CONFORMITY DETERMINATION REPORT AMENDMENT #5

Atlanta 1997 & 2008 Ozone Maintenance Areas

In Support of:
The Atlanta Region’s Plan
Bartow on the Move
Gainesville-Hall Regional Transportation Plan
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Attached:
Exhibit 1 – Planning & Modeling Assumptions
Exhibit 2 – Summary of Interagency Meetings
Introduction

This report serves as an addendum to the Conformity Determination Report (CDR) for the Atlanta Regional Commission’s (ARC) 2016 Atlanta Region’s Plan Transportation Element and associated FY 2018-2023 Transportation Improvement Program (TIP), along with the Cartersville-Bartow County MPO (CBMPO) transportation plan – Bartow on the Move – and the Gainesville-Hall County MPO (GHMPO) transportation plan. This document is being updated to reflect changes to emissions as a result of modifications to project timing and scope associated with the fifth amendment of the 2016 Atlanta Region’s Plan.

Since the development of ARC’s Amendment #3, which required a full emissions analysis in fall 2017, there has been a change to the requirements for conformity in the Atlanta region. In February 2018, a court ruling vacated the revocation of conformity requirements for the 1997 ozone standard. As a result, a conformity determination is required for transportation projects and programs in the 20-county Atlanta 1997 ozone maintenance area concurrently with requirements for the 15-county 2008 ozone maintenance area. This ruling did not change the classification of the former Atlanta nonattainment area; the region remains in maintenance for the 1997 and 2008 ozone standards as well as the 1997 annual PM$_{2.5}$ standard.

Appropriate sections of this addendum have been updated to reflect the latest planning assumptions, transportation project information and emissions results for both the 1997 and 2008 ozone standards. For the full body of text, see the Atlanta Region’s Plan documentation available on ARC’s website at http://atlantaregional.org/wp-content/uploads/atlanta-region-s-plan-cdr-full-v3.pdf. The addendum associated with the 3rd amendment of the CDR can be found here: http://documents.atlantaregional.com/The-Atlanta-Region-s-Plan/rtp/Conformity-Determination-Report.pdf

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1 South Coast Air Quality Management District v USEPA et al., No. 15-1115 (D.C. Cir. Feb. 16, 2018)
The Region’s Current Attainment Status

The following section describes changes to the region’s attainment status since the documentation in the full Conformity Determination Report was released in February, 2016.

1997 Ozone Standard

Previously, transportation conformity for the 1997 eight-hour ozone standard was revoked effective April 6, 2015. As a result of a February 16, 2018 court ruling, conformity requirements for the 1997 ozone standard are reinstated. The Atlanta region’s status under the 1997 ozone standard is unchanged, and the region is currently still a maintenance area.

2008 Ozone Standard

On May 3, 2016 the United States Environmental Protection Agency (USEPA) ruled on a clean data determination for the 2008 ozone standard effective on August 15, 2016. This determination indicated that the Atlanta region had met the 2008 ozone standard for the three summers from 2013-2015. One day later, on May 4, 2016 the region was reclassified from a marginal to a moderate nonattainment area for failure to meet the ozone standard before July 20, 2015.

On July 18, 2016, the Georgia Environmental Protection Division (GA EPD) submitted a Maintenance Plan to USEPA. This document shows the state’s plan for continuing to attain the 2008 ozone standard into the future. Effective June 2, 2017, USEPA has approved the state’s plan and the associated Motor Vehicle Emissions Budgets (MVEBs). This action officially redesignated the Atlanta region as a maintenance area.

This window of attainment will likely be brief, as USEPA is moving ahead with the new 2015 ozone standard. Current monitored values indicate that some portion of the Atlanta region will be classified nonattainment for that standard in the future, likely sometime in 2018.

1997 PM$_{2.5}$ Standard

On February 24, 2016 USEPA approved the State’s PM$_{2.5}$ Maintenance Plan for the 1997 annual standard. Since all counties in Georgia were classified as attaining the newer 2012 PM$_{2.5}$ standard on September 6, 2016 and a Maintenance Plan was in place for the older 1997 standard, all conformity requirements for the 1997 PM$_{2.5}$ standard were revoked effective October 24, 2016. Unlike the 1997 ozone standard, conformity requirements have not been reinstated for the revoked 1997 PM$_{2.5}$ standard.

