NATIONAL CAPITAL REGION
TRANSPORTATION PLANNING BOARD

MEMORANDUM

September 17, 2014

To: **Transportation Planning Board**

From: **Jane Posey**
Senior Transportation Engineer

Subject: **Air Quality Conformity Assessment for the 2014 Constrained Long Range Plan (CLRP) and the FY2015-2020 Transportation Improvement Program (TIP)**

INTRODUCTION

This memo documents summary results of the air quality conformity assessment of the 2014 CLRP and FY2015-2020 TIP with respect to the following pollutants: (1) ground level ozone precursors- Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx), (2) fine particulate matter – $PM_{2.5}$ direct and $PM_{2.5}$ Precursor NOx, and (3) Wintertime Carbon Monoxide (CO). A summary description of the emissions threshold (budgets) for these pollutants is provided below.

- **Ozone Season VOC and NOx**. On May 21, 2012 EPA designated the Metropolitan Washington, DC, (DC-MD-VA) region as 'marginal' nonattainment for the 2008 ozone National Ambient Air Quality Standards (NAAQS). Under a 'marginal' designation it is not necessary to develop updated mobile budgets; however, the region must still adhere to those currently approved by EPA under the old 1997 standard. The currently approved budgets for VOC and NOx were submitted to the EPA by the Metropolitan Washington Air Quality Committee (MWAQC) in 2007, as part of an 8-hour ozone SIP, responding to the 1997 Ozone Standard, under which the region was designated as 'moderate'. On February 7, 2013 EPA found adequate the 2009 Attainment and 2010 Contingency budgets included in this SIP. The budgets are 66.5 tons/day of Volatile Organic Compounds (VOC) and 146.1 tons/day of Nitrogen Oxides (NOx) for the 2009 Attainment Plan and 144.3 tons/day of NOx for the 2010 Contingency Plan.

- **Fine Particles ($PM_{2.5}$).** On December 17, 2004 EPA designated the Metropolitan Washington, DC, (DC-MD-VA) region as nonattainment for the 1997 Fine Particles NAAQS. The region developed and submitted an Attainment SIP with motor vehicle emissions budgets for $PM_{2.5}$ direct and $PM_{2.5}$ Precursor NOx. On January 12, 2009, however the EPA determined that the region had attained the 1997 $PM_{2.5}$ NAAQS and issued a clean data determination for the area. The region subsequently withdrew the $PM_{2.5}$ Attainment SIP and decided to seek redesignation as a Maintenance Area for the 1997 $PM_{2.5}$ Fine Particles NAAQS. On May 22, 2013 MWAQC approved a $PM_{2.5}$ Redesignation Request and a Maintenance Plan for the Washington region. This Maintenance Plan includes forecast year mobile budgets for $PM_{2.5}$ direct and $PM_{2.5}$ Precursor NOx for 2017 and 2025. On April 28, 2014, EPA found these mobile budgets adequate for use in conformity analyses, with an effective date of May 13, 2014, so these budgets will be used for the first time officially in

the conformity analysis of the 2014 CLRP. The Maintenance Plan includes two tiers of mobile budgets. Tier 1 budgets were based on mobile emission inventory projections for 2017 and 2025, and are applicable with EPA's adequacy finding. Tier 2 budgets were developed by adding a 20% buffer to the mobile emission inventory projections for 2017 and 2025. The Tier 2 mobile budgets will become effective if it is determined that technical uncertainties primarily due to model changes and to vehicle fleet turnover, which may affect future motor vehicle emissions inventories, lead to motor vehicle emissions estimates above the Tier 1 budgets. The determination to use the Tier 2 budgets will be made through the interagency consultation process. Tier 1 mobile budgets are 1,787 tons/year for 2017 $PM_{2.5}$ direct, 1,350 tons/year for 2025 $PM_{2.5}$ direct, 41,709 tons/year for 2017 $PM_{2.5}$ Precursor NOx, and 27,400 tons/year for 2025 $PM_{2.5}$ Precursor NOx. Tier 2 mobile budgets are 2,144 tons/year for 2017 $PM_{2.5}$ direct, 1,586 tons/year for 2025 $PM_{2.5}$ direct, 50,051 tons/year for 2017 $PM_{2.5}$ Precursor NOx, and 32,880 tons/year for 2025 $PM_{2.5}$ Precursor NOx.

- **Wintertime CO.** The region is designated as a Maintenance Area for mobile source wintertime CO, and is required to show that CO emissions from on-road mobile sources do not exceed the approved budget of 1671.5 tons/day.

The regional air quality conformity analysis of the projects and programs in the 2014 CLRP and FY2015-2020 TIP shows that mobile emissions are within the mobile budgets for all analysis years for all pollutants.

The results, based upon analyses contained in the full technical report, of the Air Quality Conformity Determination of the 2014 Constrained Long Range Plan and FY2015-2020 Transportation Improvement Program for the Washington Metropolitan Region, were released for public comment and interagency consultation on September 11, 2014. The public comment period ends on October 11, 2014.

BACKGROUND

The Transportation Planning Board (TPB) approved the Scope of Work and project submissions for the 2014 CLRP and FY2015-2020 TIP air quality conformity assessment on April 16, 2014.

Key technical inputs include:
- New Cooperative Land Activity Forecasts- Round 8.3
- New Project and Updates to Existing Project Submissions
- The Version 2.3.57 Travel Demand Model including a 3722 Transportation Analysis Zones (TAZ) area system
- 2011 Vehicle Registration Data with an updated vehicle population forecasting methodology
- EPA's MOVES 2010a Emissions Estimation Model
- Updated Environmental Inputs: fuel, Meteorology, and Inspection & Maintenance Program data

WORK ACTIVITIES

Inventories were developed for each pollutant for five forecast years (2015, 2017, 2025, 2030 and 2040). Ozone season pollutants (VOC and NOx) and wintertime CO are inventoried for average weekday conditions, and $PM_{2.5}$ precursor NOx and $PM_{2.5}$ direct are inventoried to reflect

emissions on a yearly total basis. These inventories address a primary conformity assessment criterion to demonstrate that emissions associated with the plan do not exceed the SIP budgets approved or found adequate for use in regional air quality conformity analyses.

CLRP Projects

Attachment A lists the major changes to the conformity project inputs since the 2013 CLRP. A complete list of highway and transit projects with updates as approved by the TPB included in the conformity analysis is shown in Appendix B of the full technical report.

Land Activity Forecasts

The COG Board approved the draft Round 8.3 Cooperative Forecasts for use in the air quality conformity analysis of the 2014 CLRP and FY2015-2020 TIP in February, 2014. This update from Round 8.2 includes changes in the District, as well as Frederick, Fairfax, Loudoun, and Prince William counties. Generally Round 8.3, has slightly higher region-wide projections of households, population, and employment by 2040 when compared to Round 8.2. It also includes updates from the Baltimore region (BMC Round 8) for Anne Arundel, Howard, and Carroll counties. Attachment B shows a summary of the Round 8.3 data.

Travel Modeling Process

Travel demand forecasts were developed for each of the analysis years using the Version 2.3.57 travel demand model. Exhibit 1 presents the geographic areas for travel modeling and for emissions reporting for each pollutant. Exhibit 2 presents the resulting average weekday transit trips, vehicle trips, and Vehicle Miles Travelled (VMT) results through time for each conformity analysis year, for the full modeled area.

MOVES

MOVES (MOtor Vehicle Emissions Simulator) is a software program developed by the US Environmental Protection Agency (EPA) to estimate air pollution emissions from on-road mobile sources. Officially released in 2010, the MOVES model version, MOVES2010, replaced the previous on-road emissions model, MOBILE6.2. MOVES2010a, a subsequent release of the program, was used in this conformity analysis, as it was for the conformity analysis of the 2013 CLRP.

MOVES Inputs

Inputs to the MOVES model include both transportation and environmental data. Transportation data include travel information from the travel demand model, such as VMT and speed distributions. They also include vehicle population data, which is derived from Vehicle Identification Number (VIN) based registration records from the District, Maryland, and Virginia Departments of Motor Vehicles (DMV). Environmental data include fuel supply and formulation, meteorology data, and state Inspection and Maintenance (I/M) program information.

