And an under-supply of residential units would also signal pressure for new or continued residential development.

- Provide an illustration, and lens through which to interpret, regional economic trends and conditions. For example, in a market that cycles up and down from high to low vacancies and in a market with periods of high and low levels of non-residential construction activity, high vacancy rates would suggest that overall demand for, i.e., employment growth, is tracking below the regional long-term average. Alternatively, in the same type of market, low vacancy rates would suggest that recent employment growth trends are above average.

This is particularly instructive for the interpretation and assessment of whether and to what extent the rates of growth contained in DRCOG's most recent set of projections reflect any short-

[12] Again, one purpose of this historical evaluation is to provide a juxtaposition of DRCOG's population forecasts against levels of historic activity for the sake of assessing whether the Denver region is likely to achieve such growth again in the future.

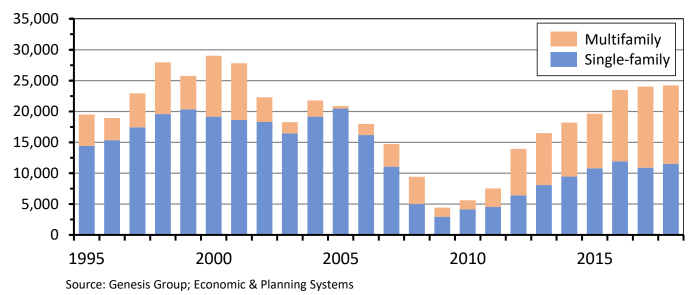
term anchoring bias (as compared to previous versions of DRCOG's forecasts). These conditions are particularly instructive for understanding the market risks associated with near-term major development plans that incorporate non-residential uses.

Residential

Meeting the demand for a growing population requires an adequate supply of housing. While a variety of quantitative and qualitative measures can be used to characterize an "adequate" supply, such as total inventory, availability of inventory for rent or purchase (i.e., not for "seasonal use"), and more subjective quality of inventory, "supply" for the purposes of this report is defined in quantitative terms as trends in new single-family and multifamily housing construction activity. It should also be noted that land and/or zoning also need to be sufficient to facilitate construction activity, such as land for greenfield developments or existing capacity for infill development or redevelopment. A land supply analysis, however, is beyond the scope of this project.

In a "balanced" market, the supply would grow in direct proportion (with no excess or insufficiency) to the magnitude of population growth. In neither the regional nor the national markets, however, has there recently been such a continually balanced market. On the contrary, construction activity has either resulted in periods of over- or under-supply. As will be demonstrated later in this section, the housing market in the region is currently under-supplied.

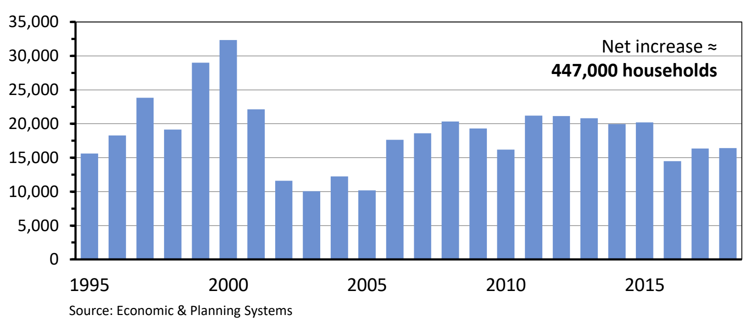
Figure 3-8 illustrates the magnitude of single-family and multifamily residential units that have been constructed in the 7-county MSA since 1995. Overall, nearly 455,000 units have been built in the area since 1995, which averages to approximately 19,000 units per year. On an annual basis, an average of 70 percent of units constructed were single-family and 30 percent were multifamily units.



Source: Genesis Group; Economic & Planning Systems

FIGURE 3-8

SINGLE-FAMILY AND MULTI-FAMILY CONSTRUCTION IN THE 7-COUNTY MSA 1995-2018



Source: Economic & Planning Systems

FIGURE 3-9

HOUSEHOLD GROWTH IN THE 7-COUNTY MSA 1995-2018

During the same period, **Figure 3-9** illustrates that the number of households increased by 447,000, averaging approximately 19,000 households per year. Household growth has fluctuated above and below this average over time but has been more consistent the last decade and a half.

In summary, when compared to annual growth in households during the same period of time, as shown previously, housing production capacity in the Denver region has caught up with a period of under-supply as of 2018, as depicted in **Figure 3-10**.

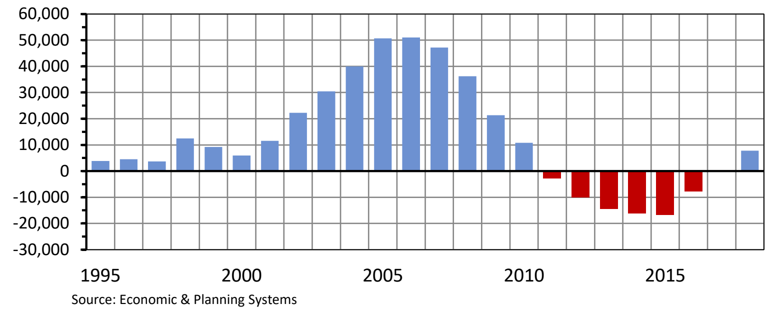


FIGURE 3-10

CUMULATIVE OVER OR UNDER-SUPPLY OF HOUSING 1995-2018

Non-Residential

Meeting the demand for a growing employment base means that an adequate and expanding supply of appropriate quality non-residential space must exist to accommodate that growth. While numerous additional considerations (e.g., lease rates, Class of space, locations) can be made for such an assessment, the metrics chosen to provide a relevant high-level overview of such conditions were net absorption and vacancy rates for industrial, office, and retail space. Indicators are identified at the regional level and for the E-470 influence area, and the data also come from Costar. It should be noted that in the commercial real estate industry, the term "absorption" is the most common way to characterize demand; "net" absorption is then defined as total new square footage leased minus the total square footage no longer occupied. These are the data reported by Costar.

Reference Forecasts

Long-Term Forecasts

Bureau of Labor Statistics

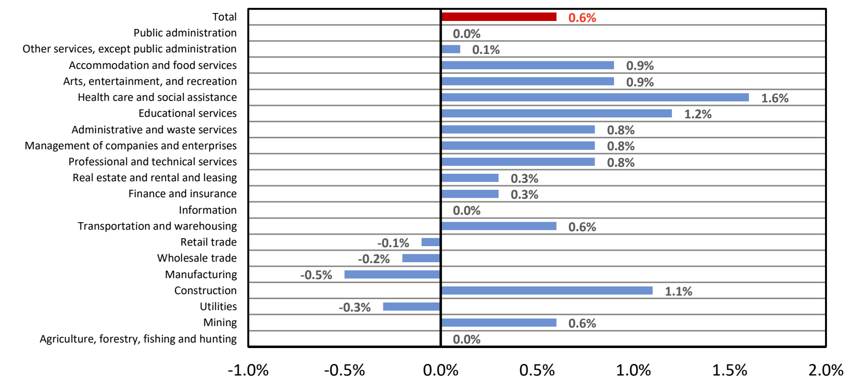
The BLS publishes projections every two years of the U.S. labor force, industry employment, and occupational employment. The most recently published projections, available from their website and in the journal *Monthly Labor Review*, cover the 10-year period 2018 through 2028.

These projections are made with a few key assumptions about the characteristics of the economy, such as:

- Labor market equilibrium where labor supply meets labor demand
- Projections focus on long-term structural change as opposed to market cycles, e.g., recessions

The percentages shown in **Figure 3-11** are the BLS's projection of industry growth rates for 2018 through 2028. Overall, the BLS forecasts U.S. employment to grow an average of 0.6 percent annually over the next ten years. Industries projected to expand at above-average rates include: Accommodations and Food Service; Arts, Entertainment, and Recreation; Health Care and Social Assistance; Educational Services; Administrative Services; Management; Professional and Technical Services; and Construction. Some industries are projected to lose jobs, including: Retail Trade; Wholesale Trade; Manufacturing; and Utilities. Other industries are projected to neither expand nor contract, including: Public Administration; Information; and Agriculture.

Colorado Department of Local Affairs



Source: BLS; Economic & Planning Systems

FIGURE 3-11

BUREAU OF LABOR STATISTICS 10-YEAR EMPLOYMENT PROJECTION

The projections of population, households, and employment shown in **Table 3-3** are updated annually, as noted on the website of the Colorado Department of Local Affairs (DOLA). [13] The two differences include that of geography (DOLA's forecasts represent both the 7- and 11-county region) and sole proprietorships (DOLA's estimates include a number that is closer to the U.S. Census Nonemployer Statistics). To make direct comparisons, these projections were normalized with DRCOG's by replacing DOLA's 2015 numbers with DRCOG's. For subsequent forecast years, DOLA's rates of growth were applied. DOLA's original projections, without adjustment indicate population and household growth in the 11-county area show an increase of approximately 1.5 million, a 44 percent increase over its 2015 base; an increase of approximately 709,700

Table 3-3
Summary of Regional DOLA Projections

					2015-2040						
					Growth		Annual		Annual Percentage		
Forecast	2015	2020	2030	2040	Total	Percent	Average	Percent	2015-2020	2020-2030	2030-2040
DOLA											
7-county											
Population	3,075,701	3,344,182	3,812,128	4,213,553	1,137,852	37%	45,514	1.27%	1.69%	1.32%	1.01%
Households	1,234,478	1,362,339	1,607,708	1,805,345	570,867	46%	22,835	1.53%	1.99%	1.67%	1.17%
Employment	1,913,109	2,248,430	2,538,281	2,675,537	762,427	40%	30,497	1.35%	3.28%	1.22%	0.53%
Normalized (1)											
Population	3,077,340	3,345,964	3,814,159	4,215,798	1,138,458	37%	45,538	1.27%	1.69%	1.32%	1.01%
Households	1,176,097	1,297,912	1,531,677	1,719,967	543,870	46%	21,755	1.53%	1.99%	1.67%	1.17%
Employment	1,682,429	1,977,317	2,232,218	2,352,924	670,495	40%	26,820	1.35%	3.28%	1.22%	0.53%
11-county											
Population	3,400,418	3,729,955	4,340,538	4,893,004	1,492,586	44%	59,703	1.47%	1.87%	1.53%	1.21%
Households	1,354,728	1,506,756	1,807,689	2,064,412	709,684	52%	28,387	1.70%	2.15%	1.84%	1.34%
Employment	2,070,916	2,437,813	2,770,027	2,934,644	863,728	42%	34,549	1.40%	3.32%	1.29%	0.58%
Normalized (1)											
Population	3,203,818	3,514,302	4,089,584	4,610,108	1,406,290	44%	56,252	1.47%	1.87%	1.53%	1.21%
Households	1,224,482	1,361,894	1,633,894	1,865,935	641,453	52%	25,658	1.70%	2.15%	1.84%	1.34%
Employment	1,715,168	2,019,039	2,294,183	2,430,522	715,354	42%	28,614	1.40%	3.32%	1.29%	0.58%

(1) EPS calibrated 2015 to DRCOG's totals for 2015 and applied DOLA's annual rates of growth to the remaining years.
Source: DOLA; Economic & Planning Systems

households, or 52 percent over the 2015 base, and an increase of approximately 863,700 jobs, or 42 percent over the 2015 base. With the normalization, DOLA's projections imply an increase of

(13) https://demography.dola.colorado.gov/

more than 56,300 people per year, approximately 25,700 households and 28,600 wage and salary jobs per year.

Short-Term Economic Outlook

This section provides a summary of the short-term (one- to two-year) economic outlooks for the Denver Metro Area. These short-term outlooks were identified to inform the adjustment of projections for the near-term (between 2020 and 2022).

Colorado Legislative Council

The Colorado Legislative Council (CLC) staff serves as the nonpartisan research arm of the Colorado General Assembly. The CLC's role is to provide support to legislative committees, respond to requests for research and constituent services, prepare fiscal notes, provide revenue projections, and perform other centralized legislative support services. In its March 2020 release of *Focus Colorado: Economic and Revenue Forecast*, the CLC projects that the state's economy will continue to expand in 2021 and 2022, with caveats regarding the potential downside and long-term risks associated with the COVID-19 pandemic. Specifically, the document notes: "This forecast anticipates that current actions to maintain social distancing will continue over the next several months and that they will be successful in slowing the spread of the coronavirus. They will also allow the economy to reboot later this year and recover to trend levels of economic activity in 2021."

A few notable statistics from its outlook are a projection of average state population growth of 76,400 persons per year over the next two years and average state non-farm employment growth of 39,500 jobs per year. Using recent regional growth patterns as an indicator, the 7-county region might experience population growth between 45,800 and 51,900 persons per year and employment growth between 23,700 and 26,900 jobs per year.

Governor's Office of State Planning and Budgeting

The primary role of the Office of State Planning and Budgeting (OSPB) is to provide the Governor with information and recommendations to make sound public policy and budget decisions. Among the OSPB's core functions are developing reliable revenue estimates, a defensible budget, proposals for new legislation, monitoring budget implementation, anticipating issues, and developing solutions. It also publishes quarterly economic outlooks, the most recent of which was published in March 2020.

Like the CLC, OSPB's economic analysis and forecast also included a proviso: "This forecast is subject to a substantially heightened risks associated with the unfolding developments of COVID-19. The forecast reflects the latest projections of the impacts that COVID-19 may have on state revenues and expenditures, yet the epidemiological course of COVID-19 and the duration and depth of an economic slowdown are highly uncertain. Although economic conditions could be more positive than described in this forecast, the risks to the budget outlook are balanced to the downside, and the risks of a recession have increased substantially."

Comparable statistics from its outlook consist of average state population growth of 77,000 persons per year over the next two years and average state non-farm employment growth of 32,500 jobs per year – considerably lower than CLC's. Using recent regional growth patterns as an indicator, OSPB's forecast might equate to the 7-county area experiencing population growth between 46,200 and 52,400 persons per year and employment growth between 19,500 and 22,100 jobs per year.

DRCOG Original Forecasts

Background to DRCOG Forecasts

It is noteworthy, that conditions of the past decade represented almost every outlying state of the market except steady growth, i.e., periods of exceptionally high growth, uncertainty, stagnation, and recovery. As such, the forecaster is placed in the position of creating and justifying forecasts that account for not only long-term demographic and economic relationships, but also account for the uncertainty around current conditions that do not reflect what is conventionally called "the norm". A further complication in DRCOG's role as a quasi-governmental body, overseen by its representative jurisdictions, is that these projections (at least at the jurisdictional level) are "approved" by each municipality and, thus, often influenced by non-economic or political factors.

For example, in 2006, at the height of a business cycle (14) and just before the residential construction and financial market crisis, DRCOG released its first vintage 2005-2035 forecasts with long-term annual employment growth of approximately 28,000 jobs per year. In early 2007, when observed residential construction activity data became available for 2006 and indicated that the level of construction activity had dropped by more than 30 percent in the fourth quarter, DRCOG responded to pressures to rerelease their 2005-2035 forecasts with some recognition of near-term outlook. Although DRCOG adjusted the 2010 household, population, and employment estimates, the control totals for 2035 were held constant.

In 2010, with the effects of the Great Recession still weighing heavily on the economy, DRCOG released another version of the 2005-2035 forecasts. This time, DRCOG revised its 2035 control totals and aligned some of the socioeconomic variables for 2010 more closely with recently released State Demographer's Office information. And while this adjustment placed 2010 numbers more in-line with observed data than they were previously, these newer forecasts implied an unprecedented long-term employment growth of 34,000 jobs per year between 2010 and 2035 in the 11-county MSA.

By 2014, the nation and region continued to recover from the recession, regaining employment levels not seen in more than five years. Notably, Colorado was one of a few states in the country that had already regained and surpassed pre-recession employment levels. Given the duration of the economic recovery and the delayed release of its 2040 forecasts, DRCOG produced an updated set of 2035 forecasts (2012 Cycle 2 forecasts) in 2012, in which it ran slightly modified assumptions through its model. One of the major changes to the model was a correction of the model's employment control totals for 2035, which reduced its annual employment growth to a much more justifiable long-term rate of 22,000 jobs per year between 2010 and 2035.

While a comprehensive review of the variations in DRCOG's different vintage forecasts is beyond the scope of this study, this brief overview is intended to give the reader an appreciation of not

(14) Refer to the explanation of a "cycle" in the Defining Periods of Economic Activity section, page 21 of EPS's full report located in Appendix A.

only the short-term anchoring bias commonly at play in their forecasts, but also to highlight the socioeconomic team's challenges arising from jurisdictional-level influence on the projections.

DRCOG Methodology

DRCOG's socioeconomic team is responsible for land use modeling, which has recently undergone significant changes with the introduction several years ago of UrbanSim, a parcel-based model that attempts to simulate the dynamic interaction of households, business, real estate markets, and the regional transportation system. While the geospatial modeling procedure has changed, it is important to note that the overarching employment and demographic forecasts of DRCOG's projections have not. DRCOG has historically used a third party to create a single control total for employment and population, from which it utilizes its geospatial techniques to apportion that growth by county, municipality, and TAZ. That remains the case today.

For the purposes of this study, it was important to gain an understanding of how the UrbanSim model functions and what inputs and assumptions are used; and, thus, to gain an understanding of the credibility of its outputs. In general, any model's outputs are as good as its inputs, such as regional control totals for employment and population. An analysis of DRCOG's most recent 2017 forecasts (with the horizon year 2040) and a fuller description of EPS' understanding of DRCOG's methodology are described in more detail in the DRCOG Methodology section beginning on page 36 of EPS's Final Report, Regional Economic Growth Analysis, located in Appendix A.

Summary of Forecasts

Regional composite growth projections within DRCOG's planning area are shown in **Table 3-4** at the 11-county and 7-county areas, and the E-470 influence area. The population forecast for the 11-county area shows an increase of nearly 1.2 million people between 2015 and 2040, an

Table 3-4
Summary of DRCOG Regional Growth Projections

					2015-2040						
					Growth		Annual		Annual Percentage		
Forecast	**2015**	**2020**	**2030**	**2040**	Total	Percent	Average	Percent	2015-2020	2020-2030	2030-2040
Original DRCOG Trends											
11-County region											
Population	3,181,316	3,459,096	3,948,980	4,360,742	1,179,426	37%	47,177	1.27%	1.69%	1.33%	1.00%
Households	1,285,361	1,421,009	1,650,743	1,837,423	552,062	43%	22,082	1.44%	2.03%	1.51%	1.08%
Employment	1,712,408	1,828,463	2,085,058	2,395,190	682,782	40%	27,311	1.35%	1.32%	1.32%	1.40%
7-County region											
Population	3,061,520	3,322,716	3,771,545	4,143,968	1,082,448	35%	43,298	1.22%	1.40%	1.11%	0.95%
Households	1,239,219	1,368,339	1,582,447	1,753,844	514,625	42%	20,585	1.40%	1.64%	1.25%	1.03%
Employment	1,682,905	1,796,227	2,046,643	2,349,363	666,458	40%	26,658	1.34%	1.31%	1.35%	1.39%
Influence Area											
Population	1,028,999	1,142,753	1,347,254	1,538,555	509,556	50%	20,382	1.62%	1.81%	1.50%	1.34%
Households	385,477	441,151	533,587	618,698	233,221	61%	9,329	1.91%	2.19%	1.71%	1.49%
Employment	539,656	595,659	713,462	880,057	340,401	63%	13,616	1.98%	1.88%	1.97%	2.12%

Source: DRCOG; Economic & Planning Systems

increase of 37 percent over its 2015 base, averaging to approximately 47,200 people per year. For the 7-county area, the 2040 population is projected to increase 35 percent over the 2015 base. It is important to note that DRCOG's base year population is approximately 15,800 people lower (0.5 percent lower) than observed data from the Census.[15] In terms of households, the 11-county area shows an increase of approximately 552,100 households, 43 percent higher than the 2015 base, which is an average of approximately 22,100 households per year.

For the 7-county area, the number of households in 2040 is projected to increase by 42 percent or by 514,600 over the 2015 base. Unlike DRCOG's base year population, which was 0.5 percent lower than observed data, the base year number of households is approximately 63,200 higher (5.1 percent) than observed Census data.

In terms of wage and salary employment, DRCOG's projections show an increase of 682,800 wage and salary jobs in the 11-county area and 666,500 jobs in the 7-county area between 2015 and 2040, an increase of 40 percent over both the 11- and 7-county areas 2015 bases, which average approximately 27,300 jobs and 26,700 jobs per year, respectively.

Within the E-470 influence area, the population is projected to grow 50 percent over the 2015 base, the number of households are projected to grow 61 percent over the 2015 base, and the number of wage and salary jobs is projected to grow 63 percent over the 2015 base.

Adjustments to DRCOG Forecasts

Population

Table 3-5 illustrates the original and adjusted population forecasts, as well as differences between the two and magnitude of adjustment made for each step of the process. At the 11-county level, DRCOG projects a population of 4.36 million by 2040, an increase of 37 percent over the 2015 base, which averages to approximately 47,200 persons per year. For the same geography, EPS projects a population of 4.31 million by 2040, a 34 percent increase over an adjusted 2015 base, which averages to approximately 44,100 persons per year. Overall, EPS' population forecast for 2040 at the 11-county level is 1.3 percent lower than DRCOG's. The base year carry-through adjustments account for a 0.7 percent, 0.7 percent, 0.6 percent, and 0.5 percent upward adjustment for years 2015, 2020, 2030 and 2040, respectively. The city and county growth rate adjustments account for 0.9 percent, 1.4 percent, and 2.7 percent downward adjustments in 2020, 2030 and 2040, respectively. The TAZ-level adjustments account for a 0.5 percent reduction, a 0.1 percent increase, and a 1.0 percent increase for 2020, 2030, and 2040, respectively.

[15] A direct comparison between DRCOG's 11-county area and observed data from the U.S. Census is not possible because DRCOG does not include the entirety of Weld County in its planning area.

Table 3-5
Population Adjustments

Forecast	2015	2020	2030	2040	2015-2040 Growth Total	2015-2040 Growth Percent	2015-2040 Annual Average	2015-2040 Annual Percent	Annual Percentage 2015-2020	Annual Percentage 2020-2030	Annual Percentage 2030-2040
Original DRCOG											
E-470 Corridor	1,028,999	1,142,753	1,347,254	1,538,555	509,556	50%	20,382	1.62%	2.12%	1.66%	1.34%
Remainder	2,152,317	2,316,343	2,601,726	2,822,187	669,870	31%	26,795	1.09%	1.48%	1.17%	0.82%
11-County	**3,181,316**	**3,459,096**	**3,948,980**	**4,360,742**	**1,179,426**	**37%**	**47,177**	**1.27%**	**1.69%**	**1.33%**	**1.00%**
Adjustments											
1) Base year carry-through	22,502	22,502	22,502	22,502	---	---	---	---	---	---	---
2) County & City Level	-	(31,294)	(56,949)	(118,851)	---	---	---	---	---	---	---
3) TAZ Specific	-	(18,541)	4,919	41,671	---	---	---	---	---	---	---
Total	**22,502**	**(27,333)**	**(29,528)**	**(54,678)**	---	---	---	---	---	---	---
as % of Original											
1) Base year carry-through	0.7%	0.7%	0.6%	0.5%	---	---	---	---	---	---	---
2) County & City Level	0.0%	-0.9%	-1.4%	-2.7%	---	---	---	---	---	---	---
3) TAZ Specific	0.0%	-0.5%	0.1%	1.0%	---	---	---	---	---	---	---
Total	**0.7%**	**-0.8%**	**-0.7%**	**-1.3%**	---	---	---	---	---	---	---
EPS Adjusted Forecasts											
E-470 Corridor	1,014,235	1,096,202	1,309,231	1,497,697	483,462	48%	19,338	1.57%	1.57%	1.79%	1.35%
Remainder	2,189,583	2,335,561	2,610,221	2,808,367	618,784	28%	24,751	1.00%	1.30%	1.12%	0.73%
11-County Metro Area	**3,203,818**	**3,431,763**	**3,919,452**	**4,306,064**	**1,102,246**	**34%**	**44,090**	**1.19%**	**1.38%**	**1.34%**	**0.95%**
Difference											
E-470 Corridor	(14,764)	(46,551)	(38,023)	(40,858)	(26,094)	---	(1,044)	-0.05%	-0.55%	0.13%	0.02%
Remainder	37,266	19,218	8,495	(13,820)	(51,086)	---	(2,043)	-0.09%	-0.18%	-0.05%	-0.08%
11-County Metro Area	**22,502**	**(27,333)**	**(29,528)**	**(54,678)**	**(77,180)**	---	**(3,087)**	**-0.08%**	**-0.30%**	**0.00%**	**-0.05%**
as % of DRCOG											
E-470 Corridor	-1.4%	-4.1%	-2.8%	-2.7%	---	---	---	---	---	---	---
Remainder	1.7%	0.8%	0.3%	-0.5%	---	---	---	---	---	---	---
11-County Metro Area	**0.7%**	**-0.8%**	**-0.7%**	**-1.3%**	---	---	---	---	---	---	---

Source: DRCOG; Economic & Planning Systems

Households

Table 3-6 illustrates the original and adjusted household forecasts, as well as differences between the two and magnitude of adjustment made for each step of the process. At the 11-county level, DRCOG projects 1.84 million households by 2040, a 43 percent increase over the 2015 base, which averages to approximately 22,100 households per year. For the same geography, EPS projects 1.77 million households by 2040, a 44 percent increase over an adjusted 2015 base, which averages to approximately 21,800 households per year. Overall, EPS' household forecast for 2040 at the 11-county level is 3.7 percent lower than DRCOG's. The base year carry-through adjustments account for 4.7 percent, 4.3 percent, 3.7 percent, and 3.3 percent geography, EPS projects 1.77 million households by 2040, a 44 percent increase over an adjusted 2015 base, which averages to approximately 21,800 households per year. Overall, EPS' household forecast for 2040 at the 11-county level is 3.7 percent lower than DRCOG's. The base year carry-through adjustments account for 4.7 percent, 4.3 percent, 3.7 percent, and 3.3 percent downward adjustments in years 2015, 2020, 2030 and 2040, respectively. The city and county growth rate adjustments account for a 0.9 percent decrease, a 0.1 percent increase, and a 0.7 percent decrease in years 2020, 2030 and 2040, respectively. The TAZ-level adjustments account for a 0.8 percent reduction, a 0.4 percent reduction, and a 0.3 percent increase in years 2020, 2030 and 2040, respectively.