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2 82 FR 25523
Statement of Conformity

An updated transportation conformity analysis is required under the 1997 and 2008 eight-hour ozone standard for all three Metropolitan Planning Organization (MPO) Regional Transportation Plans (RTPs) and TIPs as a result of numerous changes to regionally significant projects. ARC is making changes to the timing and capacity of nonexempt regionally significant projects in this update. CBMPO and GHMPO are currently amending their TIPs, but the project changes do not impact regional emissions.

The purpose of this report is to document compliance with the relevant elements of the Clean Air Act (Subsections 176(c) (1) (2) and (3)), the Transportation Conformity Rule (40 CFR Parts 51 and 93) and Metropolitan Planning Regulations (23 CFR Part 450) by demonstrating that the Atlanta Region’s Plan RTP (including the FY 2018-2023 TIP), Bartow on the Move and the GHMPO transportation plan conform to the purpose of the State Implementation Plan (SIP) for both eight-hour ozone standards. ARC has conducted the conformity determination for the entirety of both ozone maintenance areas, encompassing all three MPOs and part of the state outside the boundary of the MPOs.

The conclusion of the conformity analysis, documented below, indicates that the ARC, CBMPO, and GHMPO TIPs and RTPs support the broad intentions of the Clean Air Act for achieving and maintaining the National Ambient Air Quality Standards (NAAQS) for ozone as outlined in the Atlanta area SIP.

Statement of Conformity – Eight-Hour Ozone Standard

Ozone is not emitted directly by any source; it is formed when Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC) combine in the atmosphere in the presence of sunlight. Therefore, air pollution control strategies are aimed at controlling NOx and VOC. Budgets are established for these two pollutants instead of ozone directly.

For both eight-hour ozone conformity analyses the MVEB test is required to demonstrate conformity. The latest approved MVEBs applicable to conformity under the 1997 eight-hour ozone standard were established by GA EPD as part of Georgia’s Reasonable Further Progress (RFP) SIP for the 1997 Ozone NAAQS and the Ozone Maintenance Plan for the 1997 Ozone NAAQS. The latest approved MVEBs applicable to conformity under the 2008 eight-hour ozone standard were established by GA EPD as part of Georgia’s Ozone Maintenance Plan for the 2008 Ozone NAAQS. These budgets differ from those used in the main body of the CDR and reflect the latest planning assumptions and approved SIPs. The transportation conformity analysis for both eight-hour ozone maintenance areas was performed using a MVEB test with the approved budgets outlined in Tables 1 and 2.
Table 1: 1997 Eight-Hour Ozone Standard Conformity Tests

<table>
<thead>
<tr>
<th>Establishing SIP</th>
<th>Effective Date</th>
<th>Years</th>
<th>MVEBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia’s RFP SIP for the 1997 Ozone Non-Attainment Area</td>
<td>December 4, 2013</td>
<td>All conformity years prior to 2024</td>
<td>NOx – 272.67 tons/day VOC – 171.83 tons/day (2008)</td>
</tr>
<tr>
<td>Georgia’s Ozone Maintenance Plan for the 1997 Ozone NAAQS</td>
<td>January 2, 2014</td>
<td>All conformity years 2024 and later</td>
<td>NOx – 126 tons/day VOC – 92 tons/day (2024)</td>
</tr>
</tbody>
</table>

Table 2: 2008 Eight-Hour Ozone Standard Conformity Tests

<table>
<thead>
<tr>
<th>Establishing SIP</th>
<th>Effective Date</th>
<th>Years</th>
<th>MVEBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia’s Ozone Maintenance Plan for the 2008 Ozone NAAQS</td>
<td>June 2, 2017</td>
<td>All conformity years prior to 2030</td>
<td>NOx – 170.15 tons/day VOC – 81.76 tons/day (2014)</td>
</tr>
<tr>
<td>Georgia’s Ozone Maintenance Plan for the 2008 Ozone NAAQS</td>
<td>June 2, 2017</td>
<td>All conformity years 2030 and later</td>
<td>NOx – 58 tons/day VOC – 52 tons/day (2030)</td>
</tr>
</tbody>
</table>