Outputs from the travel demand model served as inputs to the MOVES model after a post-model

processing phase in order to be become MOVES-compatible. Average annual weekday VMT and trip data generated by the travel demand model are adjusted by a post processor to create annual county-level VMT estimates for the MOVES model. VMT are defined as Annual VMT and VMT by facility type. The annual VMT for MOVES input is based on 6 HPMS vehicle types. The VMT by facility type is stratified by MOVES vehicle type (13 categories) and road type (5 categories). Average vehicle speeds are stratified by vehicle type, road type, time of day, and type of day (i.e. weekday vs. weekend). Bus VMT and Auto Access to Transit VMT are added into the mix.

The 2011 VIN vehicle population profile – consisting of age and vehicle type distributions -- served as the basis to develop future year vehicle population distributions. Trendlines, which were derived from actual vehicle population data from the period 1975-2011, served as the basis for developing total vehicle population projections – by jurisdiction -- for the analysis years. As a departure from previous conformity cycles, future year vehicle population projections are no longer derived using growth rates; instead, they are derived directly from the trendlines' equations. The updated methodology is documented in a separate brief technical memorandum, which is available for review.

Inputs related to fuel supply and formulation and Inspection/Maintenance programs are provided directly from the state air agencies in MOVES format through the MWCOG Department of Environmental Programs (DEP). Meteorology inputs are developed by the MWCOG/DEP staff and supplied as hourly records of temperature and relative humidity in MOVES format.

As part of the 2014 CLRP conformity assessment, meteorology data for the Fine Particles' analyses was updated – from what was used during the 2013 CLRP conformity determination -- in order to be consistent with what was used in the $PM_{2.5}$ Maintenance Plan since the recently found adequate $PM_{2.5}$ mobile budgets now apply for conformity. In addition, the state air agencies provided updated Inspection/Maintenance and fuel inputs updates reflecting Tier III-related gasoline sulfur content reductions, a change to Reid Vapor Pressure (RVP) data for Maryland jurisdictions, and a technical correction in the data for the Maryland jurisdictions.

Mobile Emissions Inventories

Ozone Season and Wintertime CO – Daily Emissions
Ozone season emissions totals are illustrated in Exhibits 3 and 4. Wintertime CO emissions totals are shown in Exhibit 7. Ozone Season emissions reductions through time are attributed to the impact of the cleaner fuel/vehicle fleet and related emissions reductions/control programs. The emissions are shown in relation to the approved mobile budget for each pollutant.

$PM_{2.5}$ – Yearly Emissions
$PM_{2.5}$ direct and $PM_{2.5}$ Precursor NO_x emissions totals are illustrated in Exhibits 5 and 6. The emissions reductions through time are largely attributable to Tier II federal standards, cleaner fuels, and the heavy duty engine rule. The $PM_{2.5}$ direct and $PM_{2.5}$ Precursor NOx emissions are shown in relation to the Tier 1 and Tier 2 mobile budgets contained in the region's $PM_{2.5}$ Maintenance SIP. The Tier 2 budgets levels for these pollutants are available for conformity on an as/if needed basis. Current analysis indicates no such need and, as such, Tier 1 level budgets are in effect.

Emissions Inventories vs. Budgets
Exhibits 3-7 display net emissions for each forecast year. The charts show that the mobile emissions are within the mobile budgets for ozone season pollutants, fine particles pollutants, and Wintertime CO for all forecast years.

TERMs

Transportation Emission Reduction Measures (TERMs) are strategies or actions that the TPB and/or its member agencies can employ to offset increases in emissions from mobile sources. All TERMs are intended to reduce motor vehicle emissions by reducing either the number of vehicle trips (VT), vehicle miles traveled (VMT), or both. These strategies may include ridesharing and telecommuting programs, improved transit and bicycling facilities, clean fuel vehicle programs or other possible actions.

TERMs analyzed for the 2014 CLRP conformity analysis were grouped into four categories:
- TPB Commuter Connections Program
- Regional Incident Management Program
- Pedestrian Facilities Expansions & Enhancements
- Freeform Carpooling (Slug Lots)

Exhibit 7 lists the emission reduction potential of these TERMs, by pollutant, for each analysis year. The benefits of these projects are not included in the emissions totals in this report, but are available, if necessary, to ensure that regional emissions stay below the approved motor vehicle emissions budgets and also help offset future growth in mobile emissions.

COMMENTS / RESPONSE TO COMMENTS

SUMMARY

The analytical results described in this air quality assessment provide a basis for a determination by the TPB of conformity of the 2014 CLRP and FY2015-2020 TIP.

Following: Exhibits 1- 8
                     Attachments A - B

EXHIBIT 1
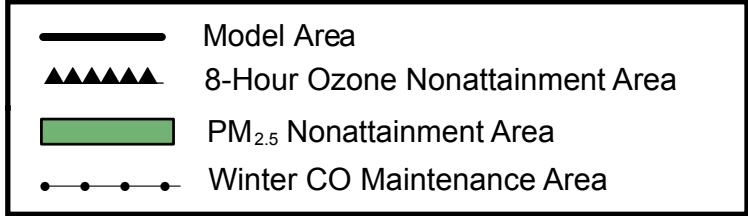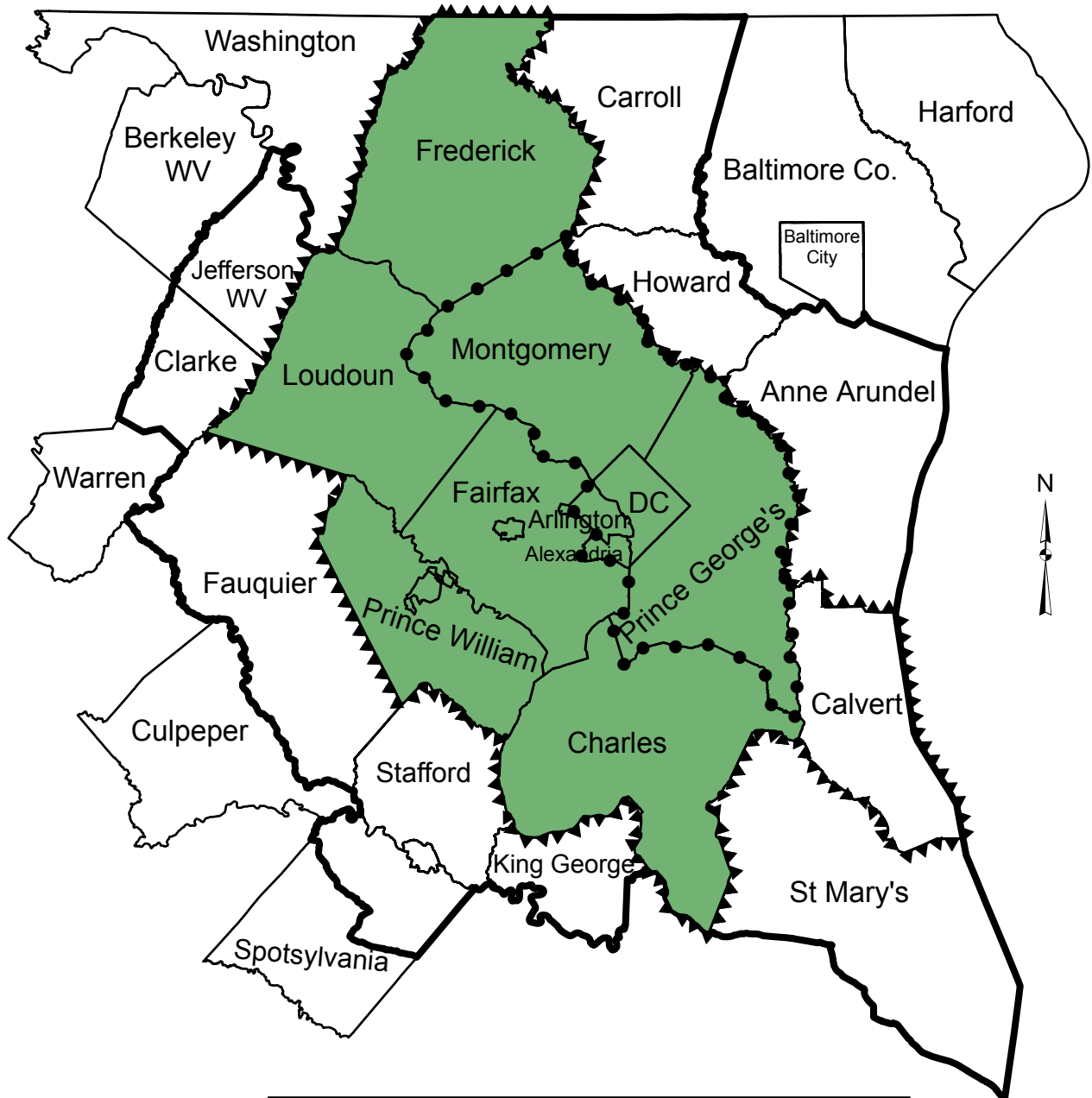## Washington, D.C.- Maryland - Virginia
Planning Areas