Table 3-6
Household Adjustments

Forecast	2015	2020	2030	2040	2015-2040 Growth Total	2015-2040 Growth Percent	2015-2040 Annual Average	2015-2040 Annual Percent	Annual Percentage 2015-2020	Annual Percentage 2020-2030	Annual Percentage 2030-2040
Original DRCOG											
E-470 Corridor	385,477	441,151	533,587	618,698	233,221	61%	9,329	1.91%	2.73%	1.92%	1.49%
Remainder	899,884	979,858	1,117,156	1,218,725	318,841	35%	12,754	1.22%	1.72%	1.32%	0.87%
11-County Metro Area	**1,285,361**	**1,421,009**	**1,650,743**	**1,837,423**	**552,062**	**43%**	**22,082**	**1.44%**	**2.03%**	**1.51%**	**1.08%**
Adjustments											
1) Base year carry-through	(60,920)	(60,879)	(60,880)	(60,879)	---	---	---	---	---	---	---
2) County & City Level	41	(12,405)	2,004	(12,546)	---	---	---	---	---	---	---
3) TAZ Specific	-	(12,040)	(6,989)	4,805	---	---	---	---	---	---	---
Total	**(60,879)**	**(85,324)**	**(65,865)**	**(68,620)**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
as % of Original											
1) Base year carry-through	-4.7%	-4.3%	-3.7%	-3.3%	---	---	---	---	---	---	---
2) County & City Level	0.0%	-0.9%	0.1%	-0.7%	---	---	---	---	---	---	---
3) TAZ Specific	0.0%	-0.8%	-0.4%	0.3%	---	---	---	---	---	---	---
Total	**-4.7%**	**-6.0%**	**-4.0%**	**-3.7%**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
EPS Adjusted Forecasts											
E-470 Corridor	357,640	396,235	495,714	581,230	223,590	63%	8,944	1.96%	2.07%	2.27%	1.60%
Remainder	866,842	939,450	1,089,164	1,187,573	320,731	37%	12,829	1.27%	1.62%	1.49%	0.87%
11-County Metro Area	**1,224,482**	**1,335,685**	**1,584,878**	**1,768,803**	**544,321**	**44%**	**21,773**	**1.48%**	**1.75%**	**1.73%**	**1.10%**
Difference											
E-470 Corridor	(27,837)	(44,916)	(37,873)	(37,468)	(9,631)	---	(385)	0.05%	-0.66%	0.34%	0.11%
Remainder	(33,042)	(40,408)	(27,992)	(31,152)	1,890	---	76	0.05%	-0.10%	0.17%	-0.01%
11-County Metro Area	**(60,879)**	**(85,324)**	**(65,865)**	**(68,620)**	**(7,741)**	**---**	**(310)**	**0.04%**	**-0.27%**	**0.22%**	**0.03%**
as % of DRCOG											
E-470 Corridor	-7.2%	-10.2%	-7.1%	-6.1%	---	---	---	---	---	---	---
Remainder	-3.7%	-4.1%	-2.5%	-2.6%	---	---	---	---	---	---	---
11-County Metro Area	**-4.7%**	**-6.0%**	**-4.0%**	**-3.7%**	**---**	**---**	**---**	**---**	**---**	**---**	**---**

Source: DRCOG; Economic & Planning Systems

Employment

Table 3-7 illustrates the original and adjusted employment forecasts, as well as differences between the two and magnitude of adjustment made for each step of the process. At the 11-county level, DRCOG projects wage and salary employment to reach 2.40 million by 2040, a 40 percent increase over the 2015 base, which averages to approximately 27,300 jobs per year. For the same geography, EPS projects 2.34 million wage and salary jobs by 2040, a 36 percent increase over an adjusted 2015 base, which averages to approximately 24,900 jobs per year.

Overall, EPS' wage and salary employment forecast for 2040 is 2.3 percent lower than DRCOG's. The base year carry-through adjustments are approximately 0.1 percent, 0.2 percent, 0.1 percent, and 0.1 percent higher in years 2015, 2020, 2030 and 2040, respectively. The city and county level adjustments are 3.6 percent higher, 0.8 percent higher, and 2.7 percent lower in years 2020, 2030, and 2040, respectively. The TAZ-level adjustments account for a 0.3 percent reduction, a 0.7 percent increase, and a 0.2 percent increase in years 2020, 2030, and 2040, respectively.

Table 3-7
Employment Adjustments

Forecast	2015	2020	2030	2040	2015-2040 Growth Total	2015-2040 Growth Percent	2015-2040 Annual Average	2015-2040 Annual Percent	Annual Percentage 2015-2020	Annual Percentage 2020-2030	Annual Percentage 2030-2040
Original DRCOG											
E-470 Corridor	539,656	595,659	713,462	880,057	340,401	63%	13,616	1.98%	1.99%	1.82%	2.12%
Remainder	1,172,752	1,232,804	1,371,596	1,515,133	342,381	29%	13,695	1.03%	1.00%	1.07%	1.00%
11-County Metro Area	**1,712,408**	**1,828,463**	**2,085,058**	**2,395,190**	**682,782**	**40%**	**27,311**	**1.35%**	**1.32%**	**1.32%**	**1.40%**
Adjustments											
1) Base year carry-through	1,965	2,760	2,760	2,760	---	---	---	---	---	---	---
2) County & City Level	795	65,203	17,625	(64,003)	---	---	---	---	---	---	---
3) TAZ Specific	-	(5,819)	14,944	5,040	---	---	---	---	---	---	---
Total	**2,760**	**62,144**	**35,329**	**(56,203)**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
as % of Original											
1) Base year carry-through	0.1%	0.2%	0.1%	0.1%	---	---	---	---	---	---	---
2) County & City Level	0.0%	3.6%	0.8%	-2.7%	---	---	---	---	---	---	---
3) TAZ Specific	0.0%	-0.3%	0.7%	0.2%	---	---	---	---	---	---	---
Total	**0.2%**	**3.4%**	**1.7%**	**-2.3%**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
EPS Adjusted Forecasts											
E-470 Corridor	541,408	616,351	733,138	858,489	317,081	59%	12,683	1.86%	2.63%	1.75%	1.59%
Remainder	1,173,760	1,274,256	1,387,249	1,480,498	306,738	26%	12,270	0.93%	1.66%	0.85%	0.65%
11-County Metro Area	**1,715,168**	**1,890,607**	**2,120,387**	**2,338,987**	**623,819**	**36%**	**24,953**	**1.25%**	**1.97%**	**1.15%**	**0.99%**
Difference											
E-470 Corridor	1,752	20,692	19,676	(21,568)	(23,320)	---	(933)	-0.11%	0.63%	-0.07%	-0.53%
Remainder	1,008	41,452	15,653	(34,635)	(35,643)	---	(1,426)	-0.10%	0.65%	-0.22%	-0.35%
11-County Metro Area	**2,760**	**62,144**	**35,329**	**(56,203)**	**(58,963)**	**---**	**(2,359)**	**-0.10%**	**0.65%**	**-0.17%**	**-0.41%**
as % of DRCOG											
E-470 Corridor	0.3%	3.5%	2.8%	-2.5%	---	---	---	---	---	---	---
Remainder	0.1%	3.4%	1.1%	-2.3%	---	---	---	---	---	---	---
11-County Metro Area	**0.2%**	**3.4%**	**1.7%**	**-2.3%**	**---**	**---**	**---**	**---**	**---**	**---**	**---**

Source: DRCOG; Economic & Planning Systems

Comparison of Forecasts

Using an independent forecasting method, based on a variety of factors as described in more detail in the full report in Appendix A, and utilizing those control totals as a basis for calibrating TAZ-level data for the DRCOG Planning Area (which excludes a majority of Weld County), EPS' derived forecasts are slightly lower than DRCOG's and DOLA's projections, as shown in **Table 3-8**. And while not the basis and rationale for EPS' forecasting methodology, EPS' average employment and population increases reflect longer-term average growth trends (see Table 3-1 and Table 3-2).

In terms of population in year 2015, there is a very modest 0.5 percent difference between the DOLA and EPS forecasts versus DRCOG's original forecast. As identified in Table 3-1, the overall average growth of the past 50 years has been approximately 40,400 people per year. While EPS has not calibrated its average annual growth to this long-term average precisely, it is EPS' opinion that land use and water rights constraints, along with trends concerning aging in place and a constrained housing supply will affect the growth potentials of the region.

Table 3-8
Comparison of Forecasts for the 7-County Region

Forecast	2015	2020	2030	2040	2015-2040 Total Growth	2015-2040 Annual Average	2015-2040 Annual Percent	Annual Percentage 2015-2020	Annual Percentage 2020-2030	Annual Percentage 2030-2040
Population Forecasts										
Original DRCOG	3,061,520	3,322,716	3,771,545	4,143,968	1,082,448	43,298	1.22%	1.65%	1.28%	0.95%
DOLA	3,077,340	3,345,964	3,814,159	4,215,798	1,138,458	45,538	1.27%	1.69%	1.32%	1.01%
EPS Adjusted	3,077,340	3,281,358	3,724,073	4,064,588	987,248	39,490	1.12%	1.29%	1.27%	0.88%
Household Forecasts										
Original DRCOG	1,239,219	1,368,339	1,582,447	1,753,844	514,625	20,585	1.40%	2.00%	1.46%	1.03%
DOLA	1,176,097	1,297,912	1,531,677	1,719,967	543,870	21,755	1.53%	1.99%	1.67%	1.17%
EPS Adjusted	1,176,097	1,278,126	1,510,527	1,676,705	500,608	20,024	1.43%	1.68%	1.68%	1.05%
Employment Forecasts										
Original DRCOG	1,682,905	1,796,227	2,046,643	2,349,363	666,458	26,658	1.34%	1.31%	1.31%	1.39%
DOLA [1]	1,682,429	1,977,317	2,232,218	2,352,924	670,495	26,820	1.35%	3.28%	1.22%	0.53%
EPS Adjusted	1,682,429	1,854,917	2,077,469	2,289,347	606,918	24,277	1.24%	1.97%	1.14%	0.98%

[1] Because of the different magnitudes of sole proprietorships quantified by DOLA and Woods & Poole, EPS has calibrated each of their 2015 employment levels to EPS's adjusted totals for 2015 and applied their own respective annual rates of growth to the
Source: Economic & Planning Systems

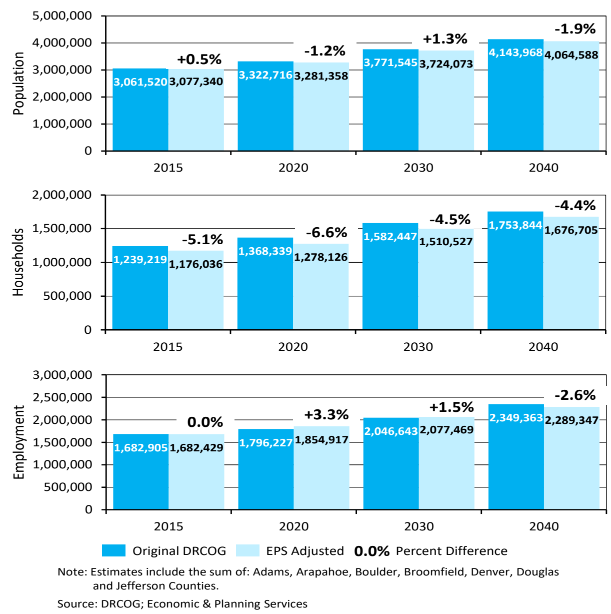
\\NHVSVR2\tft\TFT Group\Projects\CO 240041 E-470 2019 IG and Toll Rate Study\Report\DRAFT Report\Tables\[Table 3-1 through 3-8.xlsx]Table 3-8

EPS's employment forecast has been calibrated to align more with the structural implications of the long-term (see Table 3-2) than either DRCOG or DOLA forecasts. It is EPS' opinion that the lower employment growth rate was justifiable given their independent economic forecast, as well as labor market and housing constraint considerations, which will affect near-term structural growth cited by both the Colorado Legislative Council and the State Office of Planning and Budgeting.

Overview

Metro Area

The original DRCOG forecasts and the EPS adjusted forecasts for the 7-county Metro Area are illustrated in **Figure 3-12**. The adjustments reflect extensive data and market analysis, research, and understanding of the original DRCOG model and forecasts. While the EPS forecasts in years 2015, 2020, 2030 and 2040 are generally lower than the original DRCOG forecasts for population and households and lower in 2040 for employment, it does not mean that growth is not occurring. In fact, just the opposite is true. In the DRCOG region, population between 2015-2020, 2020-2030 and 2030-2040 is forecasted by



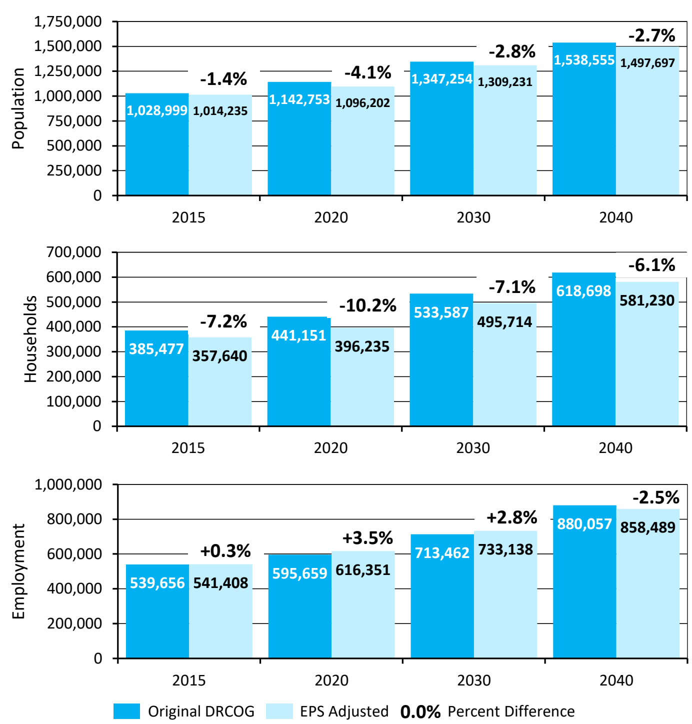
Note: Estimates include the sum of: Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas and Jefferson Counties.
Source: DRCOG; Economic & Planning Services

FIGURE 3-12
DRCOG AND EPS ADJUSTED 7-COUNTY METRO AREA FORECAST COMPARISONS

EPS to grow by 1.3 percent, 1.3 percent and 0.9 percent per annum, respectively. EPS has also forecasted households to grow by 1.7 percent, 1.7 percent and 1.1 percent per annum between 2015-2020, 2020-2030 and 2030-2040, respectively. Finally, regional employment between 2015-2020, 2020-2030 and 2030-2040 is also forecasted by EPS to grow by 2.0 percent, 1.1 percent and 1.0 percent per annum, respectively. It should also be noted that EPS' forecasted growth rates presented in this chapter reflect long-term rates, and that actual year-over-year growth rates may be higher or lower than these projections, as growth does not typically occur linearly.

Influence Area

Differences between the original DRCOG forecasts and the EPS adjusted forecasts within the E-470 influence area are illustrated in **Figure 3-13**. They are provided to contrast the extent of the differences. Between 2015-2020, 2020-2030 and 2030-2040, population is forecasted to grow by 1.6 percent, 1.8 percent and 1.4 percent per annum, respectively. This translates into population growth between 2015-2040, within the E-470 influence area that is approximately 0.5 percent per annum higher than the forecasted growth in the Denver Metro area as a whole (1.6 percent per annum versus 1.1 percent per annum).



Note: Estimates include the sum of: Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas and Jefferson Counties.

Source: DRCOG; Economic & Planning Services

FIGURE 3-13

DRCOG AND EPS ADJUSTED E-470 INFLUENCE AREA FORECAST COMPARISONS

EPS has also forecast households to grow by 2.1 percent, 2.3 percent and 1.6 percent per annum between 2015-2020, 2020-2030 and 2030-2040, respectively. This means that within the E-470 influence area, households are forecasted to grow by approximately 0.6 percent per annum more than the forecasted Metro area growth between 2015 and 2040. Finally, study area employment between 2015-2020, 2020-2030 and 2030-2040 is forecasted by EPS to grow by 2.6 percent, 1.8 percent and 1.6 percent per annum, respectively. This translates into employment growth within the E-470 corridor that is 0.7 percent per annum greater than in the Metro area as a whole.

In general, while approximately one-third of the region's population, households and employment reside within the E-470 influence area, EPS forecasts that between approximately 40-60 percent of the growth in the demographics will occur there. These adjustments, as described briefly in earlier sections of this chapter, and in more detail in the full EPS report located in Appendix A, are based on extensive data and market analysis, research, as well as understanding of the original DRCOG forecasts, methodology and assumptions.

Disclaimer

This corridor growth analysis was prepared as the nation and world seek to address the coronavirus/COVID-19 pandemic, an unprecedented public health crisis. During this period, protecting public health is a top priority. The economic fallout, however, has so far been both significant and abrupt, yet its length and severity are unknown.

As such, the impact on the findings of the corridor growth analysis will depend on how the situation unfolds over the next three to six months. The consensus at the time of this analysis was that the economic (or fiscal, financial, market) impacts were likely to dissipate over the long-term, although the exact pace and timeframe for recovery remained unclear.

Specifically, although EPS's adjusted TAZ-level socioeconomic data have already been incorporated into the travel demand modeling and sensitivities conducted by CDM Smith, the events as they have rapidly unfolded during March 2020 have, in the opinion of EPS, the potential to significantly impact the following elements of their findings:

- Estimates of current year (2020) and near-term employment and population;
- Long-term projections of employment and population (2040); and,
- Timing of major development plans within the Influence Area.

Chapter 4

Traffic and Revenue Analysis

Chapter 4 provides a summary of the traffic and revenue forecasts based on the "Current" toll rate structure, which was introduced on January 1, 2020. This chapter also details the refinement and calibration process of the travel demand model used in developing the forecasts, as well as the assumptions underlying these forecasts, such as toll rates, values of time, vehicle operating costs and toll revenue leakage. The forecasts also recognize travel patterns along E-470 through the incorporation of anonymous trip data gleaned from E-470's 87.3 million transactions observed in 2018. Using the transaction data, the individual transactions were linked, creating trip patterns and trip lengths along E-470 which proved invaluable in travel demand model calibration and in the forecasting of future usage of E-470. The traffic forecasts also incorporated the results of an independent review of socioeconomic forecasts discussed in **Chapter 3**, **Corridor Growth Analysis**, the latest traffic data and counts, a detailed analysis of traffic profiles on E-470, and the most recent highway improvement assumptions.

The following text presents the analytical methodology, study assumptions, steps taken to reflect the socioeconomic update, and results of an analysis of the sensitivity of usage and revenue to toll rates. The final products of the analysis are the estimates of annual traffic and toll revenue under the current toll rate assumptions, a comparison of these forecasts with the last CDM Smith forecasts from December 2018, and select sensitivity tests dealing with the potential traffic and revenue impacts associated with the COVID-19 pandemic, reduced regional growth forecasts and reduced value of time assumptions.

Analytical Methodology

As part of this comprehensive traffic and revenue study, a regional travel demand model was employed to assist with the estimation of the future year transactions and toll revenue estimates. The travel demand modeling undertaken for this study utilized, as the basic modeling platform, the Denver Regional Council of Governments' (DRCOG) Focus 2.2 travel demand model. The model area covers eleven counties within the Denver metropolitan area and is divided into approximately 2,800 traffic analysis zones (TAZ). TAZs generally contain only a few blocks of residential and/or commercial properties. This allows the model to receive detailed socioeconomic data inputs, such as population, households, employment, trip characteristics, and travel behaviors and to estimate trip movements with the same level of geographic detail. The DRCOG Focus 2.2 travel demand model used in this study included a 2015 base year model and three future year models: 2020, 2030 and 2040.

The DRCOG Focus 2.2 model is an activity-based model. This modeling process differs from the traditional four-step modeling process in that it seeks to estimate trips and travel patterns based on the likely decisions and travel behaviors of individuals over the course of a typical weekday, as opposed to using trip generation assumptions based on aggregate socioeconomic and demographic estimates. This process is an improvement over the traditional four-step modeling process in that it links trips together into trip chains and can adjust sets of trips based on changes in socioeconomic assumptions and time of day preferences. Based on the trips generated through the synthesized population process, the model then develops a traditional origin and destination trip table matrix linked to the TAZs. These trip table matrices, which are provided by time period, serve as inputs to the final traffic assignment step used to develop estimates of traffic volumes by roadway link across the model highway network.

Additionally, in order to reflect current planning throughout the corridor, the road network, transit network, and land use assumptions were reviewed and updated, as described below. These updated assumptions were then incorporated into the regional travel demand model and used to generate the ultimate traffic and revenue estimates.

Land Use and Demographic Assumptions

A summary of the results of the updated socioeconomic forecasts for years 2015, 2020, 2030, and 2040 were provided in **Chapter 3**. The independent economist provided input socioeconomic data for each of the model years utilizing the standard DRCOG household and employment categories. The development of the final socioeconomic files was completed by DRCOG staff using their UrbanSim model. This tool created the needed model input tables based on the total household and total employment numbers provided by the independent economist.

Roadway and Transit Network Review

A thorough review was completed of the roadway and transit networks included in the base DRCOG travel demand models for the base and three forecasts years by subconsultant Felsburg Holt & Ullevig (FHU). Beginning with the 2015 model, a detailed assessment of the road network, functional classifications, and number of lanes was completed to ensure consistency with the existing network. The forecast year networks included in the base DRCOG models were then reviewed and compared to the fiscally constrained roadway and rapid transit capital improvements described in the DRCOG 2040 Metro Vision Regional Transportation Plan (RTP) (Cycle Year 2019). The planning document identifies new roadways, additional lanes, and additions to the transit network consistent with the current FasTracks regional rapid transit expansion plans. Special attention was given to regional projects adjacent to the project corridor as well as those projects likely to affect the traffic forecasts on E-470. This review process, the specific projects considered, and their assumed years of construction are described in greater detail later in this chapter. A listing of the regional Metro Vision projects within the study area is included as **Table 4-1** and shown graphically in **Figure 4-1**.

The toll forecasting process was designed to provide traffic revenue forecasts for 2019, 2020, 2021, 2025, 2030, 2035 and 2040. This was achieved by using the RTP to build future year models between the available years of 2015, 2020, 2030 and 2040. In order to develop E-470 forecasts that were more representative of existing travel demands throughout the system, the RTP was reviewed to determine if any projects had already been completed since the models were established in 2015. Several key projects were identified, and the improvements were added into the base 2015 travel demand model. This incorporation was designed to provide an easier comparison between 2019 count data and an updated 2019 base/calibration year model. Specific key projects identified by FHU are listed below.