The results of the emissions analysis for the Atlanta Region’s Plan RTP, the CBMPO RTP, and the GHMPO RTP demonstrate adherence to the established MVEBs. The conformity analysis for the 1997 ozone standard was performed for the years 2020, 2024, 2030 and 2040. The conformity analysis for the 2008 ozone standard was performed for the years 2020, 2030 and 2040. The analysis years meet the requirements for specific horizon years that the transportation plan must reflect as specified in 93.106(a)(1) of the Transportation Conformity Rule and specific analysis years that the regional emissions analysis must reflect per Section 93.118(b) and 93.118(d)(2).

Upon completion of the technical conformity analysis, ARC staff have determined that the Atlanta Region’s Plan RTP, Bartow on the Move and the GHMPO RTP and associated TIPs together demonstrate compliance with the Clean Air Act as amended in 1990 in accordance with all conformity requirements as detailed in 40 CFR Parts 51 and 93 (the Transportation Conformity Rule) and 23 CFR Part 450 (the Metropolitan Planning Regulations as established in MAP-21).
Interagency Consultation

The draft Atlanta Region’s Plan Amendment #5 documents were made available to ARC planning partners through the TCC and the TAQC committees in April 2018, to allow time for comment prior to formal adoption or publication, in accordance with 93.105(b)(2)(iii) of the Transportation Conformity Rule. Documentation was provided to the interagency consultation group via email ahead of the initiation of public comment for ARC on March 26, 2018. Final Atlanta Region’s Plan RTP/FY 2018-2023 TIP Amendment #5 documents are anticipated to be provided on May 10, 2018, upon approval of the update, fulfilling the requirements of 40 CFR 93.105(c)(7).

Public Involvement

The official public comment period for the FY 2018-2023 TIP Amendment #5 was held between March 26 – April 24, 2018. GHMPO’s public comment period was held between April 1 – April 15, 2018. CBMPO’s public comment period was held between March 30 – April 30, 2018. ARC’s public involvement process, as detailed in the Regional Community Engagement Plan for TIP amendments, includes specific outreach strategies to share project information with the public. Other MPO’s processes can be found in their amendment documentation available on their websites3\(^3\)\(^4\).

- **30-Day Public Comment Period**: A public review and comment period ran from March 26, 2018 through midnight April 24, 2018. ARC must receive comments during this timeframe in order to be considered in the official record of comments. A summary of all comments received during the period and responses to the comments was presented to ARC’s technical and policy committees and the ARC Board for their consideration before taking action on the amendment.

- **Project Summary**: A project summary was prepared to provide the public with a user-friendly explanation of the most important elements of the project and is accessible on the ARC website.

- **ARC staff was available for questions, comments and speaking engagements by contacting 470-378-1563 or transportation@atlantaregional.org.**

- **Public Comments**: Following completion of the public comment period, ARC prepared a Public Comment Report, which summarizes all stakeholder and public outreach and comments. Any comments received and corresponding responses were posted on the TIP Amendment #5 webpage.

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Fiscal Constraint

This amendment was undertaken to accomplish three key outcomes:

1. Program remaining non-exempt funding commitments from the 2017 ARC project solicitation under the Atlanta urbanized area sub-allocation of the Surface Transportation Block Grant (STBG) – Urban, Transportation Alternatives Program (TAP), and Congestion Mitigation & Air Quality Program (CMAQ).
2. Address project cost estimate and programmatic changes that are of a time sensitive nature or cannot be handled administratively.
3. Incorporate changes to the travel demand model coding

Federal, state and local revenue projections remain consistent with the previous version of the plan. The magnitude of changes to project costs/schedule and the allocation of funds to new projects requires a demonstration of fiscal constraint for the plan. The tables presented in this section reflect project changes made under this RTP/TIP amendment.
### Table 3: FY 2018-2023 Yearly TIP Balances – Federal Highway Administration Funds ($YOE)