Legend:

— Model Area

▲▲▲▲▲ 8-Hour Ozone Nonattainment Area

� green▮ PM$_{2.5}$ Nonattainment Area

•–•–•–• Winter CO Maintenance Area

EXHIBIT 2

AIR QUALITY CONFORMITY
Travel Demand Summary
Modeled Area Trips and Vehicle Miles Traveled (000's)
Average Weekday Traffic (AWDT)

	2015	2017	2025	2030	2040
Transit Trips	1,175.1	1,235.9	1,399.9	1,450.1	1,548.0
Vehicle Trips	16,847.4	17,168.1	18,471.2	19,208.0	20,438.0
VMT	167,728.8	171,082.0	186,310.1	194,932.0	207,557.3

EXHIBIT 3
AIR QUALITY CONFORMITY
2014 CLRP & FY2015-2020 TIP
Mobile Source Emissions
Ozone Season VOC
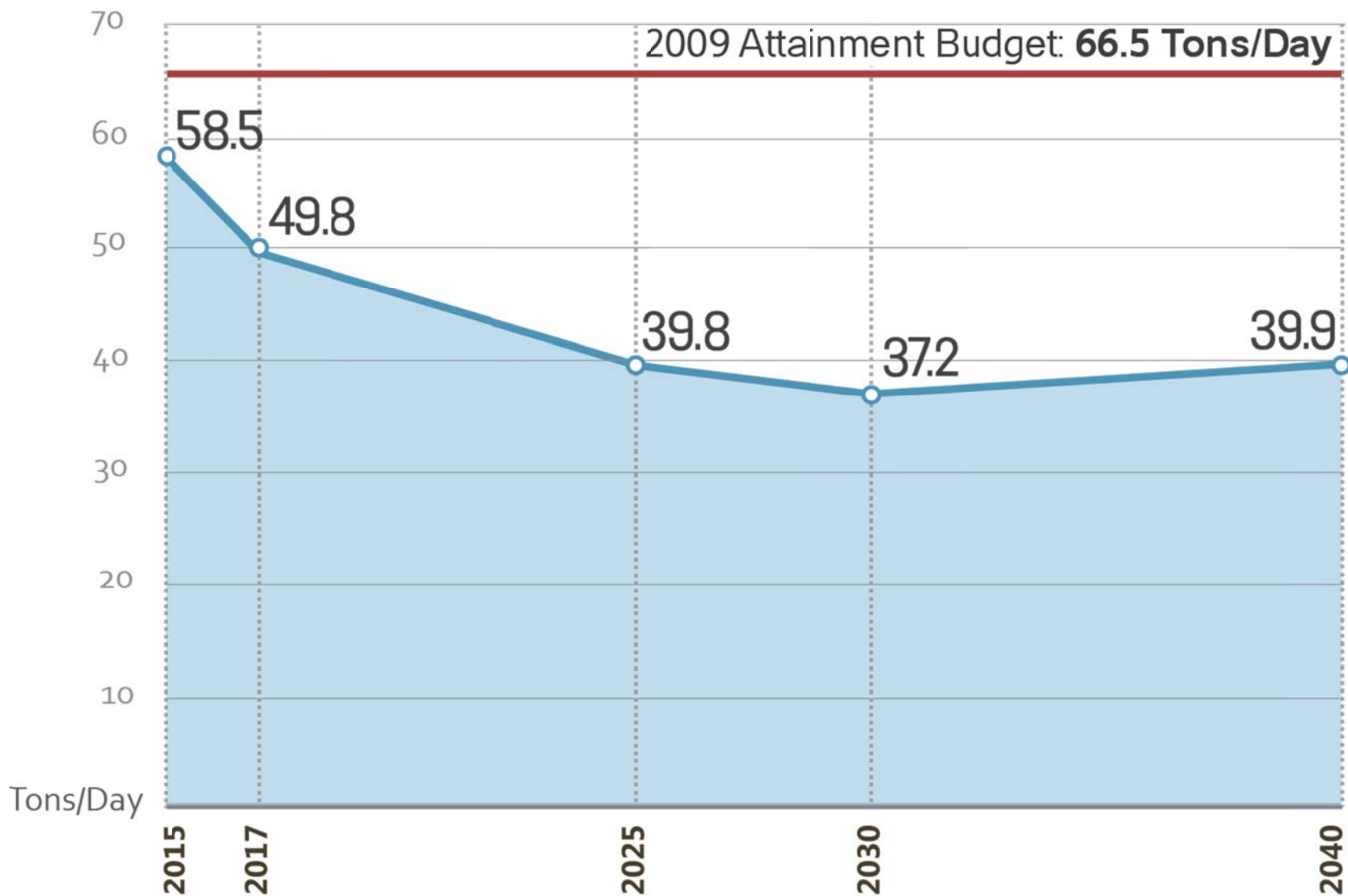
2009 Attainment Budget: **66.5 Tons/Day**

58.5
49.8
39.8
37.2
39.9

Tons/Day

2015 2017 2025 2030 2040

TCMs and TERMS are not included in totals.

EXHIBIT 4
AIR QUALITY CONFORMITY
2014 CLRP & FY2015-2020 TIP
Mobile Source Emissions
Ozone Season NOx