Table 4-1 (Continued)
Programmed Regional Highway Improvements

Network Year of Improvement	Facility Name	From	To	Improvement	Length	Counties
2030	56th Ave.	Dunkirk St.	Himalaya St.	Widen from 4 to 6 Lanes	0.5	Denver
2030	56th Ave.	E-470	Powhaton Rd.	Widen from 2 to 6 Lanes	2.0	Adams
2030	56th Ave.	Havana St.	Pena Blvd.	Widen from 2 to 6 Lanes	4.3	Denver
2030	56th Ave.	Himalaya St.	Picadilly Rd.	Widen from 2 to 6 Lanes	1.0	Denver
2030	56th Ave.	Pena Blvd.	Tower Rd.	Widen from 4 to 6 Lanes	0.7	Denver
2030	56th Ave.	Picadilly Rd.	E-470	Widen from 2 to 6 Lanes	1.0	Adams
2030	64th Ave.	Denver/Aurora City Limit	Himalaya St.	Widen from 2 to 6 Lanes	0.5	Adams
2030	64th Ave.	Harvest Rd.	Powhaton Rd.	New 2 Lanes	1.0	Adams
2030	64th Ave.	Himalaya Rd.	Harvest Rd.	Widen from 2 to 4 Lanes	3.0	Adams
2030	64th Ave.	Powhaton Rd.	Monaghan Rd.	New 4 Lanes	1.0	Adams
2030	64th Ave.	Tower Rd.	Denver/Aurora City Limits	Widen from 2 to 4 Lanes	0.5	Denver
2030	6th Ave.	Airport Blvd.	Tower Rd.	Widen from 2 to 6 Lanes	1.0	Arapahoe
2030	6th Ave./SH 30	Tower Rd.	6th Pkwy.	Widen from 2 to 6 Lanes	1.6	Arapahoe
2030	6th Pkwy. / Steve D. Hogan	E-470	Gun Club Rd.	Widen from 2 to 6 Lanes	0.3	Arapahoe
2030	Arapahoe Rd.	Waco St.	Himalaya St.	Widen from 4 to 6 Lanes	1.3	Arapahoe
2030	Arapahoe Rd.	Himalaya Way	Liverpool St.	Widen from 4 to 6 lanes	0.5	Arapahoe
2030	Broncos Pkwy.	Jordan Rd.	Parker Rd.	Widen from 4 to 6 Lanes	0.8	Arapahoe
2030	Broncos Pkwy. (Easter Ave.)	Havana St.	Peoria St.	Widen from 4 to 6 Lanes	1.0	Arapahoe
2030	Buckley Rd.	118th Ave.	Cameron Dr.	Widen from 2 to 6 Lanes	1.3	Adams
2030	Buckley Rd.	136th Ave.	Bromley Ln.	Widen from 2 to 4 lanes	2.0	Adams
2030	C-470	Broadway	I-25	EB: Add 1 Toll/Managed Lane	6.6	Douglas
2030	C-470	Colorado Blvd.	Lucent Blvd.	WB: Add 1 Toll/Managed Lane	3.7	Douglas
2030	C-470	S. Kipling Pkwy.	Wadsworth Blvd.	EB: Add 1 Toll/Managed Lane	3.0	Jefferson
2030	C-470	Wadsworth Blvd.	S. Kipling Pkwy.	WB: Add 1 Toll/Managed Lane	1.4	Jefferson
2030	Chambers Rd.	Main Street	Lincoln Ave.	Widen from 2 to 4 Lanes	1.4	Douglas
2030	E. Bromley Ln.	Tower Rd.	I-76	Widen from 4 to 6 Lanes	1.1	Adams
2030	E. Bromley Ln.	Hwy 85	Sable Blvd.	Widen from 4 to 6 Lanes	0.5	Adams
2030	E-470	88th Ave.		Add New Interchange		Adams
2030	E-470	I-25 South	Parker Rd.	Widen from 6 to 8 Lanes	5.5	Arapahoe
2030	E-470	Pena Blvd.	I-76	Widen from 4 to 6 anes	7.6	Adams/Denver
2030	E-470	I-70		Interchange Rebuild Completion /		Adams
2030	Green Valley Ranch Blvd.	Chambers Rd.	Pena Blvd.	Widen from 2 to 4 Lanes	1.0	Denver
2030	Green Valley Ranch Blvd.	Telluride St.	Tower Rd.	Widen from 4 to 6 Lanes	0.5	Denver
2030	Gun Club Rd.	1.5 Miles s/of Quincy Ave.	Quincy Ave.	Widen from 2 to 6 Lanes	1.6	Arapahoe
2030	Hampden Ave.	Picadilly Rd.	Gun Club Rd.	Widen from 2 to 4 Lanes	1.1	Arapahoe
2030	Harvest Mile Rd.	56th Ave.	64th Ave.	New 3 Lanes	1.0	Adams
2030	Harvest Mile Rd.	I-70	26th Ave.	New 2/4 Lanes	1.5	Adams
2030	Harvest Mile Rd.	48th Ave	56th Ave	New 6 Lanes	1.2	Adams

Table 4-1 (Continued)
Programmed Regional Highway Improvements

Network Year of Improvement	Facility Name	From	To	Improvement	Length	Counties
2030	Harvest Rd.	6th Ave.	I-70	New 6 Lanes	1.1	Adams
2030	Harvest Rd.	Alameda Ave.	6th Ave.	Widen from 3 to 6 Lanes	1.0	Arapahoe
2030	Huron St.	150th Ave.	160th Ave.	Widen from 2 to 4 lanes	1.3	Broomfield
2030	Huron St.	160th Ave.	SH-7	Widen from 2 to 4 lanes	1.2	Broomfield
2030	I-25	120th Ave.	SH-7	Add 1 Toll/Managed Lane each direction	6.0	Adams/Broomfield
2030	I-25	84th Ave.	Thornton Pkwy.	Add 1 New Lane Each Direction	2.8	Adams
2030	I-70	Harvest Rd.		Add New Interchange		Adams/Arapahoe
2030	I-70	I-25	Chambers Rd.	Add 2 New Managed Lanes	3.8	Denver/Adams
2030	I-70	Picadilly Rd.		Add New Interchange		Adams
2030	I-76	Bridge St		New Interchange		Adams
2030	Jewell Ave.	E-470	Gun Club Rd.	Widen from 2 to 6 Lanes	0.5	Arapahoe
2030	Jewell Ave.	Gun Club Rd.	Harvest Rd.	Widen from 2 to 6 Lanes	1.0	Arapahoe
2030	Jewell Ave.	Himalaya Rd.	E-470	Widen from 3 to 6 Lanes	1.4	Arapahoe
2030	Lincoln Ave.	Keystone Blvd.	Parker Rd.	Widen from 4 to 6 Lanes	1.6	Douglas
2030	Lincoln Ave.	Peoria St.	1st Ave.	Widen from 4 to 6 Lanes	0.7	Douglas
2030	Lincoln Ave.	1st St.	Keystone Blvd.	Widen from 4 to 6 Lanes	1.8	Douglas
2030	Pena Blvd.	Jackson Gap St. West Ramps	DIA Terminal	Widen from 6 to 8 Lanes	1.7	Denver
2030	Pena Blvd.	I-70	E-470	Widen from 4 to 8 Lanes	6.4	Denver
2030	Pena Blvd.	E-470	Jackson Gap St.	Widen from 6 to 8 Lanes	2.9	Denver
2030	Peoria St.	E-470	.75 miles s/o Lincoln Ave.	Widen from 2 to 4 Lanes	1.9	Douglas
2030	Picadilly Rd.	48th Ave.	56th Ave.	Widen from 2 to 6 lanes	1.2	Adams
2030	Picadilly Rd.	56th Ave.	70th Ave./Aurora City Limits	New 6 Lanes	1.7	Adams
2030	Picadilly Rd.	6th Ave.	Colfax Ave.	Widen from 2 to 6 Lanes	1.6	Arapahoe
2030	Picadilly Rd.	70th Ave.	82nd Ave.	New 6 Lanes	1.5	Denver
2030	Picadilly Rd.	Colfax Ave.	I-70	New 6 Lanes	0.3	Adams
2030	Picadilly Rd.	I-70	Smith Rd.	Widen from 2 to 6 Lanes	0.5	Adams
2030	Picadilly Rd.	Smith Rd.	48th Ave.	Widen from 2 to 6 Lanes	2.2	Adams
2030	Powhaton Rd.	26th Ave.	48th Ave	New 6 Lanes	2.0	Adams
2030	Quebec St.	120th Ave.	128th Ave.	Widen from 2 to 4 Lanes	1.0	Adams
2030	Quebec St.	132nd Ave.	160th Ave.	Widen from 2 to 4 Lanes	3.5	Adams
2030	Quincy Ave.	Plains Pkwy./Copperleaf Blvd.	Gun Club Rd.	Widen from 2 to 6 Lanes	0.6	Arapahoe
2030	Ridgegate Pkwy. (Mainstreet)	Havana St.	Lone Tree E. City Limit	Widen from 2 to 4 Lanes	1.8	Douglas
2030	SH-30	Steve D. Hogan Pkwy	Mississippi Ave.	Widen from 2 to 4 Lanes	2.2	Arapahoe
2030	SH-7	Sheridan Pkwy.	I-25	Widen from 2 to 6 Lanes	1.5	Broomfield
2030	SH-7	164th Ave.	Dahlia St.	Widen from 2 to 4 Lanes	2.2	Adams
2030	SH-7	York St	Big Dry Creek	Widen from 2 to 4 Lanes	0.7	Adams
2030	Tower Rd.	48th Ave.	56th Ave.	Widen from 4 to 6 Lanes	1.0	Denver
2030	Tower Rd.	56th Ave.	Pena Blvd.	Widen from 4 to 6 Lanes	2.4	Denver

Table 4-1 (Continued)
Programmed Regional Highway Improvements

Network Year of Improvement	Facility Name	From	To	Improvement	Length	Counties
2030	Tower Rd.	6th Ave.	Colfax Ave.	New 2 Lanes	1.0	Arapahoe
2030	Tower Rd.	Colfax Ave.	Smith Rd.	Widen from 2 to 6 Lanes	1.0	Adams
2030	Tower Rd.	Pena Blvd.	104th Ave.	Widen from 4 to 6 Lanes	3.8	Adams
2030	Tower/Buckley Rd.	105th Ave.	118th Ave.	New 4 Lanes	2.0	Adams
2030	US-85	104th Ave		New Interchange		Adams
2030	US-85	120th Ave		New Interchange		Adams
2030	Washington St.	152nd Ave.	160 Ave.	Widen from 2 to 4 Lanes	1.4	Adams
2030	York St.	160th Ave. (SH-7)	168th Ave.	Widen from 2 to 4 Lanes	1.0	Adams
2030	York St.	E-470	SH-7	Widen from 2 to 4 Lanes	0.7	Adams
2035	48th Ave.	Imboden Rd.	Quail Run Rd.	Widen from 2 to 6 Lanes	1.0	Adams
2035	6th Pkwy.	SH-30	E-470	Widen from 2 to 6 Lanes	1.3	Arapahoe
2035	E-470	112th Ave.		Add New Interchange		Adams
2035	E-470	I-25 North	I-76	Widen from 4 to 6 Lanes	11.0	Adams
2035	E-470	Parker Rd.	Smoky Hill Rd.	Widen from 6 to 8 lanes	5.4	Arapahoe/Douglas
2035	E-470	Smoky Hill Rd.	I-70	Widen from 6 to 8 lanes	9.7	Arapahoe
2035	E-470	I-76		Ramp - NB E-470 to WB I-76		Adams
2035	E-470	I-76	US 85	Widen from 3 to 6 lanes	2.8	Adams
2035	Hampden Ave./Havana St. (SH-	Florence St.	s/o Yale Ave.	Widen from 5 to 6 Lanes	1.4	Denver
2035	I-70	E-470		Interchange Capacity		Adams/Arapahoe
2035	Main Street	Lone Tree E. City Limit	Chambers Rd.	Widen from 2 to 4 lanes	0.9	Douglas
2040	120th Ave.	E-470	Picadilly Rd.	Widen from 2 to 6 Lanes	2.6	Adams
2040	120th Ave.	Sable Blvd.	E-470	Widen from 2 to 6 Lanes	2.0	Adams
2040	152nd Ave.	Washington St.	York St.	Widen from 2 to 4 Lanes	1.2	Adams
2040	48th Ave.	Powhaton Rd.	Monaghan Rd.	Widen from 2 to 4 Lanes	1.0	Adams
2040	56th Ave.	Powhaton Rd.	Imboden Rd.	Widen from 2 to 4 Lanes	5.0	Adams
2040	64th Ave.	Harvest Rd.	Powhaton Rd.	Widen from 2 to 4 Lanes	1.0	Adams
2040	64th Ave.	Himalaya Rd.	Harvest Rd.	Widen from 4 to 6 lanes	3.0	Adams
2040	96th Ave.	SH-2	Tower Road	Widen from 2 to 4 Lanes	5.0	Adams
2040	96th Ave.	Tower Rd.	Picadilly Rd.	Widen from 2 to 6 Lanes	2.0	Adams
2040	Colorado Blvd.	144th Ave.	168th Ave.	Widen from 0/2 to 4 Lanes	3.7	Adams
2040	E-470	Potomac		Add New Interchange		Adams
2040	E-470	I-76		Ramp - WB I-76 to NB E-470		Adams
2040	E-470	US 85	I-25 N	Widen from 3 to 6 lanes	8.2	Adams
2040	E-470	Pena Blvd.	I-76	Widen from 6 to 8 Lanes	7.6	Adams/Denver
2040	Gun Club Rd.	Yale Ave.	Mississippi Ave.	Widen from 2/4 to 6 Lanes	2.1	Arapahoe
2040	Harvest Mile Rd.	56th Ave.	64th Ave.	Widen from 3 to 6 Lanes	1.0	Adams
2040	Harvest Mile Rd.	I-70	26th Ave.	Widen from 4 to 6 lanes	1.5	Adams
2040	Harvest Mile Rd.	56th Ave.	64th Ave.	Widen from 3 to 6 lanes	1.0	Adams

Table 4-1 (Continued)
Programmed Regional Highway Improvements

Network Year of Improvement	Facility Name	From	To	Improvement	Length	Counties
2040	Harvest Rd.	Jewell Ave.	Mississippi Ave.	Widen from 2 to 6 lanes	1.0	Arapahoe
2040	I-225	I-25	Yosemite St.	Interchange Capacity		Denver
2040	I-270	I-25	I-70	Widen from 4 to 6 lanes		Adams
2040	Imboden Rd.	48th Ave.	56th Ave.	Widen from 2 to 4 Lanes	1.0	Adams
2040	Monaghan Rd.	Quincy Ave.	Yale Ave.	New 6 Lanes	2.0	Arapahoe
2040	Monaghan Rd.	26th Ave.	56th Ave.	Widen from 2 to 4 Lanes	5.0	Arapahoe
2040	Monaghan Rd.	56th Ave.	64th Ave.	New 4 Lanes	5.0	Arapahoe
2040	Parker Rd. (SH-83)	Quincy Ave.	Hampden Ave.	Widen from 6 to 8 Lanes	1.0	Arapahoe
2040	Peoria St.	.75 miles s/o Lincoln Ave.	Main Street	Widen from 2 to 4 Lanes	0.5	Douglas
2040	Picadilly Rd.	82nd Ave.	96th Ave.	New 6 Lanes	1.8	Adams
2040	Picadilly Rd.	96th Ave.	120th Ave.	New 6 Lanes	3.0	Adams
2040	Powhaton Rd.	Smoky Hill Rd.	County Line Rd.	Widen from 2 to 6 Lanes	1.0	Arapahoe
2040	Quail Run Rd.	I-70	48th Ave.	New 4 Lanes	3.0	Adams
2040	Quincy Ave.	Hayesmount Rd.	Watkins Rd.	Widen from 2 to 6 Lanes	2.0	Arapahoe
2040	Quincy Ave.	Monaghan Rd.	Hayesmount Rd.	Widen from 2 to 6 Lanes	1.1	Arapahoe
2040	SH-7	Riverdale Rd.	US-85	Widen from 2 to 4 Lanes	1.1	Adams
2040	Smoky Hill Rd.	Pheasant Run Pkwy.	Versailles Pkwy.	Widen from 4 to 6 Lanes	4.4	Arapahoe
2040	Tower Rd.	6th Ave.	Colfax Ave.	Widen from 2 to 6 Lanes	1.0	Arapahoe
2040	Watkins Rd.	Quincy Ave.	I-70	Widen from 2 to 6 Lanes	7.1	Arapahoe
2040	Yale Ave.	Monaghan Rd.	Hayesmount Rd.	Widen from 2 to 6 Lanes	1.1	Arapahoe
2040	York St.	152nd Ave.	E-470	Widen from 2 to 4 Lanes	0.2	Adams

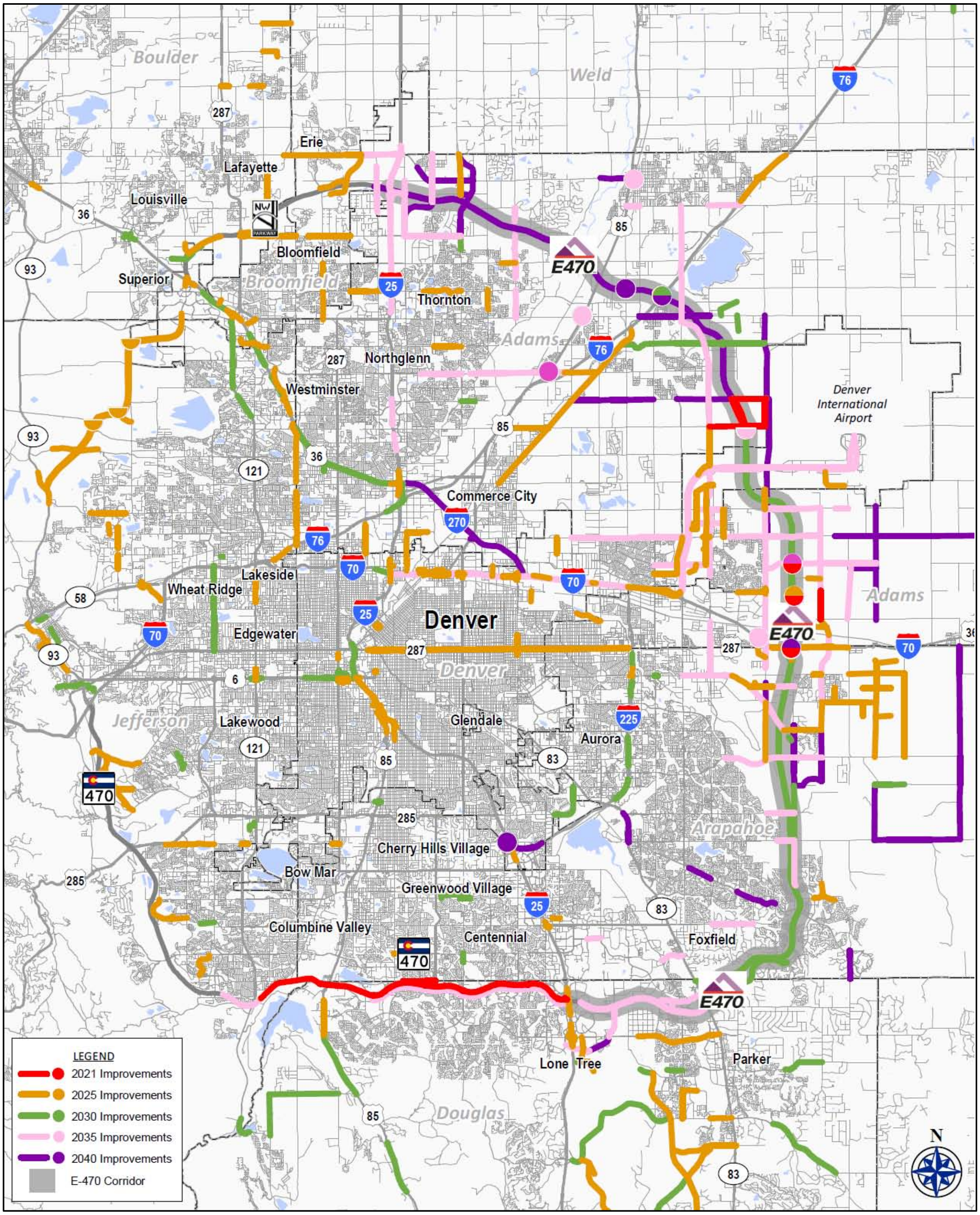


Figure 4-1
Programmed Regional Highway Improvements

- **I-25 Widening** – Widening between Ridge Gate Parkway and County Line Road was completed in 2016. This project increased the number of through lanes from six to eight.
- **E-470 Widening** – Widening between Parker Road and Quincy Avenue was completed in 2018. This project increased the number of through lanes from four to six.
- **I-25 Managed Lanes** – A single new managed lane in each direction was added between US 36 and 120th Avenue, with the improvement opening in 2016.
- **US 36 Managed Lanes** – A single new managed lane in each direction was added between I-25 and Table Mesa Drive, with the improvement opening in 2015.

Five specific future-year corridor improvements were explored based on their relation to the RTP listing. These improvements represent significant regional improvements throughout the region and were incorporated into the future year highway networks.

- **Jefferson Parkway** – The DRCOG RTP listing included the Jefferson Corridor and Interlocken Loop improvements associated with the extension of the Northwest Parkway and addition of Jefferson Parkway.
- **I-70 East Widening** – The CDOT has begun construction of a major widening project between I-25 and Chambers Road. Improvements to I-70 between I-25 and Chambers Road have been scheduled for completion by 2024 and include the addition of a new managed lane in each direction.
- **I-270 Widening** – The DRCOG RTP listing includes widening from four to six lanes between I-25 and I-70 sometime between 2030 and 2040.
- **C-470 Toll Express Lanes** – Construction is well underway for widening of C-470. While construction is behind schedule, it is expected to be completed Spring 2020. The project includes managed lanes between Wadsworth Boulevard and I-25 in each direction, with two westbound managed lanes between I-25 and Colorado Boulevard, one westbound lane continuing to Wadsworth Boulevard, and one eastbound managed lane for the entire length. A second stage of development provides a second westbound managed lane for the eastern portion of the corridor and extends the facility as a single managed lane to Kipling Street. This second stage is expected to be complete by 2029.
- **I-25 Managed Lanes Extension** – The DRCOG RTP listing includes the extensions of the single managed lanes in each direction along I-25 between 120th Avenue and SH 7, and 84th Avenue to Thornton Parkway.

In addition to the RTP project listing, one additional known improvement was included in the travel demand modeling based on the project's high likelihood of occurrence and proximity to the study corridor. This project is the construction of Aurora Parkway between Quemoy Way and Parker Road. This project is development driven and developer built and will provide a six-lane parallel facility to E-470 running between the Parker Road and Gartrell Road interchanges.

As in prior RTP documents, the current RTP does not provide the estimated project completion date for future year highway improvements. Instead, the plan indicates whether anticipated future year highway improvements should be included in the 2030 or 2040 model networks. Where project opening dates were known, as in the case of planned E-470 improvements, the impacts of improvement were applied in that year. For the RTP planned improvements, these impacts were applied in 2030 or 2040, as indicated in the planning documents.

Although listed among the highway improvements included in **Table 4-1** and **Figure 4-1** (previously shown), the programmed E-470 widenings and interchange improvements are worth specifically reviewing due to their direct impact to transactions on the system. Assumed E-470 widening and interchange improvements, based on information provided by E-470 staff, include:

Assumed E-470 Widenings

- 2021 - Quincy Avenue to I-70 - 2 to 3 lanes per direction
- 2024 - I-70 to Peña Boulevard - 2 to 3 lanes per direction
- 2027 - Peña Boulevard to I-76 - 2 to 3 lanes per direction
- 2029 - I-25 (South End) to Parker Road - 3 to 4 lanes per direction
- 2031 - Parker Road to Smoky Hill Road - 3 to 4 lanes per direction
- 2033 - Smoky Hill to I-70 - 3 to 4 lanes per direction
- 2035 - I-76 to US 85 - 2 to 3 lanes per direction
- 2038 - US 85 to I-25 (North End) - 2 to 3 lanes per direction
- 2040 - Peña Boulevard to I-76 - 3 to 4 lanes per direction

Assumed E-470 Interchange Improvements

- 2023 - Construct EB I-70 to SB E-470 Ramp
- 2024 - Construct Diamond Interchange at 38th Avenue
- 2026 - Construct Diamond Interchange at 88th Avenue
- 2030 - Completion of I-70 Interchange (Direct Connect Ramps)
- 2031 - Construct Diamond Interchange at 112th Avenue
- 2035 - Construct NB E-470 to WB I-76 Ramp
- 2036 - Construct Diamond Interchange at Potomac Avenue
- 2040 - Construct WB I-76 to NB E-470 Ramp

These improvements were paid special attention to during the travel demand modeling process due to their impact on transactions and toll revenues. It is worth noting that these projects assume the addition of four new tolled interchanges, new direct ramps to two major interstates, and the effective addition of at least one travel lane to the full E-470. These changes represent a major upgrade to the E-470 system, expanding capacity and providing new movements, which have been reflected in the ultimate transactions and toll revenue forecasts.