#### Demonstration of Fiscal Constraint (FHWA Funds) - May 2018

<table>
<thead>
<tr>
<th>FHWA Program</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022 See Note 2</th>
<th>2023 See Note 2</th>
<th>LR 2024-2030</th>
<th>LR 2031-2040</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion Mitigation &amp; Air Quality Improvement (CMAQ)</td>
<td>$29,000,000</td>
<td>$29,000,000</td>
<td>$29,000,000</td>
<td>$29,000,000</td>
<td>$29,000,000</td>
<td>$29,000,000</td>
<td></td>
<td></td>
<td>$174,000,000</td>
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<tr>
<td>TAP - Urban (&gt;200K) (ARC)</td>
<td>$7,000,000</td>
<td>$7,000,000</td>
<td>$7,000,000</td>
<td>$7,000,000</td>
<td>$7,000,000</td>
<td>$7,000,000</td>
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<td></td>
<td>$42,000,000</td>
</tr>
<tr>
<td>TAP - Statewide (Recreational Trails Program)</td>
<td>$466,400</td>
<td>$466,400</td>
<td>$466,400</td>
<td>$466,400</td>
<td>$466,400</td>
<td>$466,400</td>
<td></td>
<td></td>
<td>$2,211,840</td>
</tr>
<tr>
<td>Highway Safety Improvement Program (HSIP)</td>
<td>$35,424,000</td>
<td>$37,288,000</td>
<td>$37,288,000</td>
<td>$37,288,000</td>
<td>$37,288,000</td>
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<tr>
<td>Railway Highway Hazard Elimination Setaside</td>
<td>$1,864,800</td>
<td>$1,864,800</td>
<td>$1,864,800</td>
<td>$1,864,800</td>
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<td>$221,864,000</td>
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<tr>
<td>Railway Highway Protective Devices Setaside</td>
<td>$1,491,200</td>
<td>$1,491,200</td>
<td>$1,491,200</td>
<td>$1,491,200</td>
<td>$1,491,200</td>
<td>$1,491,200</td>
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<td></td>
<td>$177,301,514</td>
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<tr>
<td>National Highway Freight Program (NHFP)</td>
<td>$38,511,777</td>
<td>$39,380,396</td>
<td>$40,323,538</td>
<td>$40,726,733</td>
<td>$18,359,670</td>
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<td></td>
<td>$1,698,462,662</td>
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<tr>
<td>National Highway Performance Program (NHPP)</td>
<td>$341,476,665</td>
<td>$236,940,335</td>
<td>$266,911,326</td>
<td>$156,292,886</td>
<td>$264,906,666</td>
<td>$431,934,784</td>
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<td>$601,158,702</td>
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<tr>
<td>STBG - Statewide Flexible (GDOT)</td>
<td>$107,937,331</td>
<td>$122,539,738</td>
<td>$101,732,613</td>
<td>$92,578,284</td>
<td>$95,485,696</td>
<td>$80,905,040</td>
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<td></td>
<td>$601,158,702</td>
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<tr>
<td>Enhancements Setaside</td>
<td>$7,084,800</td>
<td>$7,084,800</td>