2009 Attainment Budget: 146.1 Tons/Day

2010 Contingency Budget: **144.3 Tons/Day**

160

131.9

120

103.1

80

65.8

60.4

61.1

40

Tons/Day

2015 2017 2025 2030 2040

9

TCMs and TERMS are not included in totals.
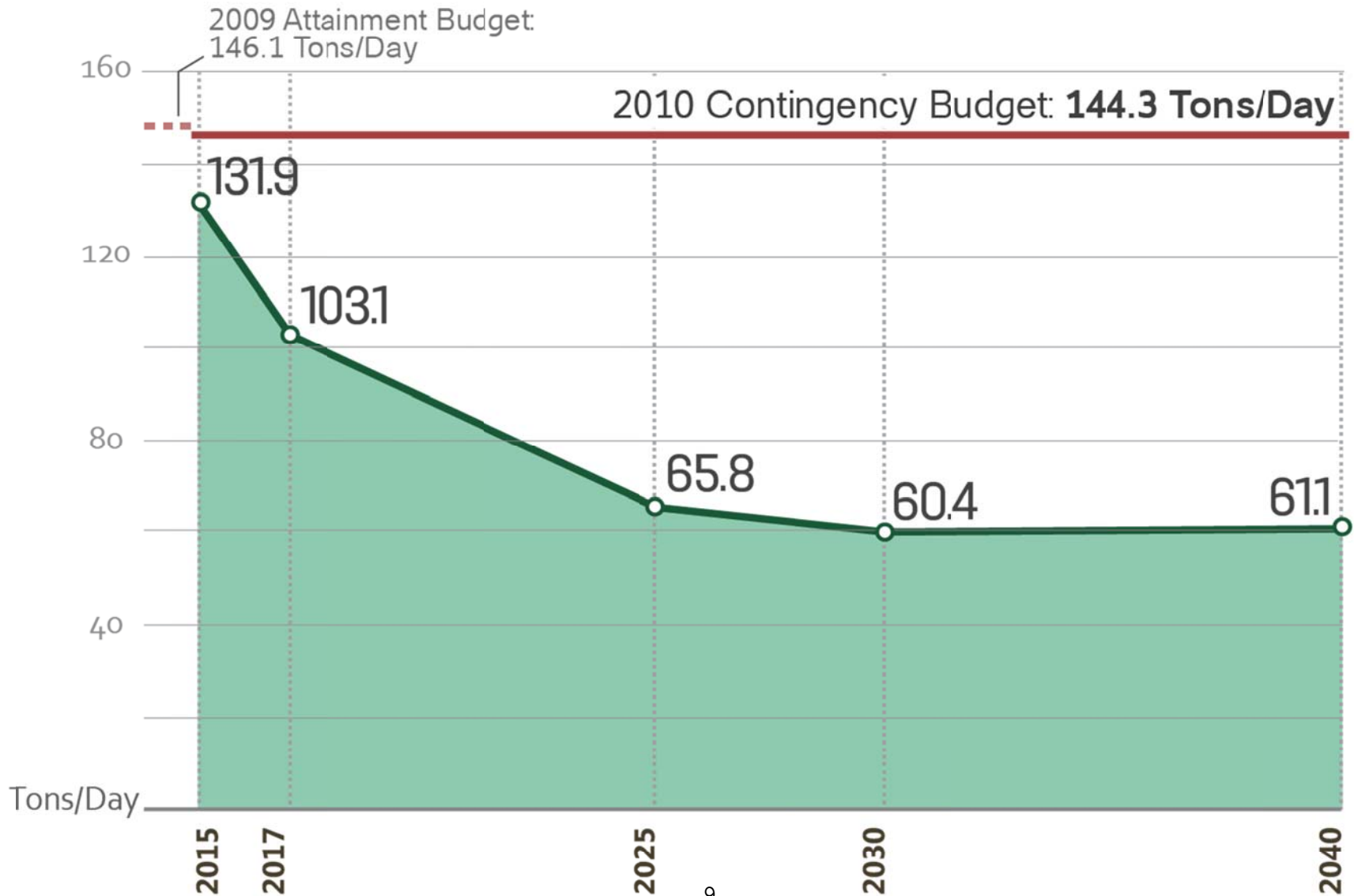
EXHIBIT 5
AIR QUALITY CONFORMITY
2014 CLRP & FY2015-2020 TIP
Mobile Source Emissions
PM$_{2.5}$ Precursor NOx

TCMs and TERMS are not included in totals.
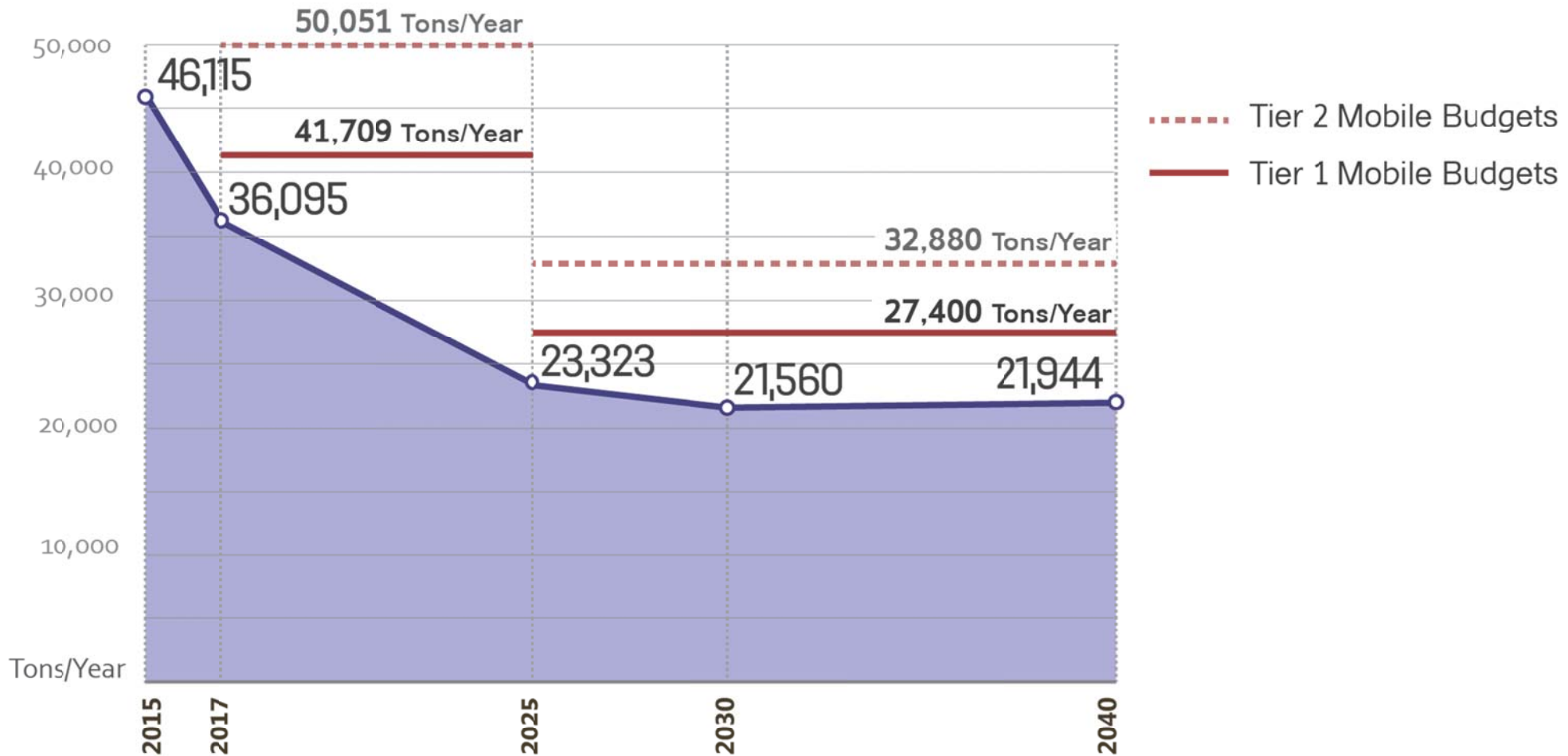
EXHIBIT 6
AIR QUALITY CONFORMITY
2014 CLRP & FY2015-2020 TIP
Mobile Source Emissions
PM$_{2.5}$ Direct

Legend:
- Tier 2 Mobile Budgets (dashed line)
- Tier 1 Mobile Budgets (solid line)

Data points:
- 2015: 1,926
- 2017: 1,696
- 2025: 1,279
- 2030: 1,255
- 2040: 1,299

Budget values:
- 2,144 Tons/Year
- 1,787 Tons/Year
- 1,586 Tons/Year
- 1,350 Tons/Year