Toll Structure

Based on the Current E-470 toll rate assumptions for toll locations, toll rates and method of toll payment participation rates were developed. These assumptions are presented in this section.

Payment Types

Since July 4, 2009, E-470 has employed an entirely cashless toll collection system, providing two methods of toll payment: ExpressToll, and License Plate Toll (LPT). For ExpressToll transactions, the customer is issued a transponder tag that is read by overhead equipment at the toll gantries. The appropriate toll is then automatically debited from their ExpressToll account, which is replenished as needed automatically for credit card accounts and via mailed invoice for check-paying customers. With LPT, a picture of the customer's license plate is taken and using this license plate number, the Authority attempts to recover the vehicle owner's information from the Department of Motor Vehicles. As an incentive to encourage customers to sign-up for ExpressToll, a roughly 37 percent toll discount (exact discount percentages vary by gantry) is provided compared with the LPT rates, based on the Current toll structure. This percent ExpressToll discount is assumed to be retained through the forecast period.

Toll Collection Percentages by Payment Type

Table 4-2 provides the traffic model assumptions for the percentage of ExpressToll and LPT customers used as part of the 2019 traffic model calibration based on the Current toll rate structure. These were based on historic trends and anticipated future increases in ExpressToll participation. These assumptions were used as input to the traffic modeling process for each model year and represent the total ExpressToll market participation for the model area. As shown in Table 4-2, estimated ExpressToll participation rates are assumed to remain relatively constant over the model forecast period based on recent trends, along with proposed changes to toll rate structure, which are discussed below.

Table 4-2
ExpressToll Market Participation Rates

	Percent of Total Transactions	
Year	Average Day	Average Weekday / Model Input
2019 [1]	72.9	73.4
2021	73.4	74.3
2025	74.3	74.6
2030	74.3	74.6
2035	74.5	74.8
2040	74.7	75.0

[1] Actual.

Toll Rates

E-470 currently has 22 toll locations; five mainline toll gantries and 17 toll gantries strategically located at E-470 ramps/interchanges. As presented in **Table 4-3**, the toll rate at the mainline toll locations in both 2019 and 2020 was $2.70 at Toll Gantries A and C, and $2.95 at Toll Gantries B, D, and E for ExpressToll passenger cars, representing a cost of $0.30 per mile for a 47-mile full-length trip on E-470. Toll rates for LPT passenger car customers are $4.30 at Toll Gantries A and C, and $4.65 at Toll Gantries B, D, and E, meaning that ExpressToll customers are provided a roughly 37 percent discount over LPT toll rates. Commercial vehicles are charged by the axle based on a modified "N-1" system. Beyond 2-axles, each additional axle is charged at roughly 90 percent of the 2-axle vehicle toll. For modeling purposes, the average toll rate for commercial vehicles was used based on the average number of axles observed at mainline toll locations. This average commercial vehicle full toll rate was roughly 3.2 times the passenger car rate. As part of a two-year pilot program, a 20 percent discount is also provided to 3-or-more axle ExpressToll vehicles between 9:00 AM and 12:00 PM. These discounted commercial vehicle toll rates were not included in the traffic assignment process due to the low volume of trucks. Instead, the discounted toll rate was incorporated into the revenue forecasts as a post-processing adjustment after the modeling assignment process. At ramp toll locations, the toll rate in 2019 and 2020 was $1.25 for ExpressToll and $2.05 for LPT customers. Passenger cars and commercial vehicles pay the same toll rate at all the ramp toll locations.

Table 4-3
Passenger Car Toll Rate Assumptions

Year	Method of Payment	Toll Location: Gantry A	Gantry B	Gantry C	Gantry D	Gantry E	Toll Ramps
2019	ExpressToll	$ 2.70	$ 2.95	$ 2.70	$ 2.95	$ 2.95	$ 1.25
	LicensePlateToll	$ 4.30	$ 4.65	$ 4.30	$ 4.65	$ 4.65	$ 2.05
2020 (1)	ExpressToll	$ 2.70	$ 2.95	$ 2.70	$ 2.95	$ 2.95	$ 1.25
	LicensePlateToll	$ 4.30	$ 4.65	$ 4.30	$ 4.65	$ 4.65	$ 2.05
2021	ExpressToll	$ 2.70	$ 2.95	$ 2.70	$ 2.95	$ 2.95	$ 1.25
	LicensePlateToll	$ 4.30	$ 4.65	$ 4.30	$ 4.65	$ 4.65	$ 2.05
2025 (2)	ExpressToll	$ 2.75	$ 3.00	$ 2.75	$ 3.00	$ 3.00	$ 1.30
	LicensePlateToll	$ 4.40	$ 4.80	$ 4.40	$ 4.80	$ 4.80	$ 2.05
2030 (2)	ExpressToll	$ 2.80	$ 3.05	$ 2.80	$ 3.05	$ 3.05	$ 1.35
	LicensePlateToll	$ 4.45	$ 4.85	$ 4.45	$ 4.85	$ 4.85	$ 2.15
2035 (2)	ExpressToll	$ 2.85	$ 3.10	$ 2.85	$ 3.10	$ 3.10	$ 1.40
	LicensePlateToll	$ 4.55	$ 4.95	$ 4.55	$ 4.95	$ 4.95	$ 2.25
2040 (2)	ExpressToll	$ 2.90	$ 3.15	$ 2.90	$ 3.15	$ 3.15	$ 1.45
	LicensePlateToll	$ 4.60	$ 5.00	$ 4.60	$ 5.00	$ 5.00	$ 2.30

(1) Toll rates effective January 1, 2020.
(2) Toll rate adjustments based on a 2 percent increase and assumed to be effective on January 1.

Based on discussions with E-470 Staff, the future year toll rates were set to assume a 2 percent increase every five years. Additionally, current toll rate differentials between ExpressToll and LPT and between passenger cars and commercial vehicles are assumed to be maintained through the forecast period. As presented in Table 4-3, the toll rate at the mainline toll locations under these assumptions will be $2.90 at Toll Gantries A and C, and $3.15 at Toll Gantries B, D, and E by

2040 for ExpressToll passenger cars. These 2040 toll rates represent a cost of $0.32 per mile for a 47-mile full-length trip on E-470. Toll rates in 2040 for LPT passenger car customers based on these assumptions will be $4.60 at Toll Gantries A and C, and $5.00 at Toll Gantries B, D, and E. At ramp toll locations, the toll rate in 2040 will be $1.45 for ExpressToll and $2.30 for LPT customers based on these toll rate assumptions. It was also assumed that passenger cars and commercial vehicles will continue to pay the same toll rate at the ramp toll locations through the forecast period.

Vehicle Operating Costs and Values of Time

In addition to tolls, two major costs are considered when calculating the total cost of a trip in CDM Smith's toll diversion models. Vehicle operating costs consider drivers' perception of the wear and tear on a vehicle as expressed in maintenance costs, tires, and other variable costs such as fuel. Value of time (VOT) is the cost per minute of a specific trip as perceived by the traveler.

Vehicle Operating Costs

For the estimation of the vehicle operating costs, past studies by CDM Smith have shown that drivers perceive primarily the fuel cost in decisions regarding trip path, but also give some consideration to other usage-related costs, such as maintenance, oil, and tires at a discounted level. Factors such as depreciation and insurance were not included in the vehicle operating cost estimate. A vehicle operating cost of $0.205 per mile for passenger cars in 2019 was assumed. The 2019 vehicle operating cost was then inflated at a rate of 2.0 percent per year through 2040. These inflation rates were based on an analysis of gas price forecasts from the Energy Information Administration (EIA) as well as fuel efficiency improvements based on current national CAFÉ standards. Operating costs of truck traffic were assumed at 3 times the operating cost of passenger cars. The estimated vehicle operating costs used in this study are shown in **Table 4-4**.

Table 4-4
Estimated Vehicle Operating Costs

	Estimated Vehicle Operating Costs	
Model Year	Passenger Car	Truck
2019	$ 0.205	$ 0.615
2020	0.209	0.627
2021	0.213	0.640
2025	0.231	0.693
2030	0.255	0.765
2035	0.281	0.844
2040	0.311	0.932

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Values of Time

Motorists' perception of their Value of Time (VOT) is another key component of the decision to use a toll facility or an alternative route. Refinement of VOT was done based on counts for the model area and benchmarked to the 2019 calibration year. For this study, a VOT Matrix representing the estimated VOT for each zone-to-zone movement was developed. This was achieved by combining the VOTs developed from Stated Preference (SP) surveys conducted as part of the 2017 Investment-Grade Traffic and Revenue Study, county-level VOTs generated based on data obtained from the U.S. Census Bureau American Community Survey, information from initial model validation runs to estimate the current share of eligible trips using the toll road, and estimated shares by trip purpose from the regional travel demand model. Through this process, the relationships between income and VOT, as well as between peak and non-peak period trips obtained from the prior SP surveys were applied to the county-level VOTs developed using the U.S. Census Bureau data. This was done to normalize the VOTs to average incomes in the Denver region. This process produced an estimated value of time of $0.320 per minute, or $19.22 per hour at 2019 levels.

An additional VOT adjustment for trips using the Denver International Airport was incorporated into the zonal VOT assumptions. Based on the 2017 SP surveys, airport trips possessed a higher VOT than other trip purposes. This is because the need to reach the destination on time is greater for airport trips than for other trips. In recognition of this finding, as well as the relative importance of trips to and from Denver International Airport using E-470, a minimum VOT of $0.446 per minute was applied to all airport trips regardless of zone origin or destination. This value was estimated based on the trip-purpose level VOT estimates obtained from the SP survey.

As with VOC, the 2019 average values of time were inflated by 2.0 percent per year through 2040 based on a review of average annual increases in Consumer Price Index (CPI) rates for the Denver Metro Area. We believe this is a conservative assumption in the traffic and revenue forecasts since it does not assume any real increases in VOT due to real income growth within the region. The value of time for commercial vehicle trips was assumed to be 3.0 times the value for passenger cars. The resulting estimates of VOT are provided in **Table 4-5**.

Table 4-5
Estimated Average Values of Time

	Value of Time	
Model Year	Per Minute	Per Hour
2019	$ 0.320	$ 19.22
2020	0.327	19.61
2021	0.333	20.00
2025	0.361	21.65
2030	0.398	23.90
2035	0.440	26.39
2040	0.486	29.14

Model Development

The most recent version of the DRCOG Focus 2.2 travel demand model was run using the modified land use as described in **Chapter 3** and the updated network assumptions described above to develop trip tables for 2015 and three forecast years: 2020, 2030, and 2040. The resulting trip tables were then exported from the model and used by CDM Smith in its Cube Voyager travel demand model platform for the model calibration and traffic forecasting process described in the following sections.

Adaptation of Trip Tables

For the purposes of the travel demand model, the original trip matrices developed by FHU and DRCOG based on the updated socioeconomic inputs were disaggregated into two payment type categories: the electronic toll collection (ETC) payment type consisted of ExpressToll customers, while the non-ETC payment type consisted of LPT customers. This was done in order to perform traffic assignments based on method of toll payment using CDM Smith's proprietary toll diversion algorithms. Based on prior study experience, this adjustment improves the modeling, calibration and traffic and revenue forecasts and produces results that more accurately reflect actual traffic conditions.

The DRCOG Focus 2.2 model also employs a time-of-day model, meaning that the model is run separately for various time periods. Specifically, the model was developed with ten time periods. Since hourly traffic volumes were not necessary at this level of analysis, these time periods were aggregated into four:

- AM peak period (6:30 AM – 9:00 AM);
- Midday period (9:00 AM – 3:00 PM);
- PM peak period (3:00 PM - 7:00 PM); and
- Nighttime period (7:00 PM – 6:30 AM).

This adjustment allowed for a simplification of the modelling process while maintaining a distinction in hourly variations in congestion typical of urban toll facilities.

Model Calibration

Following the development of trip tables based on the revised socioeconomic and highway improvement inputs, as well as the adjustments previously described, traffic assignments were run at 2019 levels. These assignments served as the starting point for the model calibration process, which included a comparison of network speeds, non-toll road volumes and volumes on E-470 against the most recently available actual traffic counts. The goal of the calibration and validation process was to have the model assign 2019 traffic volumes that reasonably replicated the actual 2019 average weekday traffic (AWDT) volumes on E-470 and other major roadways. Model outputs were reviewed to ensure that volumes approximated, as closely as possible, the 2019 balanced traffic profile, specifically at the five mainline toll gantry locations. Moreover, model assignment outputs were reviewed to ensure that the E-470 market share across several screenlines, approximated the actual market share observed in the count data collected.

As calibration progressed, additional minor adjustments and corrections to the model inputs were made in an attempt to obtain a better fit between the actual 2019 AWDT volumes and the assigned volumes. These adjustments included the correction of highway network errors, minor capacity or input speed changes, and adjustments to specific movements within the trip tables. These adjustments were based upon the posted and observed speed data, as well as professional judgment based on experience with traffic modeling in the Denver region.

Several assessments of the reasonableness of the traffic assignments in light of the actual 2019 AWDT volumes and observed travel speeds were conducted. Among these assessments was a comparison of the 2019 model output volumes against actual 2019 AWDT volumes along five project screenlines, which have been previously depicted in **Figure 2-3** of **Chapter 2, Traffic and Revenue Trends and Conditions**. The results of the comparison are provided in **Table 4-6**.

In general, the results of the traffic assignments indicated that, across the various screenlines and at the E-470 mainline toll locations, the updated travel demand model performed reasonably well. Specifically, total screenline model volumes ranged between -2.1 and 14.7 percent of actual screenline counts, with the largest differences in volume occurring at Screenline B. At the E-470 mainline toll gantries, the adjusted model produced volumes ranging between -4.7 percent (Toll Gantry C) and 7.3 percent (Toll Gantry A) of actual 2019 AWDT volumes. These represent differences of -1,610 and 3,930 vehicles per weekday, respectively. Based on these results, it was determined that the updated travel demand model was able to reasonably estimate the relative impacts of various tolling scenarios and highway improvements. Within the limitations of travel demand, the results of the calibration indicated that the updated travel demand model was a good tool for developing the transaction and toll revenue forecasts in combination with professional judgment and historical performance of the E-470.

Traffic Diversion Analysis

Following calibration of the model, future trip tables at 2021, 2025, 2030, 2035 and 2040 levels were developed based on the updated socioeconomic assumptions provided by the independent economist and described further in Chapter 3. These trip tables also incorporated the calibration adjustments made to the 2019 trip tables.

Traffic assignments were generated using CDM Smith's proprietary diversion assignment technique. This process involves comparing travel times and distances for each zone-to-zone movement using E-470 (if appropriate) with the best available toll-free alternate route. The estimated traffic that would be expected to use E-470 is a function of travel time and distance savings, the assumed monetary value of these savings, and the toll rate being tested in any given assignment. In general, as the total cost to use E-470 increases, the traffic on it decreases. A series of traffic assignments were run for future years 2021, 2025, 2030, 2035 and 2040 based on the ExpressToll participation rates, assumed tolls, estimated future year VOT and VOC values. The relative impacts of input assumptions between model years were applied to the actual balanced 2019 AWDT profile and form the basis for the estimated traffic and revenue forecasts provided in this analysis.

Table 4-6
Comparison of 2019 Average Weekday Screenline Counts and 2019 Traffic Model Volumes at Selected Locations

Screenline	Street Name	Location	2019 Actual Average Weekday Volumes	2019 Model Average Weekday Volumes	Difference	
					Number	Percent
A	I-25	North of SH 30 / E Hampden Ave.	258,250	287,980	29,730	11.5
	SH 30	South of E Dartmouth Ave.	45,990	45,630	(360)	-0.8
	I-225	Southwest of SH 83 / Parker Rd.	155,330	228,510	73,180	47.1
	Dam Rd.	Southwest of SH 83 / Parker Rd.	10,960	1,720	(9,240)	-84.3
	SH 88 / E Arapahoe Rd.	East of S Peroia St.	73,920	62,590	(11,330)	-15.3
	E Broncos Pkwy.	West of S Potomac St.	24,800	21,380	(3,420)	-13.8
	E County Line Rd.	East of Concord Center Dr.	10,270	6,270	(4,000)	-38.9
	Compark Blvd.	East of Concord Center Dr.	6,580	1,770	(4,810)	-73.1
	E-470	**Toll Gantry A [(1)]**	**53,850**	**57,780**	**3,930**	**7.3**
	E Lincoln Ave.	East of S Peoria St.	42,240	44,530	2,290	5.4
	Ridgegate Pkwy.	East of S Peoria St.	19,090	20,660	1,570	8.2
	Hess Rd.	East of S Havana St.	9,730	9,030	(700)	-7.2
	Total Screenline A		**711,010**	**787,850**	**76,840**	**10.8**
B	I-25	South of SH 6 / 6th Ave.	244,730	287,040	42,310	17.3
	SH 2 / S Colorado Blvd.	South of E 1st Ave.	55,860	50,930	(4,930)	-8.8
	SH 30 / S Havana St.	North of SH 83 / S Parker Rd.	33,500	39,090	5,590	16.7
	S Peoria St.	South of E Iliff Ave.	24,570	31,340	6,770	27.6
	I-225	North of SH 83 / S Parker Rd.	145,370	186,840	41,470	28.5
	S Chambers Blvd.	South of E Iliff Ave.	34,970	43,770	8,800	25.2
	S Buckley Rd.	South of E Iliff Ave.	30,850	31,290	440	1.4
	S Tower Rd.	South of E Iliff Ave.	28,290	31,710	3,420	12.1
	S Dunkirk St.	South of E Iliff Ave.	5,210	6,300	1,090	20.9
	E-470	**Toll Gantry B**	**46,270**	**48,020**	**1,750**	**3.8**
	SH 30 / S Gun Club Rd.	South of E Jewell Ave.	22,090	14,320	(7,770)	-35.2
	Total Screenline B		**671,710**	**770,650**	**98,940**	**14.7**
C	I-25	North of I-70	234,860	227,550	(7,310)	-3.1
	SH 265 / Brighton Blvd.	South of York St.	7,130	5,100	(2,030)	-28.5
	SH 6 / Vasquez Blvd.	North of I-70	23,510	26,360	2,850	12.1
	SH 2 / Colorado Blvd.	North of I-70	35,420	29,220	(6,200)	-17.5
	I-270	North of I-70	89,870	113,650	23,780	26.5
	Central Park Blvd.	North of I-70	31,990	21,670	(10,320)	-32.3
	Havana St.	North of I-70	31,420	28,030	(3,390)	-10.8
	Peoria St.	North of I-70	42,550	42,810	260	0.6
	Chambers Rd.	North of E 40th Ave.	39,120	36,760	(2,360)	-6.0
	Pena Blvd.	North of E 40th Ave.	126,620	150,370	23,750	18.8
	Tower Rd.	South of Green Valley Ranch Blvd.	25,660	9,950	(15,710)	-61.2
	Picadilly Rd.	South of Green Valley Ranch Blvd.	4,840	1,700	(3,140)	-64.9
	E-470	**Toll Gantry C**	**34,250**	**32,640**	**(1,610)**	**-4.7**
	Mohegan Rd.	South of E 56th Ave	930	4,310	3,380	363.4
	Total Screenline C		**728,170**	**730,120**	**1,950**	**0.3**
D	I-25	South of E 88th Ave.	175,320	173,960	(1,360)	-0.8
	I-76	South of E 88th Ave.	91,850	120,660	28,810	31.4
	Brighton Rd.	South of E 88th Ave.	4,800	5,710	910	19.0
	Rosemary St.	South of E 88th Ave.	12,910	6,650	(6,260)	-48.5
	SH 2	South of E 88th Ave.	1,500	18,390	16,890	1,126
	Tower Rd.	South of E 88th Ave.	36,530	40,710	4,180	11.4
	E-470	**Toll Gantry D**	**49,560**	**51,520**	**1,960**	**4.0**
	Total Screenline D		**372,470**	**417,600**	**45,130**	**12.1**
E	I-25	South of E 88th Ave.	175,320	173,960	(1,360)	-0.8
	E 88th Ave.	at South Platte River	23,720	28,050	4,330	18.3
	McKay Rd.	at South Platte River	18,550	15,690	(2,860)	-15.4
	SH 44 / E 104th Ave.	at South Platte River	16,300	18,220	1,920	11.8
	E 120th Ave.	at South Platte River	20,300	21,520	1,220	6.0
	Henderson Rd.	at South Platte River	7,690	2,770	(4,920)	-64.0
	E-470	**Toll Gantry E**	**36,790**	**35,760**	**(1,030)**	**-2.8**
	SH 7 / E 160th Ave.	at South Platte River	17,530	13,340	(4,190)	-23.9
	E 168th Ave.	at South Platte River	5,470	5,500	30	0.5
	Total Screenline E		**321,670**	**314,810**	**(6,860)**	**-2.1**
All	**Total Screenlines**	**All Locations**	**2,805,030**	**3,021,030**	**216,000**	**7.7**
	E-470	**Toll Gantries A, B, C, D and E**	**220,720**	**225,720**	**5,000**	**2.3**

[(1)] Actual average weekday traffic volumes include the negative traffic impacts resulting from C-470 Express Lane construction, which are estimated to be 6.25 percent. In order to better model future growth and impacts, modeled traffic volumes do not include this impact.

Basic Study Assumptions

Traffic and toll revenue estimates for E-470 are predicated upon the following assumptions, which are considered reasonable for purposes of the forecasts:

1. The toll collection concept and toll schedules as shown in this report will be adopted. Both ExpressToll and LPT will be employed.

2. The percentage of ExpressToll and LPT customers will be assumed as detailed earlier in this chapter.

3. Improvements to the present highway and local road system in the travel corridor will be limited to those described in this report. No other competing facilities, or capacity expansions, will occur in the forecast period.

4. Regional and corridor growth will be generally as forecast by DRCOG as reviewed and refined by Economic & Planning Systems for use in this study, as documented in **Appendix A**.

5. No major recession or significant economic restructuring will occur which would substantially reduce traffic in the region, other than the potential economic impacts described in this report related to the COVID-19 outbreak.

6. Over the long-term, motor fuel will remain in adequate supply, and future increases in fuel price will not significantly exceed the overall rate of inflation.

7. Inflation will average 2.0 percent per year through 2040.

8. Revenue leakage due to unreadable plates or uncollectable ExpressToll or LPT transactions or any transactions that cannot be processed and payment collected will occur. Leakage estimates have been estimated by CDM Smith in this analysis using actual historical data provided by the Authority.

9. The E-470 toll road will be well-maintained and effectively signed.

10. No natural disasters will occur that could significantly alter travel patterns through the area.

11. No local, regional, or national emergency will arise that would abnormally restrict the use of motor vehicles, other than those described in this report related to the COVID-19 outbreak.

Any significant departure from these basic assumptions could materially affect estimated traffic and toll revenue for the E-470.

Toll Rate Sensitivity

An analysis of hypothetical toll rate sensitivity was conducted at 2021 and 2040 levels in order to provide an indication of where the currently approved scheduled toll rates lie with respect to revenue maximization. Toll rate sensitivity estimates the impacts to transactions and revenue due to increases or decreases in toll rates. The resulting transaction and toll revenue estimates can then be plotted on a graph as a toll sensitivity curve, illustrating the diversion trends. In this case, the toll sensitivity analysis is hypothetical, since assumed rates have already been adopted by the Authority.

Toll sensitivity traffic assignments were run at 2021 and 2040 levels assuming mainline toll rates above or below the currently approved toll rates in increments of $0.25. Toll sensitivity was considered on a gantry-by-gantry basis in order to understand the relative toll sensitivity of each segment of the E-470 system. The impacts of increasing or decreasing these toll rates were then reviewed and applied to the transaction and revenue forecast under the assumed future year toll rates presented previously in Table 4-3. The resulting toll sensitivity curves are presented by mainline toll gantry in **Figures 4-2 and 4-3**. Curves are also shown for the total E-470 system. The points on each curve show the assumed passenger car ExpressToll rates in each of the future years used in the traffic and revenue analysis, as well as the current toll rates. It should be noted that the toll sensitivity transactions, revenues and curves were developed without COVID-19 impacts so as to understand the toll sensitivity estimated by the raw model. This sensitivity was deemed to be acceptable for use in the forecasting process, since any toll rate increases would not occur under the Base Case until 2025, which is well after the anticipated recovery from the short-term COVID-19 impacts.