<td>$7,084,800</td>
<td>$7,084,800</td>
<td>$7,084,800</td>
<td>$7,084,800</td>
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<td></td>
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<tr>
<td>Off-System Bridge Setaside</td>
<td>$10,095,200</td>
<td>$14,291,278</td>
<td>$10,195,200</td>
<td>$9,895,200</td>
<td>$15,935,200</td>
<td>$11,183,200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STBG - Urban (&gt;200K) (ARC)</td>
<td>$79,114,934</td>
<td>$80,529,294</td>
<td>$82,295,555</td>
<td>$82,295,555</td>
<td>$82,295,555</td>
<td>$82,295,555</td>
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<td></td>
<td>$488,826,448</td>
</tr>
<tr>
<td>General Federal Aid 2024-2040 (Non-MMIP Only)</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$10,392,781,572</td>
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<tr>
<td><strong>Total Project Costs (Except Long Range MMIP)</strong></td>
<td>$659,466,507</td>
<td>$577,876,241</td>
<td>$585,633,432</td>
<td>$465,983,858</td>
<td>$561,177,987</td>
<td>$690,513,779</td>
<td>$4,183,650,116</td>
<td>$6,095,208,202</td>
<td>$13,796,394,898</td>
</tr>
<tr>
<td><strong>Year of Expenditure (YOE) Multiplier</strong></td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.1773</td>
<td>1.4012</td>
</tr>
<tr>
<td><strong>Total YOE Project Costs (Except Long Range)</strong></td>
<td>$659,466,507</td>
<td>$577,876,241</td>
<td>$585,633,432</td>
<td>$465,983,858</td>
<td>$561,177,987</td>
<td>$690,513,779</td>
<td>$4,183,650,116</td>
<td>$6,095,208,202</td>
<td>$17,006,386,176</td>
</tr>
<tr>
<td><strong>YOE Long Range MMIP Project Costs See Note 1</strong></td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$6,104,286,454</td>
</tr>
<tr>
<td><strong>Running Total Cost (YOE)</strong></td>
<td>$659,466,507</td>
<td>$1,237,342,748</td>
<td>$1,822,976,180</td>
<td>$2,288,960,038</td>
<td>$2,850,138,025</td>
<td>$3,540,651,804</td>
<td>$11,212,813,554</td>
<td>$23,110,672,630</td>
<td>$23,110,672,630</td>
</tr>
<tr>
<td><strong>Estimated FHWA Revenue (YOE) See Note 1</strong></td>
<td>$722,089,681</td>
<td>$766,502,379</td>
<td>$787,663,544</td>
<td>$841,137,612</td>
<td>$894,974,430</td>
<td>$917,844,332</td>
<td>$6,886,134,630</td>
<td>$11,355,585,014</td>
<td>$23,171,931,627</td>
</tr>
<tr>
<td><strong>Running Total Revenue (YOE) See Note 2</strong></td>
<td>$722,089,681</td>
<td>$1,488,592,060</td>
<td>$2,276,255,603</td>
<td>$3,117,393,215</td>
<td>$4,012,367,645</td>
<td>$4,930,211,977</td>
<td>$11,856,346,607</td>
<td>$23,171,931,627</td>
<td>$23,171,931,627</td>
</tr>
<tr>
<td><strong>Running Total Balance (YOE)</strong></td>
<td>$62,623,174</td>
<td>$251,248,312</td>
<td>$453,279,423</td>
<td>$828,433,177</td>
<td>$1,162,229,620</td>
<td>$1,389,560,173</td>
<td>$603,533,053</td>
<td>$61,258,992</td>
<td>$61,258,992</td>
</tr>
</tbody>
</table>