TCMs and TERMS are not included in totals.
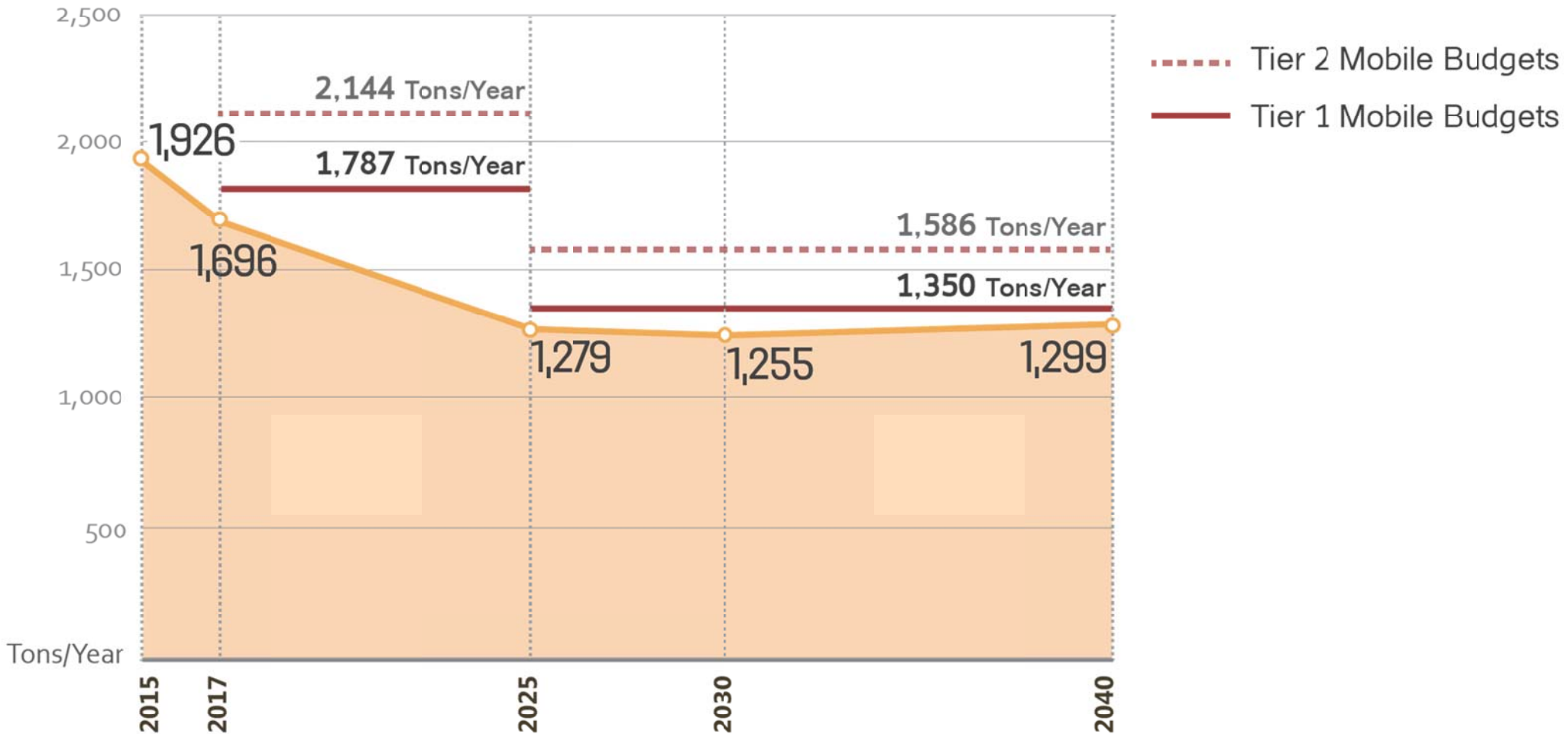
EXHIBIT 7
AIR QUALITY CONFORMITY
2014 CLRP & FY2015-2020 TIP
Mobile Source Emissions
Wintertime CO

Wintertime CO Emissions Budget: **1,671.5 Tons/Day**

494
411
360
360
381

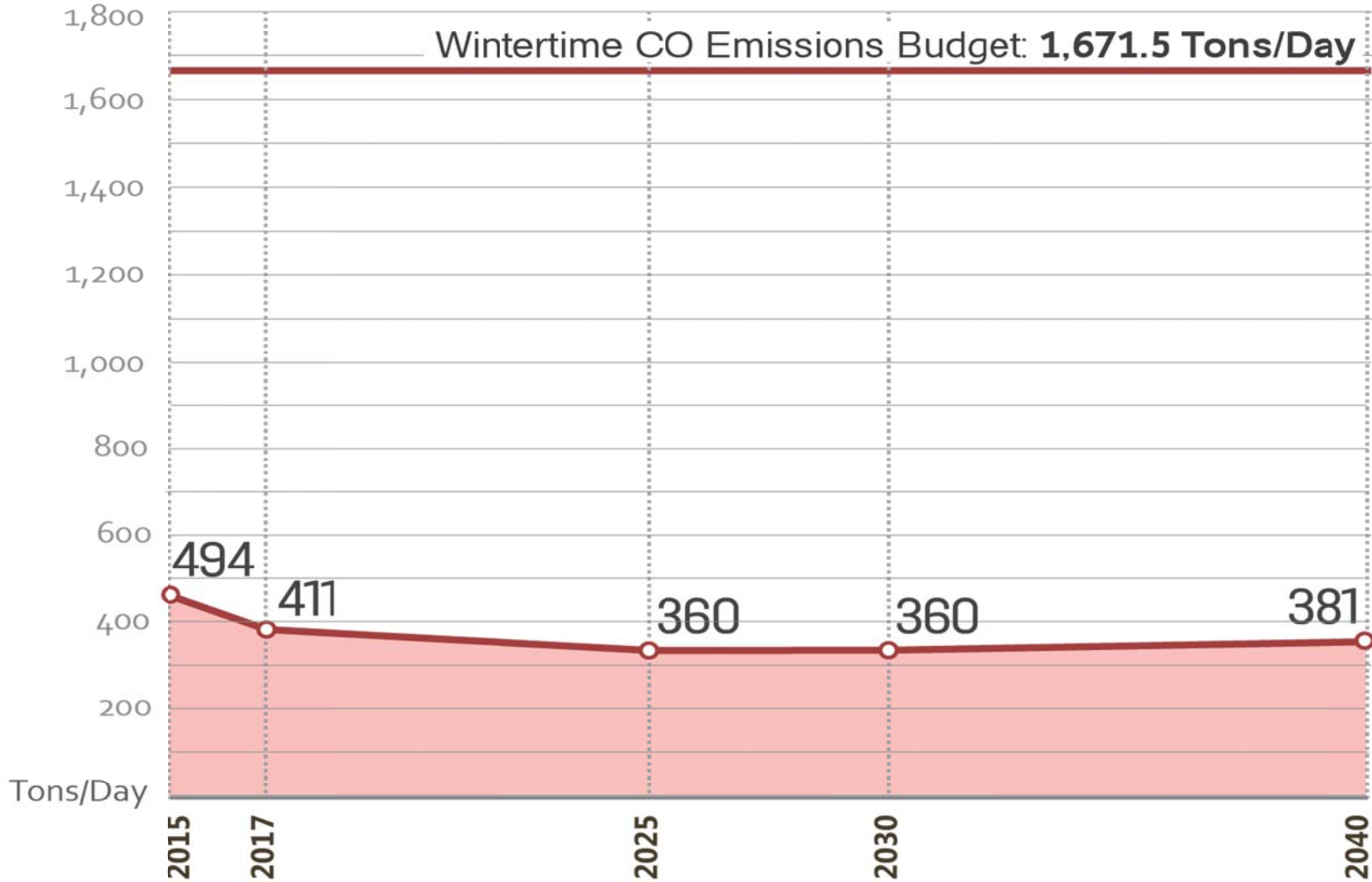TCMs and TERMS are not included in totals.

EXHIBIT 8

2014 CLRP
TRANSPORTATION EMISSIONS REDUCTION MEASURES
SUMMARY TABLE

REGIONAL EMISSIONS REDUCTIONS- ALL TERMS COMBINED					
Years/Pollutants	**Ozone - VOC**	**Ozone - NOx**	**PM2.5 Direct**	**Precursor NOx**	**Winter CO**
	(tons/day)	(tons/day)	(tons/year)	(tons/year)	(tons/day)
2015	0.06	0.10	1.11	26.72	1.07
2017	0.07	0.10	1.42	27.53	1.30
2025	0.10	0.11	2.32	30.43	2.14
2030	0.12	0.13	2.99	34.63	2.74
2040	0.19	0.19	4.56	49.88	4.23

NOTE: Benefits from these TERMs are not included in the emissions totals in this conformity analysis.