The multi-year toll sensitivity analysis shows the approved tolls ($0.30 per mile for through trips in 2021 and $0.32 per mile for through trips in 2040) are relatively high, but still lie below the top of the toll revenue curve. In 2021, it is estimated that toll rates for all mainline toll gantries are roughly $0.50 below the top of the toll revenue curve. As compared to estimates of toll sensitivity included in prior studies, this has generally been achieved through strong regional growth and toll reductions at Gantry C. Due to the toll differential between methods of payment, assumed 2021 ExpressToll rates fall roughly $0.75 below the top of the curve while LPT toll rates fall on the “downside” of the curve.

By 2040, the top of the toll revenue curve has shifted slightly to the right, indicating that the theoretical optimum toll rate has increased. This increase is due primarily to assumed inflationary increases in the VOT as well as increased congestion levels on parallel toll-free facilities. As a result of this shift, and the fact that the toll rate increases assumed in the traffic and revenue forecasts are less than the assumed annual rate of inflation, both the current (red) and assumed 2040 (purple) toll rates fall further down on the toll revenue curve. At 2040 levels, assumed toll rates fall roughly $0.75 to $1.00 below the theoretical optimum toll rate. LPT toll rates are estimated to fall just below the top of the curve in 2040, meaning additional toll increases would lead to some increases in revenue. This suggests some potential for increasing the ExpressToll / LPT toll differential in future years.

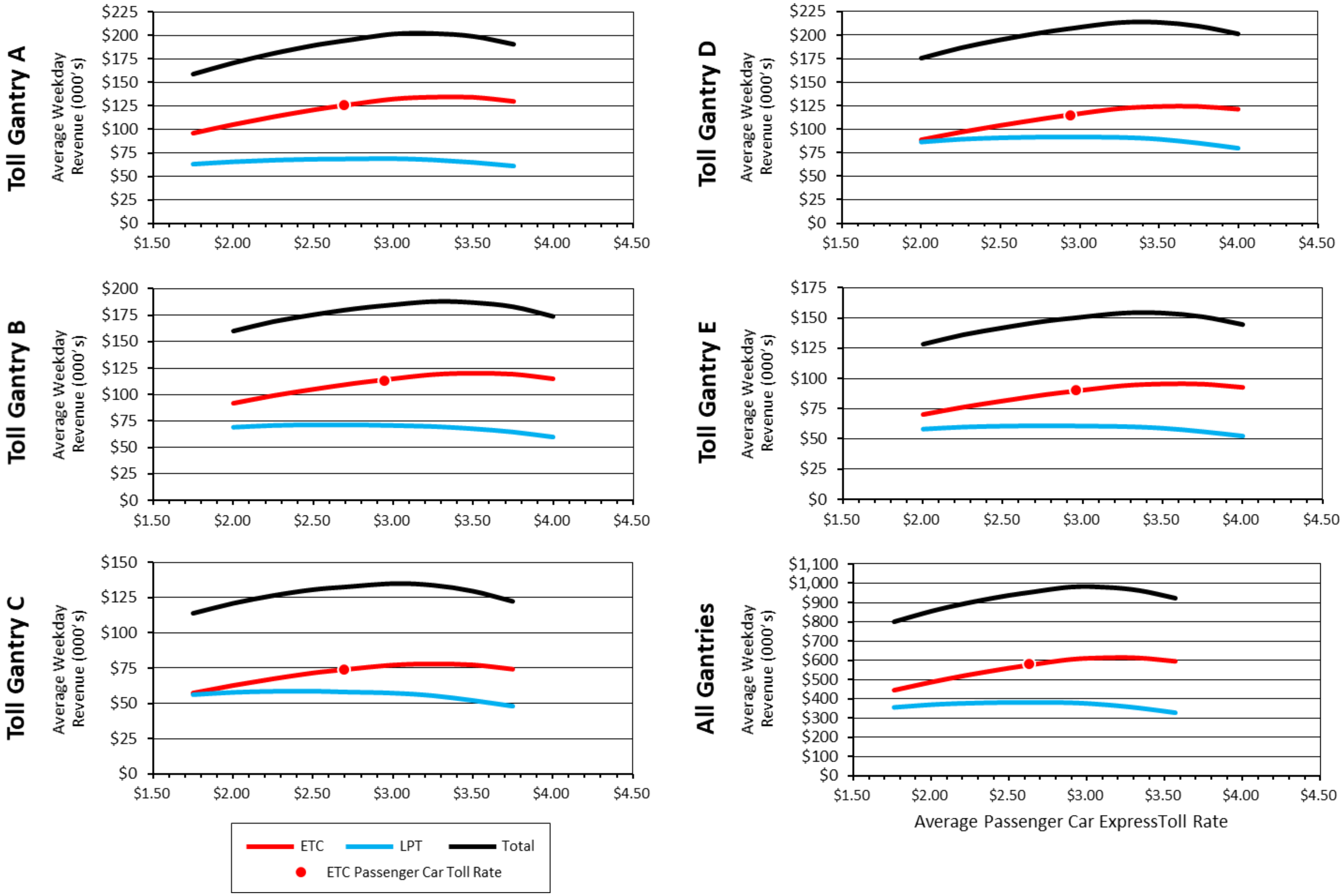


Figure 4-2
2021 Gross Toll Revenue Toll Sensitivity Curves

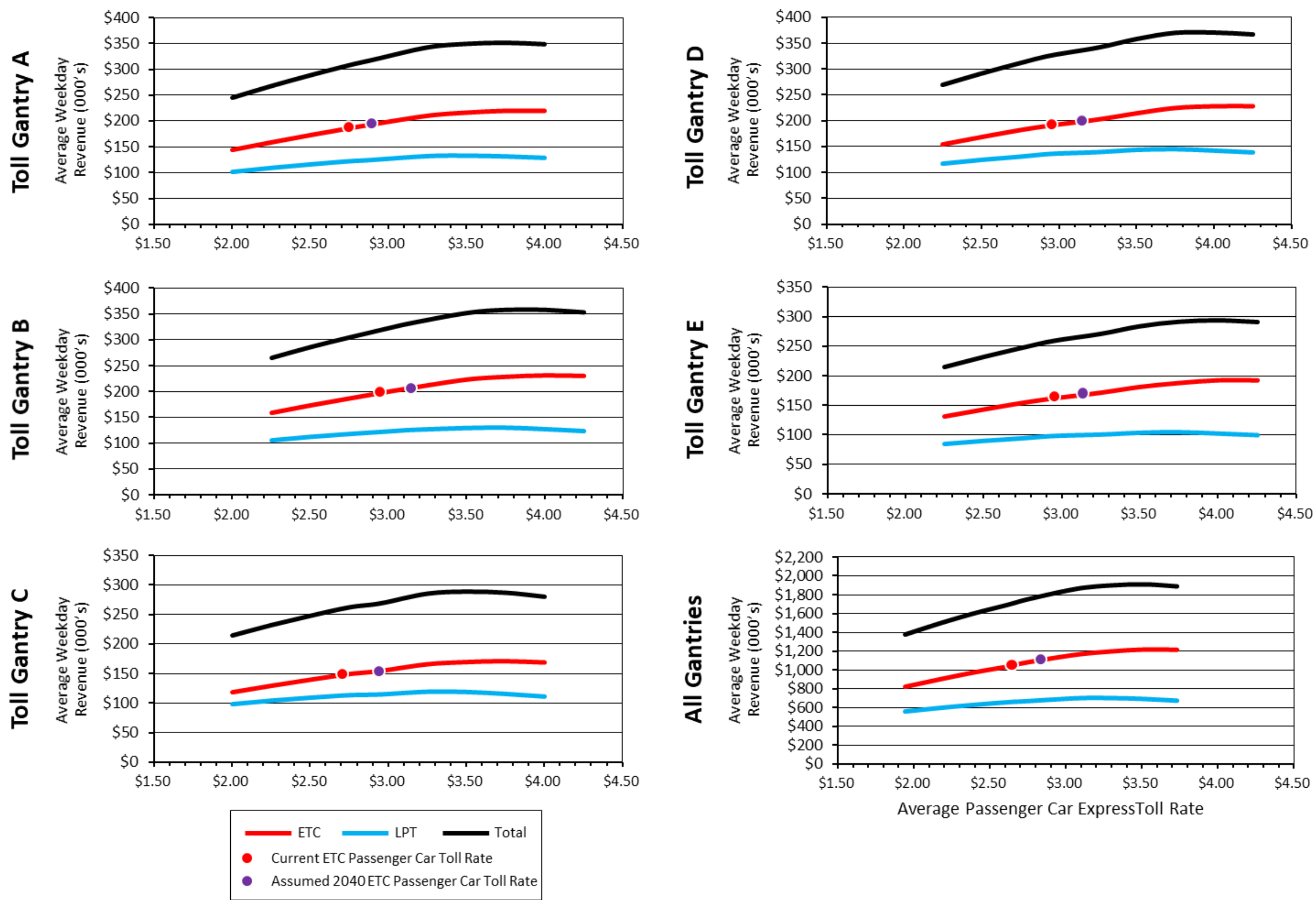


Figure 4-3
2040 Gross Toll Revenue Toll Sensitivity Curves

Estimated Base Case Traffic and Revenue

Following the year 2019 calibration process, future-year average weekday traffic assignments were run for years 2021, 2025, 2030, 2035, and 2040. The toll rates previously presented in Table 4-3 were assumed, with current toll rates increasing by 2.0 percent every five years after 2025. Values of time and vehicle operating costs were assumed to increase annually based on a 2.0 percent per year rate of inflation, based on historical increases in CPI and available forecasts of inflation.

As has been mentioned previously in **Chapter 2**, significant increases in traffic were observed on E-470 in recent years, coinciding with employment and population growth in Aurora, Broomfield, and northeast Denver and to the overall economic recovery and development activity experienced in the Denver Metro area. In developing the estimated traffic and revenue forecasts, these high short-term growth rates were taken into account when estimating initial "normal" traffic and revenue growth on E-470 through 2021. Some slight adjustments were made to short-term growth rates forecasted by the updated DRCOG model in order to incorporate the assumed construction and improvement impacts associated with the completion of the C-470 Express Lanes project. Based on these adjusted growth rates through 2021, an overall year-over-year "normal" growth rate of 3.6 percent was estimated, which is consistent with recent normal historical rates of growth. Beyond 2021, the growth rates forecasted by the travel demand model were reviewed and used as the basis for the traffic and revenue forecast through 2050.

Forecast Impacts Related to COVID-19

In addition to the "normal" growth rates developed based on historical trends and the updated DRCOG model, CDM Smith applied impacts related to the Coronavirus (COVID-19) outbreak. In March 2020, traffic impacts related to COVID-19 began as many states and localities began implementing stay-at-home orders, public space closures, social distancing orders and other restrictions in an effort to reduce the spread of the virus based on guidelines from the Center for Disease Control (CDC) and the Federal Government. On March 11, 2020, Colorado Governor Polis issued an emergency declaration due to COVID-19. This was followed by an order on March 18, 2020 to suspend in-person instruction at Colorado schools and a March 25, 2020 stay-at-home order. Following several prior extensions by the Governor, the statewide stay-at-home order expired on April 24, 2020, and was replaced by a safer-at-home order that allows slightly more travel for Colorado citizens. Denver Mayor Hancock issued a similar stay-at-home order on March 23, 2020, which expired on May 8, 2020 and was also replaced by a safer-at-home order. As of May 11, 2020, there have been almost 18,400 confirmed cases of COVID-19 in Colorado, with almost 950 deaths. Within the 8-County Denver Metro area, there have been over 13,500 confirmed cases and over 700 deaths, or roughly 75 percent of the total statewide impact.

These restrictions have significantly impacted regional traffic patterns. Moreover, since congestion on alternative roadways, such as I-25, I-70 and even local arterials, has been almost eliminated, E-470 no longer offers the same travel time savings to motorists as it did prior to the COVID-19 outbreak. As a result, E-470 has been particularly hard hit. Additionally, since more than 20 percent of E-470 traffic originates from or is destined for DIA, reductions in air travel and tourism related to the COVID-19 outbreak also have impacted E-470 to a greater extent than other facilities in the region.

As previously reviewed in **Chapter 2**, observed E-470 transactions between March 1 and April 16, 2020 (the latest available data at the time of this report) indicated that the full impact of COVID-19 on E-470 has been a reduction in systemwide transactions of over 60 percent compared to normal levels. Additionally, while E-470 passenger car transactions are down by almost 70 percent compared to the first week of March, commercial vehicle transactions are down by just over 30 percent. These reduced traffic levels were assumed as the "bottom" of the COVID-19 impacts, which would generally continue through the end of the COVID-19 outbreak, stay-at-home orders, public space closures, social distancing orders and other restrictions.

COVID-19 has impacted travel behavior in many ways. Some of these will be short-term in effect, while others will have more long-term consequences:

- **Remote working:** Many employees, particularly professional services have quickly transitioned work activities from an office to a home environment. Advances in technology, internet bandwidth, personal computing, secure networks, access to cloud-based data-files, telephone and video conference capabilities have enabled companies and employees to maintain productivity. For both employers and employees, this experience will provide more options moving forward in establishing new work protocols. Employers can view this as an opportunity to reduce office footprints, while employees may consider more flexible working reducing the frequency of work trips into the office. However, it is essential to note that the share of telecommuters is still relatively low at around 5 percent of the total employees. It is likely that this may grow in the future and will negatively impact travel demand but will be constrained by the number of occupations that this practice works effectively. Prior studies on telecommuting suggest employees prefer office environments for reasons of social engagement, creative thinking and career advancement opportunities.

- **Remote learning at all levels:** With the schools and universities switching to online education due to the current travel restrictions, the related travel has substantially decreased. Even though there might be an increased transition and reliance on online education in the short-term, we believe it is unlikely to see this change as a long-term trend affecting travel.

- **Reduced usage of shared modes of transportation:** Due to the perceived fears of close contact with other travelers, there will be a negative impact on transit, shared mobility rides services such as Uber and Lyft, and a potential reduction in the formation of High Occupancy Vehicle (HOV) pools. It is likely in the near-term that we may see a distributional shift towards Single Occupant Vehicles (SOV), potentially changing the demand characteristics of managed/express lanes and general-purpose lanes.

- **Retail Impacts:** There has been a long-term trend towards online shopping, which has been accelerated during the pandemic. Many traditional brick and mortar stores/shopping malls previously struggling against online shopping, will likely go out of business. We anticipate continued growth in warehousing distribution centers around major interstates and thoroughfares such as E-470 with increased light truck and heavy trucking movements supporting just in time delivery to customers at home.

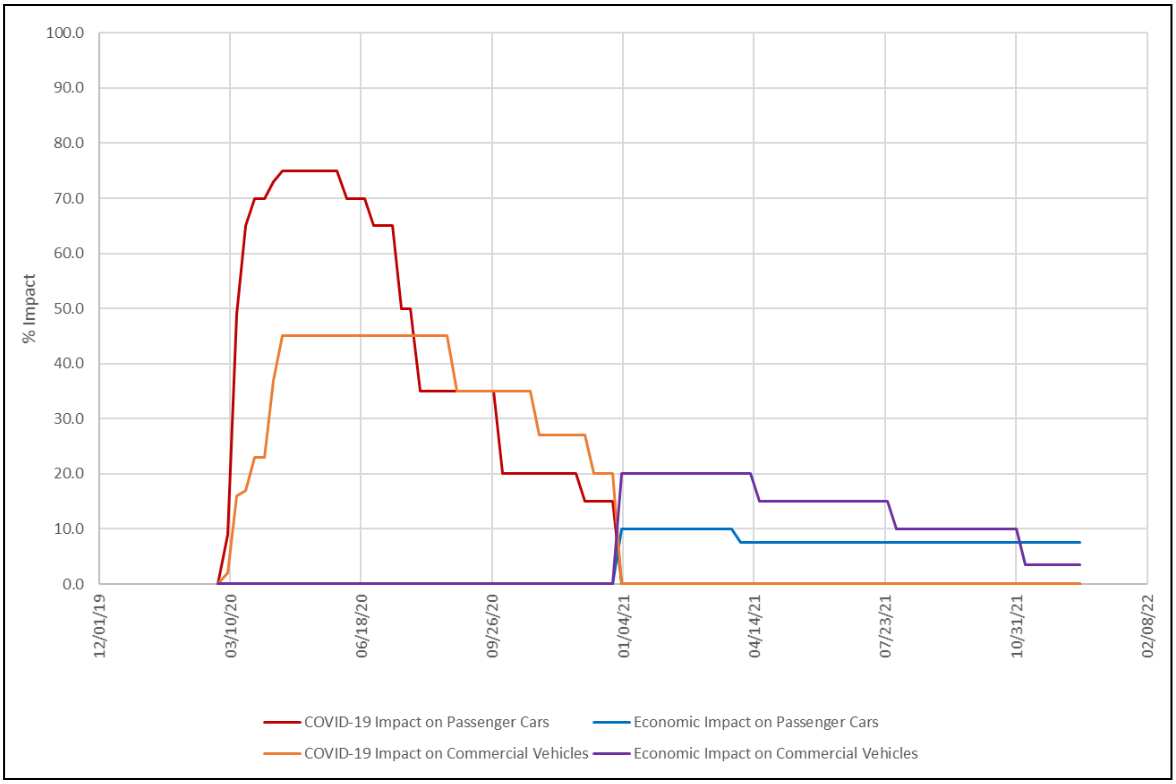
- **Change in housing and employment locations:** The changes as mentioned above in shopping behavior could mean corresponding shifts in employment locations. The urge to decrease close contact and decrease the usage of mass transit, shared mobility options could also result in a decrease in urban density. This may reduce market demand for in-fill housing and increase demand for suburban and exurban housing. These changes could, in turn, result in shift in regional travel patterns.

- **Reduced discretionary travel:** Due to the current travel restrictions, there is overwhelming evidence that there is lowered frequency of travel, increased trip chaining and lower discretionary travel. More moderate discretionary and leisure travel is leading to lower usage of roads in general. This reduced congestion along toll-free options is resulting in even lower traffic along tolled roads and managed lanes in off-peak periods, weekends and holidays. Much of this decrease in discretionary travel is related to the "stay-at-home" orders, cancellation of large gatherings or sporting events, and closure or restricted opening of shopping centers/malls. However, when the restrictive orders are lifted, the intra-city and inter-city travel might see a surge in the short-term. We expect that the discretionary travel's recovery will lag the recovery in the work-related travel, as it is tied to several other external factors that won't return to pre-COVID levels until these large gatherings/events take place and attract pre-COVID level attendance.

Based on this assessment, a review of regional and national trends, and a review of forecasts and estimates available from rating agencies and other financial institutions, annual impacts were applied to the forecast. These impacts, which are illustrated in **Figure 4-4**, were intended to account for both the short-term impacts of the COVID-19 stay-at-home orders and other closures, as well as the long-term structural economic impacts that would occur as a result of the crisis. Varied impacts are assumed for passenger cars and commercial vehicles, based on actual observations through mid-April. In the short-term, a 36.1 percent reduction in 2020 transactions was assumed, based on the forecasts of the COVID-19 crisis duration, as discussed above. This impact would result in a 33.6 percent year-over-year transaction decrease compared to 2019. Moving forward, a slow recovery was assumed in 2020. However, an annual transaction impact of 8.1 percent was applied from 2022 through the remainder of the forecast period, as compared to the forecast without COVID-19 impacts. This was done to account for the longer-term effects of the crisis, including potential recessionary impacts through 2020, increases in telecommuting, and reductions in tourism and other recreational trips.

The estimated transaction and revenue forecasts presented in the remainder of this report therefore recognize not only the forecast assumptions previously detailed in this chapter, but also the short- and long-term estimated impacts of COVID-19 crisis. We would note there is significant uncertainty to both short-term and long- term travel impacts related to the COVID-19 Pandemic. CDM Smith has attempted to use the best available information at the time of developing these forecasts. These assumptions may be subject to change depending on the escalation or recovery from COVID-19, which may materially affect the resulting traffic and revenue estimates.

Figure 4-4
Estimated Weekly COVID-19 Impacts to E-470 Transactions

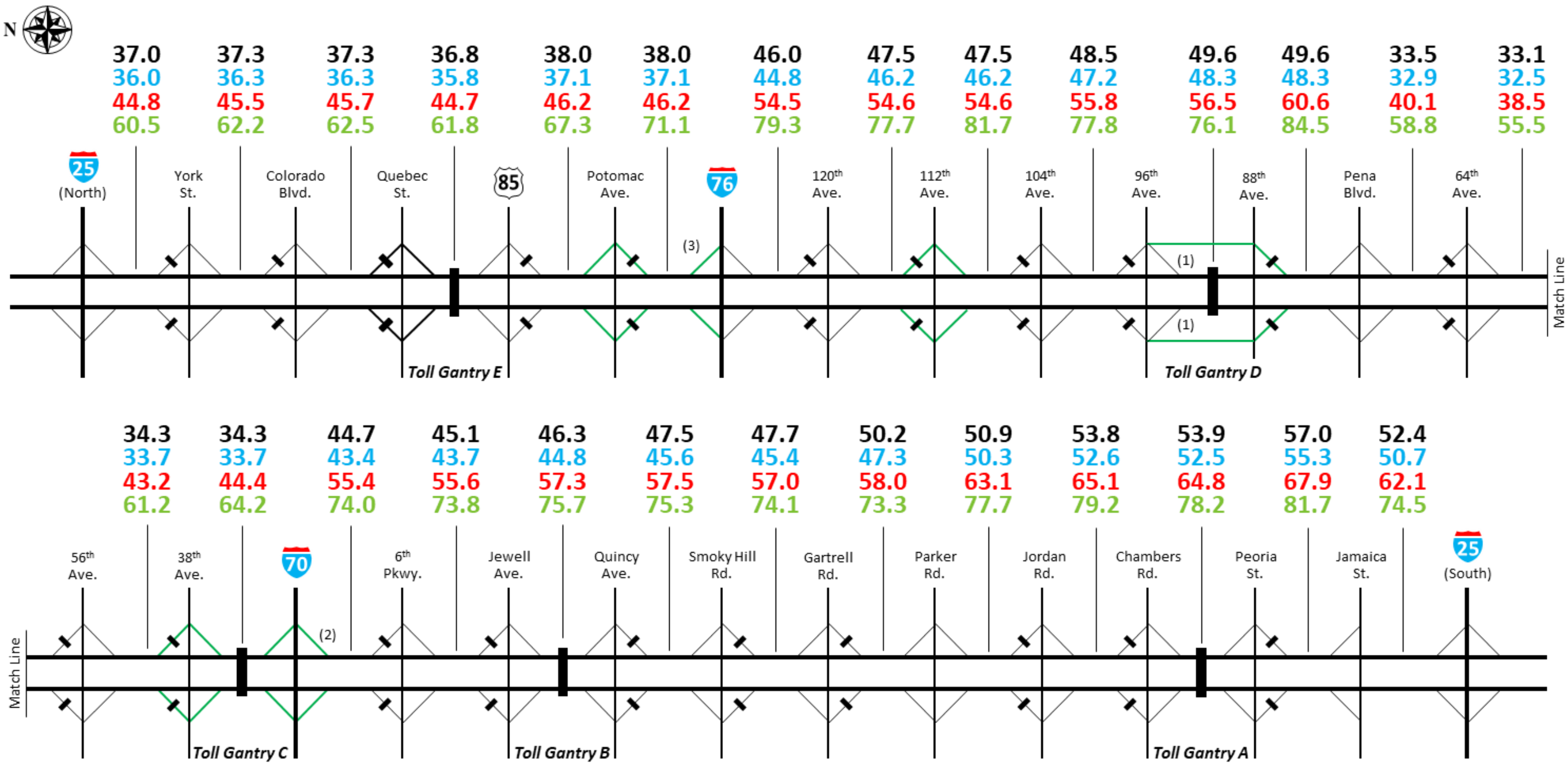


Estimated Average Weekday Traffic Volumes

Estimated AWDT volumes for each E-470 mainline segments are provided by model year in **Figure 4-5**. AWDT estimates are shown for 2019 (actual), 2021, 2030 and 2040 levels. All volumes are shown in thousands.

In general, the heaviest traffic volumes throughout the forecast period are located in the southern sections of E-470, generally between I-70 and I-25 and between Peña Boulevard and I-76. Of the five mainline toll gantries, it is estimated that Toll Gantry A will continue to experience the highest traffic volumes over the forecast period. However, by 2040, traffic volumes at Toll Gantries B and D will come close to those at Gantry A, with some mainline volumes in those areas surpassing those near Gantry A. The peak load point on the system will continue to be between Peoria Street and Jamaica Street until 2040, when it is surpassed by the mainline segment between Peña Boulevard and 88th Avenue. AWDT volumes at Gantry A are estimated to decrease from 53,900 in 2019 to 52,500 in 2021 as a result of the longer-term COVID-19 impacts. From this point, traffic volumes are estimated to increase to 64,800 and 78,200 average weekday vehicles in 2030 and 2040, respectively. Between 2021 and 2040, annual growth at Gantry A is estimated to average 2.1 percent. This is the lowest growth rate for a mainline gantry forecasted for the E-470 System, primarily due to the fact that development activity is anticipated to be greater in other areas of the facility.