(1) Note that all revenue estimates are based on assumptions about the average share of statewide revenues which will be directed to programs and projects in the Atlanta region. Actual amounts in any given year will fluctuate from these averages, as evidenced by the cost of projects programmed within the TIP period. GDOT has reviewed all TIP project commitments and confirms that financial resources are available to ensure no shortfall actually occurs within any individual fiscal year. Over the four year federally required TIP period (FY 2018-2021), the program is balanced and is less than revenue estimates.

(2) Fiscal years 2022 and 2023 are not considered to be part of the federally required four year TIP. For financial constraint purposes, project costs and revenue estimates are presented for information purposes only.

(3) For purposes of developing financing packages for negotiations with private sector partners, GDOT assumes a 3% to 4% annual cost inflation factor for MMIP projects, which is higher than the 2.2% long range inflation rate used for other RTP projects. For MMIP projects only, the project list shows YOE costs rather than current year costs.
### Table 4: FY 2018-2023 Yearly TIP Balances – Federal Transit Administration ($YOE)

#### Demonstration of Fiscal Constraint (FTA Funds) - May 2018

<table>
<thead>
<tr>
<th>FTA Program</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022 See Note 2</th>
<th>2023 See Note 2</th>
<th>LR 2024-2030</th>
<th>LR 2031-2040</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus - New (RV/20)</td>
<td>$1,550,000</td>
<td>$1,550,000</td>
<td>-</td>
<td>-</td>
<td>$10,850,000</td>
<td>$15,500,000</td>
<td></td>
<td></td>
<td>$29,450,000</td>
</tr>
<tr>
<td>Bus and Bus Facilities Program</td>
<td>$16,297,878</td>
<td>$8,124,104</td>
<td>$5,415,512</td>
<td>$4,541,343</td>
<td>$4,541,343</td>
<td>$4,541,343</td>
<td>$31,789,401</td>
<td>$54,160,000</td>
<td>$85,959,447</td>
</tr>
<tr>
<td>Clean Fuels Formula Program</td>
<td>$3,700,000</td>
<td>$3,700,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$25,900,000</td>
<td>$37,000,000</td>
<td>$63,000,000</td>
</tr>
<tr>
<td>Enhanced Mobility of Seniors and Individuals with Disabilities</td>
<td>$1,220,796</td>
<td>$1,220,796</td>
<td>$1,200,000</td>
<td>$1,200,000</td>
<td>$1,200,000</td>
<td>$1,200,000</td>
<td>$8,400,000</td>
<td>$12,000,000</td>
<td>$20,400,000</td>
</tr>
<tr>
<td>New Starts</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$163,188,000</td>
<td>$2,877,171,161</td>
<td>$3,040,359,161</td>
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<tr>
<td>State of Good Repair Grants</td>
<td>$53,011,055</td>
<td>$53,011,055</td>
<td>$48,591,797</td>
<td>$48,591,797</td>
<td>$48,591,797</td>
<td>$48,591,797</td>
<td>$340,142,579</td>
<td>$485,970,000</td>
<td>$1,126,501,877</td>
</tr>
<tr>
<td>Transit Nonurbanized Area Formula</td>
<td>$760,000</td>
<td>$760,000</td>
<td>$760,000</td>
<td>$760,000</td>
<td>$760,000</td>
<td>$760,000</td>
<td>$5,320,000</td>
<td>$7,600,000</td>
<td>$17,480,000</td>
</tr>
<tr>
<td>Transit Urbanized Area Formula Program</td>
<td>$69,051,943</td>
<td>$69,047,661</td>
<td>$62,686,800</td>
<td>$62,686,800</td>
<td>$62,686,800</td>
<td>$62,686,800</td>
<td>$438,807,000</td>
<td>$650,000,000</td>
<td>$1,477,654,404</td>
</tr>
</tbody>
</table>

#### Total Project Costs (CY)                      | $145,591,672| $137,413,616| $118,654,109| $117,779,940| $117,779,940    | $117,779,940    | $1,024,397,580| $4,139,401,161 | $6,075,951,481 |

#### Year of Expenditure Multiplier (Formula Programs) | 1.0000 | 1.0140 | 1.0282 | 1.0426 | 1.0572 | 1.0720 | 1.1099 | 1.2405 |

#### Year of Expenditure Multiplier (New Starts Capital) | N/A | N/A | N/A | N/A | N/A | N/A | 1.1773 | 1.4012 |

#### Formula Program Costs (YOE)                    | $145,591,672| $139,337,407| $121,999,680| $122,796,275| $124,515,423    | $126,258,639    | $955,858,298  | $1,565,765,792 | $3,302,123,186 |

#### New Starts Capital Project Costs (YOE)          | -          | -          | -          | -          | -               | -               | $192,118,832  | $4,031,387,858 | $4,223,506,690 |

#### Total Project Costs (YOE)                       | $145,591,672| $139,337,407| $121,999,680| $122,796,275| $124,515,423    | $126,258,639    | $1,147,977,130| $5,597,153,650 | $7,525,629,876 |

#### Running Total Cost (YOE)                        | $145,591,672| $284,929,079| $406,928,799| $529,725,034| $654,240,457    | $780,499,096    | $1,928,476,227| $7,525,629,876 | $7,525,629,876 |

#### Estimated FTA Revenue (YOE) See Note 1           | $131,681,004| $133,524,538| $135,393,882| $137,289,396| $139,211,447    | $141,610,408    | $1,237,153,362| $5,712,255,662 | $7,449,408,224 |

#### Running Total Revenue (YOE) See Note 1           | $131,681,004| $265,205,542| $400,599,423| $537,888,819| $677,100,267    | $818,260,457    | $2,055,414,037| $7,765,669,699 | $7,765,669,699 |

#### Running Total Balance (YOE) See Note 1           | ($13,910,668)| ($19,723,537)| ($6,329,335)| $8,163,785    | $22,859,809     | $37,761,578     | $126,937,810  | $242,039,822   | $242,039,822 |

(1) All revenue forecasts are based on funding apportionments under the FAST Act and align with information shown in the previous table. Project and program expenditures by transit agency recipients are estimates based on historical spending levels and previously encumbered commitments and will be adjusted periodically via future amendment processes to match actual allocation amounts each year. Over the four year federally required TIP period (FY 2018-2021), the program is balanced.