ATTACHMENT A

Major Additions and Changes to the 2014 Update to the Financially Constrained Long-Range Transportation Plan
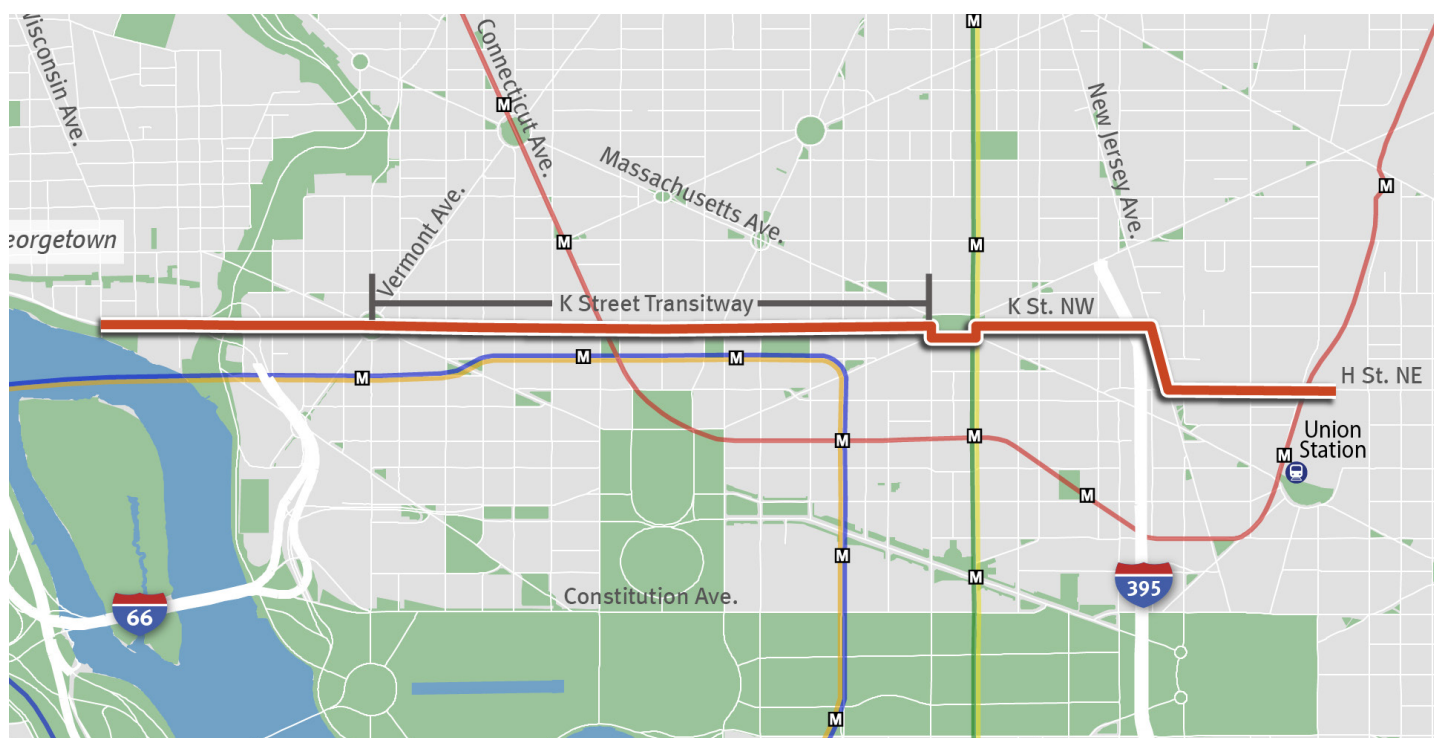
District of Columbia

1. **Union Station to Georgetown Streetcar Line from H Street NE to Wisconsin Avenue NW**

   Length: 3.4 miles

   Complete: 2020

   Cost: $348 million

Construct a streetcar line from H Street NE near Union Station, running along H Street NW to New Jersey Avenue NW, and continuing on K Street NW into Georgetown, ending at Wisconsin Avenue NW. This line will connect to the H Street NE – Benning Road line, already under construction. The streetcars will travel in mixed traffic lanes through the eastern portion of the route, but will travel in dedicated transit lanes on K Street between Mount Vernon Square/9th Street NW and Washington Circle/23rd Street NW (a project previously approved in the CLRP called the "K Street Transitway").

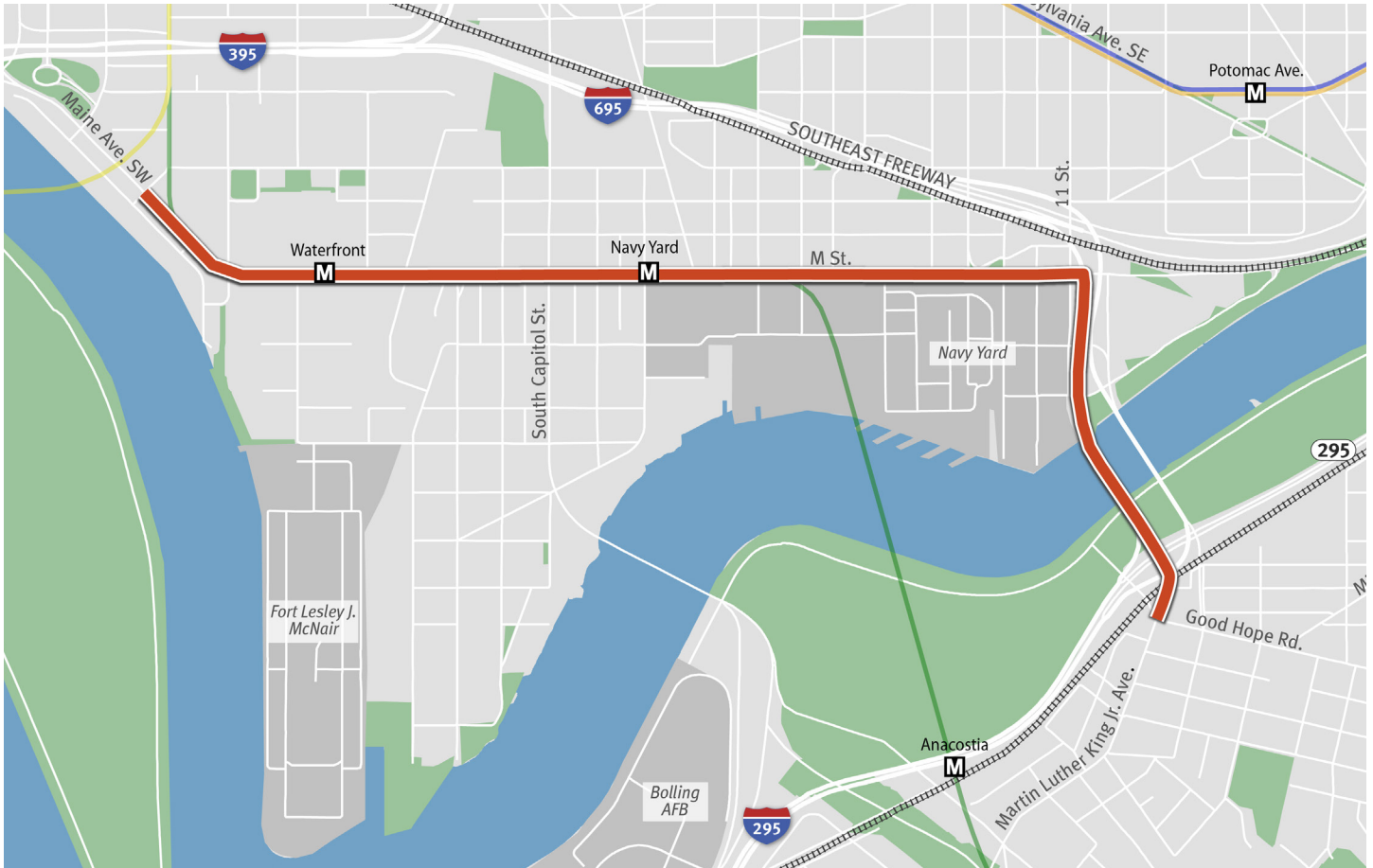See CLRP Project Description Form in Attachment A for more information.