At Toll Gantry B, AWDT volumes are estimated to decrease from 46,300 in 2019 to 44,800 in 2021 due to the impacts of COVID-19. These volumes also incorporate the impacts of the recent



LEGEND

000 2019 Volume
000 2021 Volume
000 2030 Volume
000 2040 Volume
Note: Volumes are in thousands.

Mainline Toll Location
Ramp Toll Location
Future Highway Improvement

(1) Ramps to be Removed In 2026
(2) EB I-70 to SB E-470 Ramp to open in 2023, and Full I-70 Interchange Reconfiguration to be completed in 2030.
(3) NB E-470 to WB I-76 Ramp to open in 2035, and WB I-76 to NB E-470 Ramp to open in 2040.

Figure 4-5
Average Weekday Mainline Traffic Volumes
2019, 2021, 2030 and 2040

widening from 4 to 6 lanes between Parker Road and Quincy Avenue. By 2040, AWDT volumes at Toll Gantry B are estimated to be 75,700, representing an average annual growth rate of 2.8 percent over 2021.

Traffic volumes between I-70 and Peña Boulevard in the vicinity of Toll Gantry C, currently among the lowest on E-470, are estimated to increase the fastest over the forecast period. This growth is estimated to occur primarily after the assumed resumption of normal growth trends in 2021. In 2019, actual AWDT at Toll Gantry C was 34,300. In 2021, estimated AWDT volumes for Toll Gantries C will decrease to 33,700 vehicles due to the COVID-19 impacts. Then, driven by highway improvements at I-70, a new interchange at E. 38th Avenue and increased development activity due to the Aurora Highlands and other developments, estimated AWDT volumes at Toll Gantry C will increase by to 44,400 in 2030 and 64,200 in 2040. This represents an average annual growth rate of 3.4 percent over 2021.

At Toll Gantry D, AWDT volumes are estimated to increase from 48,300 in 2021 to 56,500 in 2030 and to 76,100 in 2040, representing an average annual growth rate of 2.4 percent. These growth rates are driven primarily by the combination of local population and employment growth and growth in trips between Broomfield and DIA. It is notable that traffic volumes at Toll Gantry D, historically among the lowest on E-470, will be roughly the same as the highest volume gantries and mainlines by 2040 as a result of this growth.

At Toll Gantry E, AWDT volumes are estimated to decrease from 36,800 in 2019 to 35,800 in 2021, comparable to Toll Gantry C, due to the impacts of COVID-19. By 2040, AWDT volumes at Toll Gantry E are estimated to be 61,800, representing an average annual growth rate of 2.9 percent over 2021. Besides local developments, part of this growth will be due to improvements to the I-76 interchange.

Toll ramp volumes, not shown in the figure, are also assumed to increase as well, distributing the additional volume on E-470 based on the additional economic development and the changes to the highway network. Several additional interchanges are assumed to open on E-470 during the forecast period. These include interchanges at 38th Avenue (2024), 88th Avenue (2026), 112th Avenue (2031), and Potomac Street (2036). As previously shown in Figure 4-5, the ramps at 96th Avenue to and from the south are planned to be replaced with toll ramps at 88th Avenue just south of Toll Gantry D. Some existing interchanges are also planned to be improved during the forecast period, as previously reviewed under the highway improvement assumptions. The I-76 interchange is assumed to be reconfigured with additional ramps in 2035 and in 2040, with movements to and from the north on E-470 being made possible. In addition, the I-70 interchange is assumed to be reconfigured with fly-over ramps connecting Eastbound I-70 and Southbound E-470 in 2023, and a full reconstruction in 2030. The impacts for all these improvements and schedule widenings have been assumed within the future year forecasts.

Estimated Annual Transactions and Revenue

The average weekday transaction estimates were then annualized by method of payment. This was done to recognize the differences in trip frequency between ExpressToll and LPT customers. Based on actual 2018 data provided by the Authority, annualization factors of 324.2 and 330.1 were calculated for ExpressToll and LPT transactions, respectively. This reflects the relationship between an average weekday and the annual totals. Weekday traffic is slightly higher than the 7-day average traffic hence the annualization factor of less than 365 is used. Annualization factors were also similarly calculated for toll revenue, recognizing the different mix of vehicle types between weekday and weekend traffic.

Based on the annualized transaction and revenue estimates, an annual transaction and revenue stream was developed. Beyond 2040, the average annual normal growth rate between 2030 and 2040 was assumed by toll location. Estimated impacts of toll increases were applied in 2045 and 2050 based on the modeling impacts developed for 2035 and 2040. Based on assignments performed with and without various highway improvements, the annualized impacts of programmed widenings, interchange improvements and new toll ramps were added in the assumed year of opening. Additionally, a roughly 2 to 3 percent construction impact was assumed in the area of a programmed widening during the two years prior to the scheduled completion. This level of construction impact was based on observed historical impacts of the prior widenings. Lastly, the impacts of leap years were applied.

The resulting annual transaction and revenue estimates through 2050 are provided for the total E-470 system in **Table 4-7**. These reflect the Base Case conditions, with the toll increases assumed as shown previously in Table 4-3, as well as adjustments for the short-term and long-term impacts of the COVID-19 crisis, as previously noted. Historical growth within the E-470 corridor has averaged 6.3 percent over the last five years, fueled by local development, lower gas prices and various widenings and interchange improvements. Following this trend, annual transactions are expected to decrease from an actual of 90.3 million in 2019 to 59.9 million in 2020 as a result of the COVID-19 impacts. A recovery is anticipated in 2021, with systemwide transactions increasing back to 88.0 million. Annual transactions are not estimated to return to 2019 levels until 2023, representing a four-year lag in growth as a result of the longer-term COVID-19 impacts outlined above. Including the impacts of widenings, highway improvements and toll increases, transactions on E-470 are estimated to increase to 112.1 million in 2030 and 156.0 million in 2040. This represents an average systemwide growth rate of 3.1 percent between 2021 and 2040. The estimated share of ExpressToll transactions are estimated to increase slightly from 73.1 percent in 2019 to 75.2 percent by 2040.

Annual toll revenue estimates are also provided in Table 4-7. Gross toll revenues, excluding revenue adjustments to account for non-revenue vehicles, unbillable license plate toll images and unpaid license plate toll transactions, were calculated by multiplying the estimated transactions by the nominal toll rates, as previously mentioned. Gross toll revenues are estimated to decrease from an actual of $290.4 million in 2019 to $193.5 million in 2020 as a result of the COVID-19 impacts. Reflecting the forecasted recovery in transactions, systemwide gross toll revenues are estimated to increase to $282.6 million in 2021. Annual gross toll revenues and transactions are not estimated to return to 2019 levels until 2023 as a result of the longer-term COVID-19 impacts. Gross toll revenues on E-470 are estimated to increase to $367.0 million in 2030 and $519.5 million in 2040. This represents an average systemwide growth rate of 3.5 percent between 2021 and 2040, which incorporates the impacts of widenings, highway

Table 4-7
Estimated Base Case Annual Transactions and Revenue (In Thousands)

		Annual Transactions (000s)			Annual Toll Revenue ($000s)		
						Uncollectible	
Year		ExpressToll	LPT	Total	Gross [1]	and Unpaid [2]	Net [3]
2019	(4)	**65,910**	**24,370**	**90,280**	**$ 290,393**	**$ (41,380)**	**$ 249,013**
2020	(4)(5)(6)	44,153	15,752	59,905	193,459	(30,732)	162,727
2021	(6)(7)	**65,398**	**22,605**	**88,003**	**282,645**	**(44,291)**	**238,354**
2022		66,851	23,106	89,957	288,620	(44,889)	243,731
2023		68,521	23,627	92,148	295,331	(45,499)	249,832
2024	(5)(7)	71,545	24,510	96,055	306,862	(46,875)	259,987
2025	(8)	**72,859**	**24,616**	**97,475**	**317,254**	**(47,948)**	**269,306**
2026		74,752	25,117	99,869	321,899	(48,440)	273,459
2027	(7)	77,395	26,234	103,629	334,457	(50,350)	284,107
2028	(5)	79,497	27,072	106,569	343,834	(51,665)	292,169
2029	(7)	81,992	27,929	109,921	354,295	(53,116)	301,179
2030	(8)	**83,786**	**28,347**	**112,133**	**367,004**	**(54,461)**	**312,543**
2031	(7)	87,384	29,434	116,818	381,759	(56,560)	325,199
2032	(5)	90,618	30,543	121,161	395,173	(58,559)	336,614
2033	(7)	94,635	31,853	126,488	411,752	(60,961)	350,791
2034		98,168	33,021	131,189	425,963	(63,038)	362,925
2035	(7)(8)	**103,380**	**34,431**	**137,811**	**456,286**	**(67,215)**	**389,071**
2036	(5)	107,829	35,703	143,532	470,786	(69,206)	401,580
2037		110,038	36,495	146,533	480,398	(70,660)	409,738
2038	(7)	113,287	37,553	150,840	494,447	(72,679)	421,768
2039		115,828	38,614	154,442	506,257	(74,620)	431,637
2040	(5)(7)(8)	**117,244**	**38,776**	**156,020**	**519,513**	**(76,012)**	**443,501**
2041		119,729	39,612	159,341	529,886	(77,529)	452,357
2042		122,620	40,584	163,204	541,994	(79,300)	462,694
2043		125,604	41,585	167,189	554,428	(81,116)	473,312
2044	(5)	129,035	42,734	171,769	568,755	(83,209)	485,546
2045	(8)	**130,674**	**42,787**	**173,461**	**582,613**	**(84,391)**	**498,222**
2046		133,107	43,589	176,696	592,759	(85,855)	506,904
2047		135,600	44,412	180,012	603,116	(87,348)	515,768
2048	(5)	138,533	45,379	183,912	615,373	(89,116)	526,257
2049		140,774	46,117	186,891	624,489	(90,426)	534,063
2050	(8)	**142,143**	**46,029**	**188,172**	**638,079**	**(91,465)**	**546,614**

(1) Gross Revenue does not include adjustments for unbillable or uncollectable toll revenue.
(2) Uncollectible toll revenue represents non-revenue vehicles, bad or duplicate license plate images, or any other transactions for which revenue cannot be collected.
(3) Net Revenue includes adjustments for unbillable or uncollectable toll revenue.
(4) Includes actual data through March 2020.
(5) Leap Year.
(6) COVID-19 traffic impacts have been included in 2020 due to stay-at-home orders, public space closures and other travel restrictions. Some recovery is assumed in 2021, though longer-term traffic impacts of 8.1 percent have been included through the remainder of the forecast period.
(7) Assumed widening of various segments of the E-470 mainline.
(8) Assumed 2.0 percent Systemwide Toll Increase.

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improvements and toll increases. Thus, despite the impacts of COVID-19 in 2020 and 2021, gross toll revenues are still estimated to more than double over the course of the forecast period.

Adjustments for uncollectible and unpaid revenue were developed in order to estimate net toll revenues, which include revenue adjustments to account for non-revenue vehicles, unbillable license plate toll images and unpaid license plate toll transactions. In consultation with E-470 staff and based on historical reductions in leakage rates, CDM Smith assumed the actual 2018 and 2019 leakage rates would be reduced slightly over the forecast period as toll collection technology and enforcement improve. In 2019, total actual leakage was 14.2 percent, which is a strong performance compared with that experienced by other AET facilities nationwide. This is in part due to the fact that collections were significantly improved in 2017 with the ability of the Authority to use automated processes to identify and bill customers with temporary license plates. Moving forward, slightly more conservative leakage rates, more in line with historically observed levels, were assumed (15.9 percent in 2020) and then reduced over the forecast period based on additional improvements in technology and collections. As shown previously in Table 4-7, leakage rates were estimated to be 14.8 percent by 2030 and 14.6 percent by 2035. As a result, net toll revenues are estimated to be $312.5 million in 2030 and $443.5 million in 2040.

Comparison to Prior 2018 Forecast

Table 4-8 presents the estimated annual transactions and revenue through 2048 for both the current study Base Case and the prior 2018 Traffic and Revenue Update Study. In addition to updated socioeconomic, highway improvement, ExpressToll participation rate, VOT, VOC, and toll revenue leakage assumptions, the major differences of the current study over the prior 2018 Update Study include revised toll rate assumptions and the inclusion of estimated COVID-19 impacts. Under the 2018 Update Study, assumed toll rates were planned to increase every three years by 2.1 percent starting in 2021 and did not include the midday toll discount for commercial vehicles. Compared to the current forecast, which increases toll rates by 2.0 percent every five years starting in 2025, the difference in the rate and frequency of toll increases between the studies creates a difference in assumed toll rates of 6 percent by 2040.

Annual system-wide transactions in 2021 under the current study Base Case are estimated to be 12.9 million less than the 2018 Update Study, as a result of benchmarking the forecast to 2019 transaction and ExpressToll participation levels and the incorporation of COVID-19 impacts. Estimated gross toll revenues in 2021 are estimated to be $36.8 million less under the current study Base Case, representing a difference of 13.4 percent.

By 2040, the estimated reduction in transactions and net toll revenue between the current study Base Case and the prior 2018 Study increases to 37.9 million and $125.5 million, respectively. This represents a difference of 19.5 percent in annual toll transactions and 22.1 percent in annual gross toll revenue. Although the longer-term economic lag resulting from the COVID-19 impacts represents the majority of this impact, the negative difference in transactions and toll revenue between the current study and 2018 Update Study forecasts is estimated to increase due to the slight estimated reduction in normal growth rates and assumed slower increase in toll rates under the current study forecasts.

Table 4-8
Comparison of 2018 Update Study and Current Study Forecasts
2019 to 2050

		Annual Transactions (000s)				Annual Net Revenue ($000s) (1)			
Year		2018 Update Study	Current Study Base Case	Difference	Percent Difference	2018 Update Study	Current Study Base Case	Difference	Percent Difference
2019	(2)	**92,311**	**90,280**	**(2,031)**	**(2.2)**	**$ 248,626**	**$ 249,013**	**$ 387**	**0.2**
2020	(2)(3)(4)	95,227	59,905	(35,322)	(37.1)	257,954	162,727	(95,227)	(36.9)
2021	(4)(5)(6)(7)	**100,897**	**88,003**	**(12,894)**	**(12.8)**	**275,131**	**238,354**	**(36,777)**	**(13.4)**
2022		104,136	89,957	(14,179)	(13.6)	285,363	243,731	(41,632)	(14.6)
2023		107,557	92,148	(15,409)	(14.3)	295,623	249,832	(45,791)	(15.5)
2024	(3)(5)(6)(7)	111,729	96,055	(15,674)	(14.0)	314,583	259,987	(54,596)	(17.4)
2025	(8)	**114,797**	**97,475**	**(17,322)**	**(15.1)**	**324,081**	**269,306**	**(54,775)**	**(16.9)**
2026		117,921	99,869	(18,052)	(15.3)	332,275	273,459	(58,816)	(17.7)
2027	(5)(6)(7)	122,292	103,629	(18,663)	(15.3)	350,734	284,107	(66,627)	(19.0)
2028	(3)	126,718	106,569	(20,149)	(15.9)	362,397	292,169	(70,228)	(19.4)
2029	(5)(6)	132,582	109,921	(22,661)	(17.1)	377,947	301,179	(76,768)	(20.3)
2030	(7)(8)	**136,638**	**112,133**	**(24,505)**	**(17.9)**	**395,843**	**312,543**	**(83,300)**	**(21.0)**
2031	(5)(6)	142,053	116,818	(25,235)	(17.8)	408,018	325,199	(82,819)	(20.3)
2032	(3)	147,556	121,161	(26,395)	(17.9)	421,578	336,614	(84,964)	(20.2)
2033	(5)(6)(7)	153,454	126,488	(26,966)	(17.6)	445,125	350,791	(94,334)	(21.2)
2034		159,475	131,189	(28,286)	(17.7)	459,609	362,925	(96,684)	(21.0)
2035	(5)(6)(8)	**162,796**	**137,811**	**(24,985)**	**(15.3)**	**468,176**	**389,071**	**(79,105)**	**(16.9)**
2036	(3)(7)	168,198	143,532	(24,666)	(14.7)	488,854	401,580	(87,274)	(17.9)
2037		172,789	146,533	(26,256)	(15.2)	500,997	409,738	(91,259)	(18.2)
2038	(5)(6)	179,057	150,840	(28,217)	(15.8)	518,464	421,768	(96,696)	(18.7)
2039	(7)	183,304	154,442	(28,862)	(15.7)	539,726	431,637	(108,089)	(20.0)
2040	(3)(5)(6)(8)	**193,928**	**156,020**	**(37,908)**	**(19.5)**	**569,042**	**443,501**	**(125,541)**	**(22.1)**
2041		199,347	159,341	(40,006)	(20.1)	583,712	452,357	(131,355)	(22.5)
2042	(7)	204,475	163,204	(41,271)	(20.2)	607,955	462,694	(145,261)	(23.9)
2043		210,701	167,189	(43,512)	(20.7)	625,199	473,312	(151,887)	(24.3)
2044	(3)	217,663	171,769	(45,894)	(21.1)	644,578	485,546	(159,032)	(24.7)
2045	(7)(8)	**222,583**	**173,461**	**(49,122)**	**(22.1)**	**669,797**	**498,222**	**(171,575)**	**(25.6)**
2046		229,244	176,696	(52,548)	(22.9)	688,526	506,904	(181,622)	(26.4)
2047		236,368	180,012	(56,356)	(23.8)	708,164	515,768	(192,396)	(27.2)
2048	(3)(7)	243,276	183,912	(59,364)	(24.4)	740,630	526,257	(214,373)	(28.9)
2049			186,891				534,063		
2050	(8)		**188,172**				**546,614**		

(1) Net Revenue includes adjustments for unbillable or uncollectable toll revenue.
(2) 2018 Update Study includes actual data through October 2018. Current Base Case Forecast includes actual data through March 2020.
(3) Leap Year.
(4) COVID-19 traffic impacts have been included in 2020 due to stay-at-home orders, public space closures and other travel restrictions.
Some recovery is assumed in 2021, though longer-term traffic impacts of 8.1 percent have been included through the remainder of the forecast period.
(5) Under the 2018 Update Study Forecast, assumed widening of various segments of the E-470 mainline.
(6) Under the Current Base Case Forecast, assumed widening of various segments of the E-470 mainline.
(7) Under the 2018 Update Study Forecast, assumed 2.1 Percent Systemwide Toll Increase.
(8) Under the Current Base Case Forecast, assumed 2.0 Percent Systemwide Toll Increase.

Estimated Sensitivity Test Traffic and Revenue

The Base Case traffic and revenue forecasts included in the report are based on certain assumptions and forecast of future economic growth and other events which are ultimately subject to some level of uncertainty. As such, it is typical in traffic and revenue studies of this nature to conduct sensitivity tests aimed at identifying the sensitivity of revenue forecasts to potential changes in certain basic assumptions or future forecasts of underlying variables. Sensitivity tests typically include hypothetical changes in future socioeconomic growth forecasts, value of time assumptions and so forth. For purposes of this study, traffic forecasts for the following three different sensitivity tests were developed:

1. Second Wave of COVID-19 Impacts in 2021
2. Long-Term Reduced Economic Growth (50 Percent Lower Trip Table Growth)
3. Reduced Value of Time (25 Percent VOT Growth Reduction after 2024)

For each of the various sensitivity tests, the alternative transaction and revenue estimate is shown for each respective year of tests and the percent impact as compared with the Base Case estimates. After 2025, interim year forecasts were not developed. The sensitivity tests were produced using all of the same socioeconomic inputs, highway improvements, values of time, vehicle operating costs, toll rates, and toll revenue leakage assumptions as the Base Case forecasts, except those being assessed in the particular sensitivity test.

It is important to recognize that all of the sensitivity tests assessed herein are hypothetical conditions and represent departures from economic forecasts or assumptions used in the Base Case traffic and revenue estimates. These tests are intended to show potential impacts on traffic and revenue of these hypothetical changes from basic assumptions.

Second Wave of COVID-19 Impacts

One possibility being discussed by health officials is the potential for a second wave of COVID-19 cases to occur in 2021. For this sensitivity test, CDM Smith developed estimates of COVID-19 second wave cases. These estimates assumed an increase in COVID-19 cases beginning in late December 2020, reaching a peak in late January 2021. The peak of this second wave is roughly half of the actual cases recorded during 2020. Based on this, a sensitivity test was developed assuming that a second wave of transactions and revenue impacts will occur in 2021 at 50 percent of the level observed in 2020. These impacts would be a result of self-quarantining, new stay-at-home orders, increased telecommuting and social distancing resulting from a return of COVID-19.

The assumed impacts to transactions and net toll revenue for a second wave of COVID-19 are illustrated in **Figure 4-6**. These impacts account for both the short-term impacts of the COVID-19 stay-at-home orders and other closures, as well as the long-term structural economic impacts that would occur as a result of the crisis. Based on this assessment, an additional 19.4 percent negative impact to transactions was assumed in 2021 over the Base Case forecast. Forecasted 2021 transactions and net toll revenues under the Second Wave of COVID-19 scenario are 70.7 million and $192.2 million, respectively, as presented in **Table 4-9**. After 2021, it was assumed normal growth rates would resume, consistent with those forecasted under the Base Case. However, the additional impact in 2021, representing a delay in the full year-over-year recovery from the COVID-19 impacts, would result in a 4.7 percent reduction in transactions through the remainder of the forecast period. This results in a roughly 5- to 6-year lag in growth as E-470 transactions and revenues recover. By 2040, the estimated reduction in transactions and net toll revenue between the current study Base Case and the prior 2018 Study increases to 37.9 million and $125.5 million, respectively. Estimated 2040 transactions and revenues under the Second Wave of COVID-19 scenario are 149.2 million and $422.6 million, respectively.

Figure 4-6
Estimated Weekly COVID-19 Impacts to E-470 Transactions with 2021 Second Wave of COVID-19

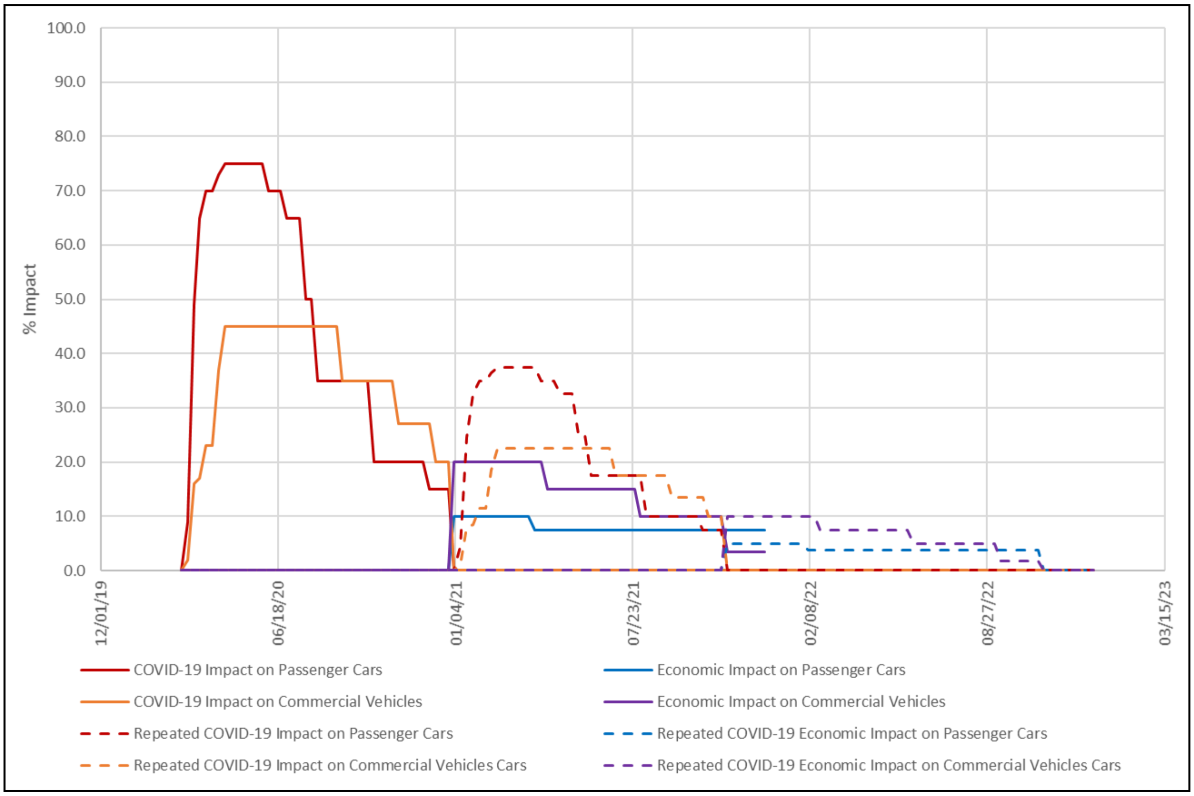

Table 4-9
Comparison of Base Case and Second COVID-19 Wave Sensitivity Test Transaction and Revenue Forecasts 2019 to 2050

		Annual Transactions (000s)				Annual Net Revenue ($000s) (1)			
Year		Current Study Base Case	Second Wave of COVID-19 Sensitivity Test	Difference	Percent Difference	Current Study Base Case	Second Wave of COVID-19 Sensitivity Test	Difference	Percent Difference
2019	(2)	**90,280**	**90,280**	**-**	**-**	**$ 249,013**	**$ 249,013**	**$ -**	**-**
2020	(2)(3)	59,905	59,905	-	-	162,727	162,727	-	-
2021	(3)	**88,003**	**70,740**	**(17,263)**	**(19.6)**	**238,354**	**192,221**	**(46,133)**	**(19.4)**
2022	(3)	89,957	86,003	(3,954)	(4.4)	243,731	232,221	(11,510)	(4.7)
2023		92,148	88,097	(4,050)	(4.4)	249,832	238,034	(11,798)	(4.7)
2024		96,055	91,833	(4,222)	(4.4)	259,987	247,710	(12,278)	(4.7)
2025	(4)	**97,475**	**93,191**	**(4,285)**	**(4.4)**	**269,306**	**256,588**	**(12,718)**	**(4.7)**
2030	(4)	**112,133**	**107,204**	**(4,929)**	**(4.4)**	**312,543**	**297,784**	**(14,760)**	**(4.7)**
2035	(4)	**137,811**	**131,753**	**(6,058)**	**(4.4)**	**389,071**	**370,698**	**(18,374)**	**(4.7)**
2040	(4)	**156,020**	**149,162**	**(6,858)**	**(4.4)**	**443,501**	**422,557**	**(20,944)**	**(4.7)**
2045	(4)	**173,461**	**165,836**	**(7,625)**	**(4.4)**	**498,222**	**474,693**	**(23,528)**	**(4.7)**
2050	(4)	**188,172**	**179,901**	**(8,271)**	**(4.4)**	**546,614**	**520,800**	**(25,813)**	**(4.7)**

(1) Net Revenue includes adjustments for unbillable or uncollectable toll revenue.
(2) Forecasts include actual data through March 2020.
(3) COVID-19 traffic impacts have been included in 2020 due to stay-at-home orders, public space closures and other travel restrictions.
Under the Base Case, some recovery is assumed in 2021, though longer-term traffic impacts of 8.1 percent have been included through the remainder of the forecast period.
Under the Sensitivity Test, a second wave of impacts is assumed in 2021, with a longer-term traffic impacts of 12.1 percent included through the remainder of the forecast period.
(4) Assumed 2.0 percent Systemwide Toll Increase.

Reduced Regional Growth

A key underlying parameter of any traffic and revenue forecast is estimated future economic growth in the project corridor. This particular sensitivity test was intended to evaluate the impact of a hypothetical long-term reduced level of overall economic growth throughout the entire corridor. It was simulated by reducing the net growth in trips in the trip tables by 50 percent from the rate of growth assumed in the Base Case forecasts. The 50 percent reduction in growth resulted in an average annual growth rate reduction ranging from 0.60 to 0.77 percent. This translated into overall trip table reductions of 2.9 percent in 2025, 6.3 percent in 2030, 8.6 percent in 2035 and 10.8 percent in 2040. Traffic assignments were rerun at 2025, 2030, 2035 and 2040 levels under the reduced growth assumptions and estimates of transactions and collected toll revenue were developed for those years. **Table 4-10** compares the resulting sensitivity test estimates of annual transactions and collected toll revenue against the Base Case forecasts.

Total transactions in 2025 are 93.7 million under the reduced growth assumptions of this sensitivity test. This represents a reduction in transactions of 3.9 percent over the Base Case scenarios. The level of impacts increases in 2035 to 10.8 percent, likely due to the reduction of assumed develop impacts in that year. A larger negative transaction impact of 12.8 percent is forecasted for 2040, with total transactions for the Reduced Growth scenario estimated at 136.0 million in that year. The transaction impacts beyond 2040 are estimated to continue to increase as estimated normal growth rates cause transactions to continue to diverge from the Base Case.

Table 4-10
Comparison of Base Case and Reduced Growth Sensitivity Test Transaction and Revenue Forecasts
2019 to 2050

		Annual Transactions (000s)				Annual Net Revenue ($000s) (1)			
Year		Current Study Base Case	Reduced Growth Sensitivity Test	Difference	Percent Difference	Current Study Base Case	Reduced Growth Sensitivity Test	Difference	Percent Difference
2019	(2)	**90,280**	**90,280**	**-**	**-**	**$ 249,013**	**$ 249,013**	**$ -**	**-**
2020	(2)(3)	59,905	59,905	-	-	162,727	162,727	-	-
2021	(3)	**88,003**	**88,003**	**-**	**-**	**238,354**	**238,354**	**-**	**-**
2022		89,957	88,848	(1,109)	(1.2)	243,731	240,812	(2,919)	(1.2)
2023		92,148	89,883	(2,265)	(2.5)	249,832	243,871	(5,961)	(2.4)
2024		96,055	92,562	(3,493)	(3.6)	259,987	250,770	(9,217)	(3.5)
2025	(4)	**97,475**	**93,689**	**(3,786)**	**(3.9)**	**269,306**	**258,878**	**(10,428)**	**(3.9)**
2030	(4)	**112,133**	**107,920**	**(4,213)**	**(3.8)**	**312,543**	**302,217**	**(10,326)**	**(3.3)**
2035	(4)	**137,811**	**122,934**	**(14,877)**	**(10.8)**	**389,071**	**347,248**	**(41,824)**	**(10.7)**
2040	(4)	**156,020**	**136,008**	**(20,012)**	**(12.8)**	**443,501**	**387,644**	**(55,857)**	**(12.6)**
2045	(4)	**173,461**	**143,950**	**(29,511)**	**(17.0)**	**498,222**	**409,006**	**(89,216)**	**(17.9)**
2050	(4)	**188,172**	**150,628**	**(37,544)**	**(20.0)**	**546,614**	**426,858**	**(119,755)**	**(21.9)**

(1) Net Revenue includes adjustments for unbillable or uncollectable toll revenue.
(2) Forecasts include actual data through March 2020.
(3) COVID-19 traffic impacts have been included in 2020 due to stay-at-home orders, public space closures and other travel restrictions.
Some recovery is assumed in 2021, though longer-term traffic impacts of 8.1 percent have been included through the remainder of the forecast period.
(4) Assumed 2.0 percent Systemwide Toll Increase.

Impacts to net toll revenues in 2025 and 2040 are comparable to the impacts estimated for transactions. Variations between the percent impact to transactions and net toll revenue are mostly due to slight changes in assumed ExpressToll participation rates between the two scenarios. Total collected toll revenues under the reduced growth assumptions are $258.9

million in 2025 and $387.6 million in 2040, representing respective impacts of 3.9 and 12.6 percent below the Base Case.

Reduced Value of Time

Value of time (VOT) is an important input parameter in estimating motorists' willingness to pay tolls. With a reduction in the assumed VOT, motorists would be less willing to pay a toll to take advantage of the potential time savings provided by E-470. A sensitivity test was developed to evaluate the impact of a hypothetical 25 percent decrease in growth of the VOT. Thus, instead of increasing VOT by 2.0 percent annually, consistent with historical and projected increases in CPI, VOT was increased by only 1.5 percent annually under this sensitivity test. Under the Base Case scenarios, the value of time averaged $0.361 per minute in 2025 and $0.486 per minute in 2040. These values were reduced under this sensitivity test to an average of $0.354 per minute in 2025 and $0.442 per minute by 2040, as shown in **Table 4-11**. Traffic assignments were then rerun at 2022 and 2040 levels under the reduced value of time assumptions and estimates of transactions and collected toll revenue were developed for those years. **Table 4-12** compares the resulting sensitivity test estimates of annual transactions and collected toll revenue against the Base Case forecasts.

Table 4-11
Estimated Average Values of Time for Sensitivity Test

	Value of Time	
Model Year	Per Minute	Per Hour
2019	$ 0.320	$ 19.22
2020	0.327	19.61
2021	0.333	20.00
2025	0.354	21.23
2030	0.381	22.87
2035	0.411	24.63
2040	0.442	26.54

As shown in the **Table 4-12**, the difference in total E-470 transactions between the Reduced VOT Scenario and the Base Case grows through 2025, as the difference in the annual VOT growth rate compounds over time. Total E-470 transactions in 2025 are estimated to be 92.8 million, or about 4.6 million below the Base Case forecast. This represents a reduction in transactions of 4.7 percent. Over the course of the forecast period, the relative impact of the reduced VOT as compared to the Base Case is held relatively steady by the impacts of various highway improvements. These improvements to other facilities, which serve to decrease the relative time savings of E-470 under both scenarios, will not impact transactions as severely under the reduced VOT scenario and will thereby mitigate some of the compounding annual impacts. This is evident in the 2030 transactions estimates, where the congestion relief provided to I-25 and I-70 as a result of the scheduled opening of managed lanes on those facilities does not create as negative an impact to E-470 under the Reduced VOT scenario as it does under the Base Case. Thus, estimated transactions in 2030 under the Reduced VOT scenario are only estimated to differ from the Base Case by 5.6 million or 5.0 percent. Other similar widenings and improvements in 2035 and 2040 also help to mitigate some of the reduced VOT impact over the forecast period. By 2040, estimated transactions under the Reduced VOT scenario are estimated to be 145.8 million, or 6.5 percent less than those under the Base Case. Lacking highway improvements beyond 2040, this percent impact is assumed to increase over the remainder of the forecast period.

Table 4-12
Comparison of Base Case and Reduced VOT Growth Sensitivity Test Transaction and Revenue Forecasts
2019 to 2050

Year		Annual Transactions (000s) Current Study Base Case	Reduced Value of Time Sensitivity Test	Difference	Percent Difference	Annual Net Revenue ($000s) (1) Current Study Base Case	Reduced Value of Time Sensitivity Test	Difference	Percent Difference
2019	(2)	**90,280**	**90,280**	-	-	$ **249,013**	$ **249,013**	$ -	-
2020	(2)(3)	59,905	59,905	-	-	162,727	162,727	-	-
2021	(3)	**88,003**	**88,003**	-	-	**238,354**	**238,354**	-	-
2022		89,957	88,737	(1,220)	(1.4)	243,731	240,519	(3,212)	(1.3)
2023		92,148	89,658	(2,489)	(2.7)	249,832	243,280	(6,552)	(2.6)
2024		96,055	92,219	(3,836)	(4.0)	259,987	249,862	(10,125)	(3.9)
2025	(4)	**97,475**	**92,847**	**(4,628)**	**(4.7)**	**269,306**	**256,058**	**(13,247)**	**(4.9)**
2030	(4)	**112,133**	**106,481**	**(5,652)**	**(5.0)**	**312,543**	**297,302**	**(15,241)**	**(4.9)**
2035	(4)	**137,811**	**129,875**	**(7,936)**	**(5.8)**	**389,071**	**365,565**	**(23,506)**	**(6.0)**
2040	(4)	**156,020**	**145,846**	**(10,174)**	**(6.5)**	**443,501**	**413,953**	**(29,548)**	**(6.7)**
2045	(4)	**173,461**	**155,224**	**(18,237)**	**(10.5)**	**498,222**	**444,054**	**(54,167)**	**(10.9)**
2050	(4)	**188,172**	**162,052**	**(26,121)**	**(13.9)**	**546,614**	**465,087**	**(81,527)**	**(14.9)**

(1) Net Revenue includes adjustments for unbillable or uncollectable toll revenue.
(2) Forecasts include actual data through March 2020.
(3) COVID-19 traffic impacts have been included in 2020 due to stay-at-home orders, public space closures and other travel restrictions.
Some recovery is assumed in 2021, though longer-term traffic impacts of 8.1 percent have been included through the remainder of the forecast period.
(4) Assumed 2.0 percent Systemwide Toll Increase.

Impacts to collected toll revenues differ slightly from the impacts estimated for transactions over the course of the forecast period. This is due to the fact that a reduction in the assumed value of time will affect LPT and ExpressToll customers differently, affecting the estimated method of payment split on E-470 and the resulting average toll rates. Total collected toll revenues in 2025 are estimated to be $256.1 million under the Reduced VOT scenario, representing an impact of $13.2 million or 4.9 percent. By 2040, total collected toll revenues under this sensitivity test are estimated to be $414.0 million, or 6.7 percent less than the Base Case.

Disclaimer

CDM Smith used currently accepted professional practices and procedures in the development of these traffic and revenue estimates. However, as with any forecast, differences between forecasted and actual results may occur, as caused by events and circumstances beyond the control of the forecasters. In formulating the estimates, CDM Smith reasonably relied upon the accuracy and completeness of information provided (both written and oral) by the E-470 Public Highway Authority. CDM Smith also relied upon the reasonable assurances of other independent parties and is not aware of any material facts that would make such information misleading.

CDM Smith made qualitative judgments related to several key variables in the development and analysis of the traffic and revenue estimates that must be considered; therefore, selecting portions of any individual result without consideration of the intent of the whole may create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results. CDM Smith gives no opinion as to the value or merit of partial information extracted from this report.

All estimates and projections reported herein are based on CDM Smith's experience and judgment and on a review of information obtained from multiple agencies, including the E-470 Public Highway Authority. These estimates and projections may not be indicative of actual or future values and are therefore subject to substantial uncertainty. Certain variables such as future developments, economic cycles, global pandemics and impacts related to advances in automotive technology etc. cannot be predicted with certainty and may affect the estimates or projections expressed in this report, such that CDM Smith does not specifically guarantee or warrant any estimate or projection contained within this report.

While CDM Smith believes that the projections and other forward-looking statements contained within the report are based on reasonable assumptions as of the date of the report, such forward-looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report, as they pertain to socioeconomic and demographic forecasts, proposed residential or commercial land use development projects and/or potential improvements to the regional transportation network.

CDM Smith is not, and has not been, a municipal advisor as defined in Federal law (the Dodd Frank Bill) to the E-470 Public Highway Authority and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to the E-470 Public Highway Authority with respect to the information and material contained in this report. CDM Smith is not recommending and has not recommended any action to the E-470 Public Highway Authority. The E-470 Public Highway Authority should discuss the information and material contained in this report with any and all internal and external advisors that it deems appropriate before acting on this information.

APPENDIX D

FORM OF BOND COUNSEL OPINION

June 18, 2020

E-470 Public Highway Authority
U.S. Bank National Association,
as trustee

E-470 Public Highway Authority

$167,370,000
Senior Revenue Bonds
Series 2020A

Ladies and Gentlemen:

We have been engaged by the E-470 Public Highway Authority (the "Authority") to act as bond counsel for the issuance of the E-470 Public Highway Authority Senior Revenue Bonds, Series 2020A, in the aggregate original principal amount of $167,370,000 (the "2020A Bonds"), pursuant to the Public Highway Authority Law, title 43, article 4, part 5 of the Colorado Revised Statutes (the "Public Highway Authority Law"), as amended, the Supplemental Public Securities Act, title 11, article 57, part 2, Colorado Revised Statutes, as amended (the "Supplemental Public Securities Act"), the Public Securities Refunding Act, title 11, article 56, Colorado Revised Statutes, as amended (the "Public Securities Refunding Act" and, together with the Public Highway Authority Law and the Supplemental Public Securities Act, the "Acts"), and the Amended and Restated Master Bond Resolution (the "Amended and Restated Master Resolution") adopted by the Board of Directors of the Authority (the "Board") on May 14, 2020, as supplemented and amended by the Series 2020A Supplemental Bond Resolution (the "2020A Supplemental Resolution" and, collectively with the Amended and Restated Master Resolution, the "Resolutions") adopted by the Board on May 14, 2020. Terms used but not defined herein have the meanings assigned to them in the Resolutions.

We have examined the Constitution and the laws of the State of Colorado (the "State"), including but not limited to the Acts; the June 26, 1996 order and judgment of the Arapahoe County District Court *In Re the Petition of the E-470 Public Highway Authority* (Case No. 96 CV 946, Division 5) regarding the status of the Authority as an "enterprise" within the meaning of article X, section 20 of the State Constitution; the provisions of the Internal Revenue Code of 1986, as amended (the "Code"), and the regulations, rulings and judicial decisions relevant to the opinions set forth in paragraph 5 below; the transcript of the proceedings relating to the issuance of the 2020A Bonds; and such other certificates, documents, opinions and papers as we deem necessary to render the opinions set forth herein. As to questions of fact material to our opinion, we have relied upon the certifications in the transcript of proceedings and other certifications of public officials furnished to us without undertaking to verify the same by independent investigation.

Based upon and in reliance on the foregoing, we are of the opinion, under existing law and as of the date hereof, that:

1. The Authority is duly created and validly existing as a body corporate and political subdivision of the State with the power to adopt the Resolutions, perform the agreements on its part contained therein and issue the 2020A Bonds.

2. The Resolutions have been duly adopted by the Authority and constitute valid and binding obligations of the Authority enforceable against the Authority.

3. Pursuant to the Public Highway Authority Law and the Supplemental Public Securities Act, the Resolutions create a valid lien as set forth in the Resolutions on the Revenues and other funds pledged by the Resolutions for the security of the 2020A Bonds on a parity with the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 1997B, the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2000B, the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2004A, the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2006B, the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2010A, the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2015A, the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2017B, the Outstanding E-470 Public Highway Authority Senior Revenue Bonds, Series 2019A, and any additional Senior Bonds that are issued under the Amended and Restated Master Resolution in the future, subject to no prior lien granted under the Public Highway Authority Law or the Supplemental Public Securities Act.

4. The 2020A Bonds have been duly authorized, executed and delivered by the Authority and are valid and binding special, limited obligations of the Authority payable solely from the sources provided therefor in the Resolutions.

5. Under the laws, regulations, rulings and judicial decisions existing on the date hereof, interest on the 2020A Bonds is excludable from gross income for federal income tax purposes and is not a specific preference item for purposes of the federal alternative minimum tax. The opinions set forth in the preceding sentence assume the accuracy of certain representations and compliance by the Authority with certain covenants designed to satisfy the requirements of the Code that must be met subsequent to the issuance of the 2020A Bonds. Failure to comply with such requirements could cause interest on the 2020A Bonds to be included in gross income for federal income tax purposes or could otherwise adversely affect such opinions, retroactive to the date of issuance of the 2020A Bonds. The Authority has covenanted to comply with such requirements. We express no opinion regarding other federal tax consequences arising with respect to the 2020A Bonds.

6. Under the Public Securities Refunding Act, the 2020A Bonds and the income therefrom are exempt from State of Colorado taxation, except inheritance, estate and transfer taxes. We express no opinion regarding other tax consequences arising with respect to the 2020A Bonds under the laws of the State or any other state or jurisdiction.

The rights of the holders of the 2020A Bonds and the enforceability of the 2020A Bonds and the Resolutions may be subject to bankruptcy, insolvency, reorganization, moratorium and other similar laws affecting creditors' rights heretofore or hereafter enacted to the extent constitutionally applicable, to the exercise of judicial discretion in appropriate cases, to the exercise by the State and its governmental bodies of the police power inherent in the sovereignty of the State and to the exercise by the United States of America of the powers delegated to it by the Constitution of the United States of America.

We have not been engaged to review the accuracy, completeness or sufficiency of the Official Statement or other offering materials relating to the 2020A Bonds and we express no opinion or belief herein relating thereto.

The opinions expressed herein are delivered as of the date hereof based on, and in reliance upon our examination on the date hereof of, the laws, documents and other items specifically described in the second paragraph hereof, as and to the extent such laws, documents and other items are in effect on the date hereof. We have no obligation to supplement or update any of such opinions based on or with respect to changes after the date hereof in any of such laws, documents or other items or with respect to any other event that occurs after the date hereof.

This opinion is being delivered to the addressees in connection with the issuance of the 2020A Bonds by the Authority, and may not be relied upon for any other purpose or by any other person without our express written consent.

Respectfully submitted,

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APPENDIX E

FORM OF CONTINUING DISCLOSURE UNDERTAKING

This Continuing Disclosure Undertaking (the "**Disclosure Certificate**") is executed and delivered by the E-470 Public Highway Authority (the "**Authority**") in connection with the issuance of the Authority's $167,370,000 in aggregate principal amount of Senior Revenue Bonds, Series 2020A (the "**Series 2020A Bonds**"). The Series 2020A Bonds are being issued pursuant to an Amended and Restated Master Resolution adopted by the Board of Directors of the Authority (the "**Board**") on May 14, 2020 and a Series 2020A Supplemental Bond Resolution adopted by the Board on May 14, 2020 (collectively, the "**Resolutions**"). The Authority covenants and agrees as follows:

SECTION 1. Purpose of the Disclosure Certificate. This Disclosure Certificate is being executed and delivered by the Authority for the benefit of the Bondholders and in order to assist the respective Participating Underwriters in complying with S.E.C. Rule 15c2-12(b)(5).

SECTION 2. Definitions. In addition to the definitions set forth in the Resolutions and the Official Statement dated June 10, 2020 (the "**Official Statement**") used in connection with the sale of the Series 2020A Bonds, which apply to any capitalized term used in this Disclosure Certificate unless otherwise defined in this section, the following capitalized terms shall have the following meanings:

"**Annual Financial Information**" means any Annual Financial Information provided by the Authority pursuant to, and as described in, Sections 3 and 4 of this Disclosure Certificate.

"**Debt Obligation**" means short-term and long-term debt obligations of the Authority under the terms of an indenture, loan agreement, lease that operates as a vehicle to borrow money, or similar contract.

"**Dissemination Agent**" means any person, firm, corporation or other entity and any successor thereto, designated in writing by the Authority to serve as its agent for disseminating on behalf of the Authority the information required hereby, and which has filed with the Authority a written acceptance of such designation.

"**Financial Obligation**" means a (i) Debt Obligation; (ii) derivative instrument entered into in connection with, or pledged as security or a source of payment for, an existing or planned Debt Obligation; or (iii) guarantee of (i) or (ii). The term Financial Obligation shall not include municipal securities as to which a final official statement has been provided to the MSRB consistent with the Rule.

"**Listed Events**" means any of the events listed in Section 5(a) and 5(b) of this Disclosure Certificate.

"**MSRB**" shall mean the Municipal Securities Rulemaking Board or any other entity designated or authorized by the United States Securities and Exchange Commission to receive reports pursuant to the Rule. Unless otherwise designated by the MSRB or the Securities and Exchange Commission, filings with the MSRB are to be made through the Electronic Municipal Market Access (EMMA) system of the MSRB available on the Internet at http://emma.msrb.org.

"**Participating Underwriters**" means J.P. Morgan Securities LLC, Morgan Stanley & Co. LLC and Jefferies LLC, the underwriters for the Series 2020A Bonds required to comply with the Rule in connection with the issuance of the Series 2020A Bonds.

"**Rule**" means Rule 15c2-12 adopted by the Securities and Exchange Commission under the Securities Exchange Act of 1934, as the same has been amended and may in the future be amended from time to time.

SECTION 3. <u>Provision of Annual Financial Information and Annual Budget Information</u>.

(a) The Authority shall provide, or shall cause the Dissemination Agent to provide, not later than 210 days after the end of each fiscal year of the Authority, commencing with the Authority's fiscal year ending December 31, 2020, to the MSRB the Annual Financial Information which is consistent with the requirements of Section 4 of this Disclosure Certificate. Not later than 15 Business Days prior to said date, the Authority shall provide the Annual Financial Information to the Dissemination Agent (if other than the Authority). The Annual Financial Information may be submitted as a single document or as separate documents comprising a package, and may cross-reference other information as provided in Section 4 of this Disclosure Certificate; provided that the audited financial statements of the Authority may be submitted separately from the balance of the Annual Financial Information.

(b) If the Authority fails to provide to the MSRB the Annual Financial Information by the date required in subsection (a), the Authority shall send a notice to the MSRB in substantially the form attached hereto as **Exhibit A**.

(c) If the Authority designates a Dissemination Agent pursuant to this Disclosure Certificate, the Dissemination Agent shall file a report with the Authority certifying that the Annual Financial Information has been provided pursuant to this Disclosure Certificate, stating the date it was provided to the MSRB.