2. **M Street Southeast/Southwest Streetcar Line
    from Good Hope Road SE to Maine Avenue SW**

    Length: 3 miles

    Complete: 2020

    Cost: $250 million

Construct a streetcar line running from Good Hope Road SE, across the 11ᵗʰ Street Bridge, to M Street SE/SW, ending at Maine Avenue SW. This line will connect to the planned Anacostia Initial Streetcar Line at Good Hope Road SE.

See CLRP Project Description Form in Attachment A for more information.

3. **Benning Road Streetcar Spur**
   from Benning Road to Minnesota Avenue Metro Station

   Length: < 1 mile

   Complete: 2018

   Cost: $40 million

Construct a spur from the Benning Road Streetcar Line heading north along Minnesota Ave to the Minnesota Avenue Metro Station.

4. **Removal of Proposed H and I Streets NW Peak Period Bus-Only Lanes**

The approved CLRP contains two projects which proposed to implement bus-only lanes during peak periods. The H Street NW lane was planned between 17th Street NW and New York Avenue NW and the I Street NW lane was planned between 13th Street NW and Pennsylvania Avenue NW. These projects will be removed from the CLRP, pending further study.

5. *Studies: Managed Lanes on 14th Street/Rochambeau Bridge, I-395/I-695, and I-295*

Length: ≈9 miles

Complete: 2015

Cost: $5.9 million

A. 14th Street/Rochambeau Bridge

The first study will look at converting the two northbound lanes on the 14th Street/ Rochambeau Bridge to High Occupancy Vehicle (HOV 3+) during the morning peak period on weekdays and the two southbound lanes on the same facility to HOV 3+ during the evening peak period on weekdays, to mirror existing HOV operations in Virginia. The existing four northbound lanes on the Arland Williams, Jr. Bridge and four south-bound lanes on the George Mason Memorial Bridge would remain as general purpose lanes. The study will also consider a subsequent conversion of the HOV lanes into High Occupancy/Toll (HOT) lanes.

B. I-395/I-695, Southeast-Southwest Freeway

The second study will look at implementing HOV lanes on the Southeast/Southwest Freeway (I-395/I-695) from the Case Bridge to the 11th Street Bridge, and subsequently converting those to HOT.

C. I-295

The third study will consider implementing HOV and then HOT lanes on I-295 from the 11th Street Bridge to the DC/Maryland Line.

See CLRP Project Description Forms in Attachment A for more information.

Maryland

6. MARC Growth and Investment Plan

> Complete: 2040
>
> Cost: $1.295 billion (Washington region)

MDOT is including $1.06 billion of project improvements for
MARC as identified in the MARC Growth and Investment
Plan. The MARC Growth and Investment Plan is a multi-
phased, multi-year plan to increase the capacity of MARC,
Maryland's commuter rail system. MARC is a key component of Maryland's commuter network providing
rail service for more than 30,000 commuters a day traveling between Washington's Union Station and
northern, central and western Maryland.

Primary objectives of the plan include providing better service for current riders and addressing existing
problems with capacity, frequency and reliability. This package of projects will increase passenger-carry-
ing capacity and increase share of trips by MARC during peak travel periods, among other benefits. The
$1.295 billion shown reflects the Washington region's proposed contribution towards projects in the larger
$2.3 billion Growth and Investment Plan, which also includes the Baltimore area.

### 7. I-95/495 Interchange at Greenbelt Metro Station

> Length: <1 mile
>
> Complete: 2020
>
> Cost: $78.21 million

Construct a full interchange along I-95/I-495
at the Greenbelt Metro Station. The existing
partial interchange provides access from
the inner loop of the Capital Beltway to the
Greenbelt Metro Station. The project includes
the addition of auxiliary lanes on I-95/I-495
between the Greenbelt metro and MD 201
interchanges.

See CLRP Project Description Form in
Attachment A for more information.
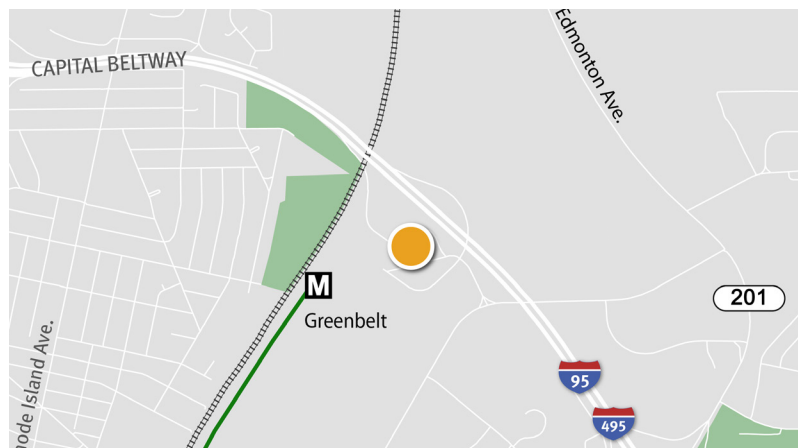
Virginia

8.   Virginia Railway Express System Plan

Cost: 2040

Cost: $977.4 million

The VRE System Plan provides a framework for VRE service expansion through 2040. The Plan includes system investments and expansion of peak service on the Fredericksburg and Manassas Lines, introduction of reverse-peak service, additional mid-day service, and service extension to the Gainesville-Haymarket area of Prince William County. Major railroad capacity projects focus on the relief of key capacity bottlenecks on the VRE system, including additional track capacity in the Long Bridge corridor and completion of a third main track on the Fredericksburg Line from Alexandria to Spotsylvania County.

The VRE System Plan outlines capital investments totaling $3.2 billion to implement plan recommendations. It builds upon prior VRE growth plans included in the CLRP financial analysis and transit-modeling assumptions proposed for implementation by 2020, for which funding has been identified. Funding for projected VRE station, yards and equipment needs through 2040 has also been identified and is reflected in the $977 million CLRP project cost. Full funding for long-term system investments in railroad capacity, including the expansion of the Long Bridge and Fredericksburg Line third main track, and service enhancements such as reverse-peak service, additional mid-day trains or the future run-through of VRE and MARC trains has not been identified. Those recommendations are included for information purposes. As funding is identified for those initiatives they will be added to the CLRP and air quality conformity analysis.

A–6

9. **Widen US 1 from Fuller Road to Russell Road Interchange**

   Length: 2.38 miles

   Complete: 2025

   Cost: $76 million

Widen US 1 from Fuller Road to Russell Road from 4 to 6 lanes.

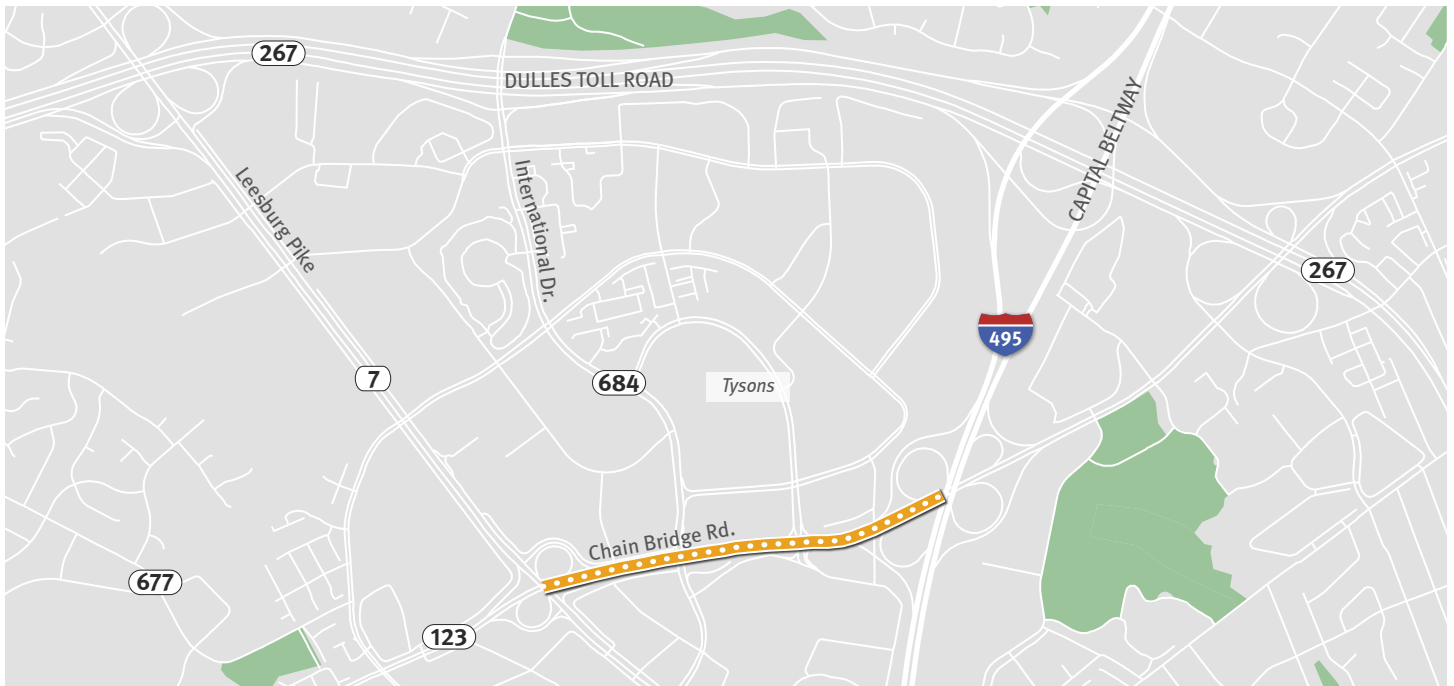See CLRP Project Description Form in Attachment A for more information.

A–7

10. **Widen VA 123 from VA 7, Leesburg Pike to I-495, Capital Beltway**

    Length: <1 mile

    Complete: 2021

    Cost: $22 million

Widen VA Route 123 from Leesburg Pike to the Capital Beltway from 6 to 8 lanes.

See CLRP Project Description Form in Attachment A for more information.

A–8

ATTACHMENT B

HOUSEHOLD DATA

TPB PLANNING AREA:	2015	2017	2020	2025	2030	2040
D.C.	287,112	294,489	305,550	323,191	340,307	370,758
MONTGOMERY	377,524	385,296	396,955	414,873	434,767	460,161
PR.GEORGES	323,364	328,465	336,107	348,307	359,878	379,020
ARLINGTON	105,692	108,296	112,211	117,332	121,383	128,605
ALEXANDRIA	72,306	74,175	76,978	81,352	84,717	94,890
FAIRFAX	412,183	419,165	429,673	455,610	478,867	523,521
LOUDOUN	122,644	129,391	139,505	151,558	158,142	164,297
PR. WILLIAM	166,083	172,975	183,321	197,890	210,450	229,944
FREDERICK	89,935	92,546	96,471	103,944	111,118	123,247
CHARLES	57,528	60,235	64,299	70,833	75,847	85,901
SUBTOTAL	2,014,371	2,065,033	2,141,070	2,264,890	2,375,476	2,560,344
ADDITIONAL COUNTIES:						
HOWARD	116,453	120,597	126,806	133,807	137,635	140,696
ANNE ARUNDEL	206,441	209,268	213,504	220,567	227,628	241,619
CALVERT	34,298	34,991	36,027	37,374	38,348	40,301
CARROLL	64,142	64,972	66,219	68,025	69,692	72,853
FREDERICKSBURG (VA) &N. SPOTSYLVANIA	47,742	49,894	53,122	57,878	62,604	69,306
CLARKE&JEFFERSON	29,378	30,455	32,064	34,783	37,347	42,371
FAUQUIER	25,337	25,981	26,954	28,616	30,272	33,801
K. GEORGE	9,808	10,379	11,237	12,808	14,366	17,142
ST. MARY'S	44,443	46,408	49,352	53,960	58,143	66,509
STAFFORD	49,673	52,815	57,533	65,473	73,367	87,670
SUBTOTAL	627,715	645,760	672,818	713,291	749,402	812,268
TOTAL	2,642,086	2,710,793	2,813,888	2,978,181	3,124,878	3,372,612

SOURCE:
- MWCOG Round 8.3 Cooperative Forecasts
- BMC Round 8 Cooperative Forecasts
- George Washington Regional Commission / Federicksburg Area MPO February 2013
  TAZ Refinements of the January 2012 GWRC/FAMPO Long-Range Transportation Plan
  Update Control Estimates and Forecasts for City of Fredericksburg, King George, Spotsylvania and Stafford Counties
- Tri-County Council for Southern Maryland data for Calvert, Charles and St. Mary's
- COG/TPB Staff used Virginia Employment Commission Population Projections, February 2013 for Clark and Fauquier
- COG/TPB Staff used West Virginia University Population Projections, February 2013 for Jefferson County

EMPLOYMENT DATA

TPB PLANNING AREA:	2015	2017	2020	2025	2030	2040
D.C.	814,957	833,701	861,814	905,846	944,096	1,001,814
MONTGOMERY	532,004	544,949	564,377	598,824	635,264	715,121
PR.GEORGES	356,958	365,324	377,879	403,134	427,514	497,652
ARLINGTON	247,460	258,989	276,281	292,078	303,044	308,830
ALEXANDRIA	110,248	112,872	116,812	131,152	149,552	167,598
FAIRFAX	693,803	719,557	758,260	814,740	866,739	930,665
LOUDOUN	163,850	177,217	197,265	224,249	248,803	278,216
PR. WILLIAM	163,423	172,538	186,215	207,340	230,047	278,151
FREDERICK	102,014	103,707	106,242	109,802	114,558	125,556
CHARLES	68,439	69,758	71,731	74,731	77,537	83,138
SUBTOTAL	3,253,156	3,358,612	3,516,876	3,761,896	3,997,154	4,386,741
ADDITIONAL COUNTIES:						
HOWARD	172,819	178,098	186,021	199,221	212,413	229,066
ANNE ARUNDEL	321,519	328,912	339,998	353,529	367,834	398,632
CALVERT	41,059	42,422	44,457	46,258	47,159	48,955
CARROLL	67,946	69,081	70,781	72,933	75,219	79,383
FREDERICKSBURG (VA) &N. SPOTSYLVANIA	78,759	81,609	85,881	92,897	99,865	116,175
CLARKE & JEFFERSON	27,533	28,329	29,530	31,348	33,052	36,300
FAUQUIER	29,270	30,016	31,135	33,071	34,996	39,086
K. GEORGE	17,804	18,433	19,377	20,947	22,490	25,747
ST. MARY'S	64,083	65,350	67,268	70,093	71,969	75,862
STAFFORD	52,681	54,970	58,399	64,304	70,170	84,159
SUBTOTAL	873,473	897,220	932,847	984,601	1,035,167	1,133,365
TOTAL	4,126,629	4,255,832	4,449,723	4,746,497	5,032,321	5,520,106

SOURCE:
- MWCOG Round 8.3 Cooperative Forecasts
- BMC Round 8 Cooperative Forecasts
- George Washington Regional Commission / Federicksburg Area MPO February 2013
  TAZ Refinements of the January 2012 GWRC/FAMPO Long-Range Transportation Plan
  Update Control Estimates and Forecasts for City of Fredericksburg, King George, Spotsylvania and Stafford Counties
- Tri-County Council for Southern Maryland data for Calvert, Charles and St. Mary's
- COG/TPB Staff used West Virginia University population projections, February 2013 for Clark and Fauquier Counties
- COG/TPB Staff used West Virginia University population projections, February 2013 for Jefferson County

NOTE: Includes Census Adjustment