(d) The Authority shall provide, or cause the Dissemination Agent to provide, to the MSRB not later than 30 days after the end of each fiscal year, commencing with the Authority's fiscal year ending December 31, 2021, the annual budget of the Authority adopted by the Board.

SECTION 4. <u>Content of Annual Financial Information</u>. The Authority's Annual Financial Information shall contain or incorporate by reference the following:

(a) The most recent financial statements of the Authority audited in accordance with generally accepted accounting principles (the "**Audit**");

(b) All gross revenues received by, and operating expenses and net toll revenues of the Authority during the Authority's most recently ended fiscal year, to the extent not clearly set forth in the Audit; and

(c) All bonds or other financial obligations of the Authority issued, remarketed or incurred by the Authority during the Authority's most recent fiscal year, to the extent not clearly set forth in the Audit.

Any or all of the items listed above may be incorporated by reference from other documents, including issuance statements or official statements of debt issues of the Authority or related public entities, or the Authority's audited financial statements, which have been submitted to the MSRB or the Securities and Exchange Commission. If the document incorporated by reference is a final official statement, it must be available from the MSRB. The Authority shall clearly identify each such other document so incorporated by reference.

SECTION 5. <u>Reporting of Significant Events</u>.

(a) At any time the Series 2020A Bonds are outstanding, in a timely manner not in excess of ten (10) business days after the occurrence of an event, the Authority shall provide or cause to be provided to the MSRB notice of any of the following events:

(1) principal and interest payment delinquencies with respect to the Series 2020A Bonds;

(2) unscheduled draws on debt service reserves with respect to the Series 2020A Bonds reflecting financial difficulties;

(3) unscheduled draws on credit enhancements with respect to the Series 2020A Bonds reflecting financial difficulties;

(4) substitution of credit or liquidity providers, or their failure to perform with respect to the Series 2020A Bonds;

(5) adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701-TEB) or other material notices or determinations with respect to the tax status of the Series 2020A Bonds, or other material events affecting the tax status of the Series 2020A Bonds;

(6) defeasances with respect to the Series 2020A Bonds;

(7) rating changes with respect to the Series 2020A Bonds;

(8) tender offers with respect to the Series 2020A Bonds;

(9) default, event of acceleration, termination event, modification of terms, or other similar events under the terms of a Financial Obligation of the Authority, any of which reflect financial difficulties; and

(10) bankruptcy, insolvency, receivership, or similar event of the Authority.

For the purposes of the event identified in paragraph (5)(a)(10) hereof, the event is considered to occur when any of the following occur: (i) the appointment of a receiver, fiscal agent or similar officer for the Authority in a proceeding under the U.S. Bankruptcy Code or in any other proceeding under state or federal law in which a court or governmental authority has assumed jurisdiction over substantially all of the assets or business of the Authority, or if such jurisdiction has been assumed by leaving the existing governing body and officials or officers in possession but subject to the supervision and orders of a court or governmental authority, or (ii) the entry of an order confirming a plan of reorganization, arrangement or liquidation by a court or governmental authority having supervision or jurisdiction over substantially all of the assets or business of the Authority.

(b) At any time the Series 2020A Bonds are outstanding, in a timely manner not in excess of ten (10) business days after the occurrence of an event, the Authority shall provide or cause to be provided to the MSRB notice of any of the following events with respect to the Series 2020A Bonds, <u>if material</u>:

(1) non-payment related defaults;

(2) modification to the rights of the beneficial owners of the Series 2020A Bonds;

(3) bond calls;

(4) release, substitution or sale of property securing repayment of the Series 2020A Bonds;

(5) the consummation of a merger, consolidation, or acquisition involving the Authority or the sale of all or substantially all of the assets of the Authority, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms; and

(6) appointment of a successor or additional trustee or a change in the name of a trustee; and

(7) incurrence of a Financial Obligation of the Authority; and agreement to covenants, events of default, remedies, priority rights, or other similar terms of a Financial Obligation of the Authority, any of which affect holders of the Series 2020A Bonds.

Whenever the Authority obtains knowledge of the occurrence of an event specified in Section 5(b) hereof, the Authority shall as soon as possible determine if such event would constitute material information for owners of the Series 2020A Bonds.

SECTION 6. Term. This Disclosure Certificate shall be in effect from the date hereof and shall extend to the earliest of (a) the date all principal and interest on the Series 2020A Bonds shall have been deemed paid pursuant to the terms of the Resolutions; (b) the date that the Authority shall no longer constitute an obligated person with respect to the Series 2020A Bonds within the meaning of the Rule; and (c) the date on which those portions of the Rule require continuing disclosure as provided in this Disclosure Certificate are determined to be invalid by a court of competent jurisdiction in a non-appealable action or have been repealed.

SECTION 7. Dissemination Agent. The Authority may, from time to time, appoint or engage a Dissemination Agent to assist it in carrying out its obligations under this Disclosure Certificate, and may discharge any such Agent, with or without appointing a successor Dissemination Agent.

SECTION 8. Amendment; Waiver. Notwithstanding any other provision of this Disclosure Certificate, the Authority may amend this Disclosure Certificate, and any provision of this Disclosure Certificate may be waived, (a) if such amendment occurs prior to the actual original issuance and delivery of the Series 2020A Bonds and the Participating Underwriters consent thereto, (b) if such amendment is consented to by the owners of no less than a majority in aggregate principal amount of the Series 2020A Bonds obtained in the manner prescribed by the Resolutions, or (c) if such amendment or waiver is otherwise required by the Rule or permitted by the Rule without consent of the owners of the Series 2020A Bonds. Written notice of any such amendment or waiver shall be provided by the Authority to the MSRB, and the Annual Financial Information shall explain the reasons for the amendment and the impact of any change in the type of information being provided.

SECTION 9. Additional Information. Nothing in this Disclosure Certificate shall be deemed to prevent the Authority from disseminating any other information, using the means of dissemination set forth in this Disclosure Certificate or any other means of communication, or including any other information in any Annual Financial Information or notice of occurrence of a Listed Event, in addition to that which is specifically required by this Disclosure Certificate; provided, however, that the Authority shall have no obligation under this Agreement to update such information or include it in any future Annual Financial Information or notice of occurrence of a Listed Event.

SECTION 10. Default and Enforcement. In the event of a failure of the Authority to comply with any provision of this Disclosure Certificate, any Bondholder may take such actions as may be necessary and appropriate, including seeking mandate or specific performance by court order, to cause the Authority to comply with its obligations under this Disclosure Certificate; provided that any such action must be taken only in a court of competent jurisdiction within the State; and provided further that only the owners of no less than a majority in aggregate principal amount of the Series 2020A Bonds then outstanding may take action to seek specific performance in connection with a challenge to the adequacy of the information provided by the Authority in accordance with this Disclosure Certificate, after notice and opportunity to comply as provided herein. A Bondholder shall provide written notice to the Authority of its intention to take an action to cause the Authority to comply with this Disclosure Certificate at least 30 days in advance of taking such action, and the Authority shall have the opportunity to cure within such 30-day period. A DEFAULT UNDER THIS DISCLOSURE CERTIFICATE SHALL NOT BE DEEMED AN EVENT OF DEFAULT UNDER THE RESOLUTIONS, AND THE SOLE REMEDY UNDER THIS DISCLOSURE CERTIFICATE IN THE EVENT OF ANY FAILURE OF THE AUTHORITY TO COMPLY WITH THIS DISCLOSURE CERTIFICATE SHALL BE AN ACTION TO COMPEL PERFORMANCE AS PROVIDED IN THIS SECTION 10.

SECTION 11. Beneficiaries. This Disclosure Certificate shall inure solely to the benefit of the Authority, the Dissemination Agent, the Participating Underwriters, and Holders from time to time of the Series 2020A Bonds, and shall create no rights in any other person or entity.

SECTION 12. Filing. The filing of Annual Financial Information, audited financial statements, notices of Listed Events or any other notice required by this Disclosure Certificate shall be effected by sending the filing or notice to the MSRB, in such designated electronic format, accompanied by such identifying information, as shall have been prescribed by the MSRB and which shall be in effect on the date of filing of such information.

Date: June 18, 2020

E-470 PUBLIC HIGHWAY AUTHORITY

By: ____

Title:____

EXHIBIT A
NOTICE TO MSRB OF
FAILURE TO FILE ANNUAL FINANCIAL INFORMATION

E-470 Public Highway Authority

$167,370,000 (aggregate principal amount) of E-470 Public Highway Authority Senior Revenue Bonds, Series 2020A

Issued on June 18, 2020

NOTICE IS HEREBY GIVEN that the Authority has not provided the Annual Financial Information with respect to the above-named Bonds as required by that certain Continuing Disclosure Undertaking of E-470 Public Highway Authority dated June 18, 2020. The Authority anticipates that the Annual Financial Information will be filed by _________ __, 20__.

Date: ______________________

E-470 PUBLIC HIGHWAY AUTHORITY

By: ____

Title:____

APPENDIX F

BOOK-ENTRY ONLY SYSTEM

*The information in this section concerning The Depository Trust Company ("**DTC**") New York, New York and DTC's Book-Entry Only System has been obtained from DTC, and the Authority and the Underwriters take no responsibility for the accuracy thereof.*

DTC will act as securities depository for the Series 2020A Bonds. The Series 2020A Bonds will be issued as fully registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully-registered Series 2020A Bond certificate will be issued for each Series, maturity and interest rate of the Series 2020A Bonds, each in the aggregate principal amount of such maturity, and will be deposited with DTC.

DTC, the world's largest securities depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System, a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934, as amended. DTC holds and provides asset servicing for over 3.5 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments (from over 100 countries) that DTC's participants ("**Direct Participants**") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions, in deposited securities through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations, and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation ("**DTCC**"). DTCC is the holding company for DTC, National Securities Clearing Corporation, and Fixed Income Clearing Corporation, all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("**Indirect Participants**"). DTC is rated AA+ by Standard & Poor's. The DTC Rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at www.dtcc.com and www.dtc.org.

Purchases of Series 2020A Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the Series 2020A Bonds on DTC's records. The ownership interest of each actual purchaser of each Series 2020A Bond ("**Beneficial Owner**") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owners entered into the transaction. Transfers of ownership interests in the Series 2020A Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in Series 2020A Bonds, except in the event that use of the book-entry system for the Series 2020A Bonds is discontinued.

To facilitate subsequent transfers, all Series 2020A Bonds deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of Series 2020A Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the Series 2020A

Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such Series 2020A Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time.

Redemption notices shall be sent to DTC. If less than all of the Series 2020A Bonds within an issue are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such issue to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to Series 2020A Bonds unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to the Authority as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the Series 2020A Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal and interest payments on Series 2020A Bonds will be made to Cede & Co., or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from the Authority or the Paying Agent, on payable dates in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participant and not of DTC, the Paying Agent, or the Authority, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of principal and interest to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of the Paying Agent, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

DTC may discontinue providing its services as depository with respect to the Series 2020A Bonds at any time by giving reasonable notice to the Authority or the Paying Agent. Under such circumstances, in the event that a successor depository is not obtained, Series 2020A Bond certificates are required to be printed and delivered.

The Authority may decide to discontinue use of the system of book-entry transfers through DTC (or a successor securities depository). In that event, Series 2020A Bond certificates will be printed and delivered.

The foregoing description of the procedures and record keeping with respect to beneficial ownership interests in the Series 2020A Bonds, payment of principal, interest, and other payments on the Series 2020A Bonds to Direct Participants, Indirect Participants, or Beneficial Owners, confirmation and transfer of beneficial ownership interest in such Series 2020A Bonds, and other related transactions by and between DTC, the Direct Participants, the Indirect Participants, and the Beneficial Owners is based solely on information provided by DTC. Such information has been obtained from sources that the Authority and the Underwriters believe to be reliable, but neither the Authority nor the Underwriters take any responsibility for the accuracy thereof. Accordingly, no representations can be made concerning these matters and neither the Direct Participants, the Indirect Participants, nor the Beneficial Owners should rely on the foregoing information with respect to such matters but should instead confirm the same with DTC or the Direct Participants, as the case may be.

APPENDIX G

Historical Passenger Car Toll Rates

The following tables set forth the Authority's historical toll rates for two-axle vehicles using the E-470 Toll Road for fiscal years 2010 through 2019. The Authority's Board voted in November 2017 to adjust the Authority's toll rate structure for the years 2018 to 2020 by modifying the License Plate Toll® ("**LPT**") premium, lowering toll rates at the mainline toll Barrier C to match the rates at Barrier A, and freezing the remaining ExpressToll rates at the 2017 levels during this three year period. Such toll schedule was developed by the Authority in 2017 taking into account recommendations of the Traffic and Revenue Consultant.

Historical Passenger Car Toll Rates
LicensePlateToll® Customers

Interchange No.	Location	Type (direction to/from)	2010[1]	2011[2]	2012	2013	2014	2015	2016	2017	2018	2019
1	I-25	No Toll	--	--	--	--	--	--	--	--	--	--
2	Jamaica	No Toll	--	--	--	--	--	--	--	--	--	--
3	Peoria	Toll (South)	$1.00	$1.20	$1.25	$1.30	$1.40	$1.45	$1.50	$1.55	$1.95	$2.05
	Barrier A	**Mainline Toll**	**2.25**	**2.70**	**2.80**	**2.95**	**3.05**	**3.15**	**3.25**	**3.40**	**4.15**	**4.30**
4	Potomac/Chambers	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
5	Jordan	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
6	Parker	No Toll	--	--	--	--	--	--	--	--	--	--
6A	Gartrell	Toll (South)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
7	Smoky Hill	Toll (South)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
8	Quincy	Toll (South)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
	Barrier B	**Mainline Toll**	**2.50**	**3.00**	**3.15**	**3.25**	**3.40**	**3.45**	**3.55**	**3.70**	**4.50**	**4.65**
9	Jewell	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
10	Sixth Avenue	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
11	I-70	No Toll	--	--	--	--	--	--	--	--	--	--
	Barrier C	**Mainline Toll**	**2.50**	**3.00**	**3.15**	**3.25**	**3.40**	**3.45**	**3.55**	**3.70**	**4.15**	**4.30**
13	56th Avenue	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
14	64th Avenue	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
15	Pena Boulevard	No Toll	--	--	--	--	--	--	--	--	--	--
	Barrier D	**Mainline Toll**	**2.50**	**3.00**	**3.15**	**3.25**	**3.40**	**3.45**	**3.55**	**3.70**	**4.50**	**4.65**
17	96th Avenue	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
18	104th Avenue	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
19	120th Avenue	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
20	I-76	No Toll	--	--	--	--	--	--	--	--	--	--
21	US85	Toll (South)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
	Barrier E	**Mainline Toll**	**2.50**	**3.00**	**3.15**	**3.25**	**3.40**	**3.45**	**3.55**	**3.70**	**4.50**	**4.65**
23	Quebec	Toll (North)	--	--	--	--	--	1.45	1.50	1.55	1.95	2.05
24	Colorado	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
25	York	Toll (North)	1.00	1.20	1.25	1.30	1.40	1.45	1.50	1.55	1.95	2.05
26	I-25	No Toll	--	--	--	--	--	--	--	--	--	--

[1] Starting in January 1, 2009, the Authority implemented the all-electronic toll collection system. *See* "THE E-470 TOLL ROAD – Toll Collection System."
[2] The Authority implemented an annual toll rate increase policy effective January 1, 2011, that continued through 2017 and was amended with an effective date of January 1, 2018.
Source: E-470 Public Highway Authority

Historical Passenger Car Toll Rates
ExpressToll® Customers

Interchange No.	Location	Type (direction to/from)	2010[1]	2011[2]	2012	2013	2014	2015	2016	2017	2018	2019
1	I-25	No Toll	--	--	--	--	--	--	--	--	--	--
2	Jamaica	No Toll	--	--	--	--	--	--	--	--	--	--
3	Peoria	Toll (South)	$ .90	$ .95	$1.00	$1.05	$1.10	$1.15	$1.20	$1.25	$1.25	$1.25
	Barrier A	**Mainline Toll**	**2.00**	**2.15**	**2.25**	**2.35**	**2.45**	**2.50**	**2.60**	**2.70**	**2.70**	**2.70**
4	Potomac/Chambers	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
5	Jordan	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
6	Parker	No Toll	--	--	--	--	--	--	--	--	--	--
6A	Gartrell	Toll (South)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
7	Smoky Hill	Toll (South)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
8	Quincy	Toll (South)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
	Barrier B	**Mainline Toll**	**2.25**	**2.40**	**2.50**	**2.60**	**2.70**	**2.75**	**2.85**	**2.95**	**2.95**	**2.95**
9	Jewell	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
10	Sixth Avenue	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
11	I-70	No Toll	--	--	--	--	--	--	--	--	--	--
	Barrier C	**Mainline Toll**	**2.25**	**2.40**	**2.50**	**2.60**	**2.70**	**2.75**	**2.85**	**2.95**	**2.70**	**2.70**
13	56th Avenue	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
14	64th Avenue	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
15	Pena Boulevard	No Toll	--	--	--	--	--	--	--	--	--	--
	Barrier D	**Mainline Toll**	**2.25**	**2.40**	**2.50**	**2.60**	**2.70**	**2.75**	**2.85**	**2.95**	**2.95**	**2.95**
17	96th Avenue	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
18	104th Avenue	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
19	120th Avenue	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
20	I-76	No Toll	--	--	--	--	--	--	--	--	--	--
21	US85	Toll (South)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
	Barrier E	**Mainline Toll**	**2.25**	**2.40**	**2.50**	**2.60**	**2.70**	**2.75**	**2.85**	**2.95**	**2.95**	**2.95**
23	Quebec	Toll (North)	--	--	--	--	--	1.15	1.20	1.25	1.25	1.25
24	Colorado	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
25	York	Toll (North)	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.25	1.25
26	I-25	No Toll	--	--	--	--	--	--	--	--	--	--

[1] Starting in January 1, 2009, the Authority implemented the all-electronic toll collection system. *See* "THE E-470 TOLL ROAD – Toll Collection System."

[2] The Authority implemented an annual toll rate increase policy effective January 1, 2011, that continued through 2017. ExpressToll rates were not increased in 2018 including a toll rate reduction at Mainline Toll Barrier C which was effective on January 1, 2018.

Source: E-470 Public Highway Authority

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APPENDIX H

Future Passenger Car Toll Rates

The following tables set forth the toll schedule showing future toll rates, beginning with the scheduled toll rates in 2020. Along with the 2017 policy which set the toll rate structure for the years 2018 to 2020, the Board approved in November 2019 to adjust and restructure the toll rates for 2020 for commercial vehicles and LPT customers. For commercial vehicles, the Authority enacted a two-year pilot program that includes an approximately 25% discount to encourage commercial vehicles to use the roadway during non-peak hours between 9:00 a.m. and 12:00 p.m. daily, and provided an overall reduction to each additional axle charge of 5% during the hours of 12:00 p.m. to 9:00 a.m. daily. The Board also approved to freeze the LPT toll rates to match 2019.

Further, on May 14, 2020, the Board of the Authority approved and adopted to extend the 2020 toll rate schedule through 2021 with Resolution 20-01, "Regarding Extension of Resolution 19-03's Toll Rate Schedule for Calendar Year 2021," to keep rates frozen at the 2020 levels. Future toll rates will be evaluated each year in conjunction with the annual budget and are subject to change.

For toll rates in 2021 and beyond, the below rates match the May 2020 Comprehensive Traffic & Revenue Study by the Traffic and Revenue Consultant. For information regarding the implementation of the current toll schedule, *see* the May 2020 Comprehensive Traffic & Revenue Study included herein at **Appendix C**. The following schedule is subject to adjustment by the Authority to meet revenue needs, and no assurance can be given that the scheduled toll rate increases will be imposed in the amounts and at the times shown. *See* "THE E-470 TOLL ROAD – Toll Collection System" and "THE TRAFFIC & REVENUE STUDY."

Scheduled Passenger Car Toll Rates[(1)]
LicensePlateToll® Customers

Interchange No.	Location	Type (direction to/from)	2020-2024	2025
1	I-25	No Toll	--	--
2	Jamaica	No Toll	--	--
3	Peoria	Toll (South)	$2.05	$2.05
	Barrier A	**Mainline Toll**	**4.30**	**4.40**
4	Potomac/Chambers	Toll (North)	2.05	2.05
5	Jordan	Toll (North)	2.05	2.05
6	Parker	No Toll	--	--
7	Gartrell	Toll (South)	2.05	2.05
8	Smoky Hill	Toll (South)	2.05	2.05
9	Quincy	Toll (South)	2.05	2.05
	Barrier B	**Mainline Toll**	**4.65**	**4.80**
10	Jewell	Toll (North)	2.05	2.05
11	Sixth Avenue	Toll (North)	2.05	2.05
12	I-70	No Toll	--	--
	Barrier C	**Mainline Toll**	**4.30**	**4.40**
13	38th Avenue	Toll (North)	--	2.05
14	56th Avenue	Toll (North)	2.05	2.05
15	64th Avenue	Toll (North)	2.05	2.05
16	Pena Boulevard	No Toll	--	--
17	88th Avenue	Toll (South)	--	--
	Barrier D	**Mainline Toll**	**4.65**	**4.80**
18	96th Avenue	Toll (North)	2.05	2.05
19	104th Avenue	Toll (North)	2.05	2.05
20	112th Avenue	Toll (North)	--	----
21	120th Avenue	Toll (North)	2.05	2.05
22	I-76	No Toll	--	--
23		Toll (South)	--	
24	US85	Toll (South)	2.05	2.05
	Barrier E	**Mainline Toll**	**4.65**	**4.80**
25	Quebec	Toll (North)	2.05	2.05
26	Colorado	Toll (North)	2.05	2.05
27	York	Toll (North)	2.05	2.05
28	I-25	No Toll	--	--

(1) Toll rates for 2021 are based on the board resolution approved in May 2020, and match the May 2020 Comprehensive Traffic & Revenue Study. Such schedule and future rates are not guaranteed to occur and is subject to annual review by the board of directors. Rates for commercial vehicles and other vehicle classes are based on the number of axles and are a factor of the rate for passenger cars (or two-axle vehicles). Commercial vehicles and other vehicle classes represented approximately 4% of total annual transactions for 2019.

Source: E-470 Public Highway Authority

Scheduled Passenger Car Toll Rates [(1)]
ExpressToll® Customers

Interchange No.	Location	Type (direction to/from)	2020-2024	2025
1	I-25	No Toll	--	--
2	Jamaica	No Toll	--	--
3	Peoria	Toll (South)	$1.25	$1.30
	Barrier A	**Mainline Toll**	**2.70**	**2.75**
4	Potomac/Chambers	Toll (North)	1.25	1.30
5	Jordan	Toll (North)	1.25	1.30
6	Parker	No Toll	--	--
7	Gartrell	Toll (South)	1.25	1.30
8	Smoky Hill	Toll (South)	1.25	1.30
9	Quincy	Toll (South)	1.25	1.30
	Barrier B	**Mainline Toll**	**2.95**	**3.00**
10	Jewell	Toll (North)	1.25	1.30
11	Sixth Avenue	Toll (North)	1.25	1.30
12	I-70	No Toll	--	--
	Barrier C	**Mainline Toll**	**2.70**	**2.75**
13	38th Avenue	Toll (North)	--	1.30
14	56th Avenue	Toll (North)	1.25	1.30
15	64th Avenue	Toll (North)	1.25	1.30
16	Pena Boulevard	No Toll	--	--
17	88th Avenue	Toll (South)	--	--
	Barrier D	**Mainline Toll**	**2.95**	**3.00**
18	96th Avenue	Toll (North)	1.25	1.30
19	104th Avenue	Toll (North)	1.25	1.30
20	112th Avenue	Toll (North)	--	--
21	120th Avenue	Toll (North)	1.25	1.30
22	I-76	No Toll	--	--
23		Toll (South)	--	--
24	US85	Toll (South)	1.25	1.30
	Barrier E	**Mainline Toll**	**2.95**	**3.00**
25	Quebec	Toll (North)	1.25	1.30
26	Colorado	Toll (North)	1.25	1.30
27	York	Toll (North)	1.25	1.30
28	I-25	No Toll	--	--

(1) Toll rates for 2021 are based on the board resolution approved in May 2020, and match the May 2020 Comprehensive Traffic & Revenue Study. Such schedule and future rates are not guaranteed to occur and is subject to annual review by the board of directors. Rates for commercial vehicles and other vehicle classes are based on the number of axles and are a factor of the rate for passenger cars (or two-axle vehicles). Commercial vehicles and other vehicle classes represented approximately 4% of total annual transactions for 2019.

Source: E-470 Public Highway Authority

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