(2) Fiscal years 2022 and 2023 are not considered to be part of the federally required four year TIP. For financial constraint purposes, project costs and revenue estimates are presented for information purposes only.
Latest Planning Assumptions

ARC updates planning assumptions including (but not limited to) population, employment, socioeconomic variables, and vehicle miles traveled (VMT) on a recurring basis. A detailed listing of the planning assumptions for this conformity analysis is outlined in Exhibit 1. These documents were submitted to the interagency consultation group in accordance with Section 93.105(c)(1)(i) of the Transportation Conformity Rule which requires interagency review of the model(s) and associated methods and assumptions used in the regional emissions analysis. Interagency approved planning assumptions for the 2008 ozone standard assumptions on February 1, 2018. After the determination was made to reestablish conformity for the 1997 ozone standard, ARC provided interagency with those assumptions, which were approved on March 14, 2018.

Tolls and Managed Lanes

There are no programmed changes to tolled or managed facilities as part of this amendment. A system of managed tolled lanes is programmed throughout the region by the year 2040.

Transit Operating Procedures

Since the adoption of the Atlanta Region’s Plan Transportation Element in February 2016 there have been some changes to the anticipated service levels of transit in the region. Those changes are outlined below.

Fare Changes

No changes to transit fares in the region are incorporated into this amendment.

Service Level Changes

Since the adoption of the TIP Amendment #3 of The Atlanta Region’s Plan in 2017, a few major service changes have occurred with metro Atlanta’s local transit agencies. MARTA incorporated two significant service modifications in 2017 that included changes to over half the bus routes. Most of those involved routing changes and the addition of three new routes. Gwinnett County Transit (GCT) modified one route in 2017. SRTA’s XPRESS bus program incorporated the rest of the Horizon 1 Express changes which included the addition of two new routes. Gainesville Express added an additional route for needs of the local senior citizen population. CATS in Cherokee County incorporated new routing to service a new hospital that opened in May 2017. CobbLinc and the Atlanta Streetcar did not significantly modify their service since TIP Amendment #3.

Future Regional Transit Service

In TIP Amendment #3, some of regional transit providers were awarded CMAQ funding for new transit service. From the More MARTA Initiative, five routes with 10 minutes peak and 12 minutes off peak arterial rapid transit (ART) frequencies and four routes of 15 minute all day frequencies were funded. Douglas County plans to shortly begin fixed route service with funding for three local circulator routes and one express route from the West Douglas park and ride, the Douglasville multimodal facility, and the Blairs Bridge area into the Hamilton E. Holmes MARTA Station. Gwinnett County Transit was funded to improve headways to 30 minutes during the day as well as expanding service to 1 AM for all local routes. Finally, new SRTA XPRESS routes were funded along the I-75/I-575 Northwest Express Lanes that will open in 2018. These routes will service a new park and ride at Hickory Grove Road and I-75, the current Big Shanty/Town Center park and ride as well as a new park and ride at Roswell Road in Marietta.
From a prior year CMAQ funding, CobbLinc plans to roll out the express route 10X in 2018 that connects universities along Cobb Parkway to Midtown. Also, Gwinnett will be beginning construction soon on a new park and ride at Harbins Road and GA-316 where the XPRESS 416 service would originate and terminate instead of at the Hebron Church in Dacula.
Quantitative Analysis

The regional emissions analysis used to demonstrate conformity for both the 1997 and 2008 eight-hour ozone standard relies on a methodology which utilizes ARC’s 20-county regional activity-based travel demand model. The following sections outline the results of the emissions analyses for the required NAAQS.

1997 Eight-Hour Ozone Standard

For the 1997 eight-hour ozone standard, updated travel model networks were created for each analysis year (2020, 2024, 2030 and 2040) to reflect projects as listed in the Atlanta Region’s Plan Amendment #5. The emissions were aggregated at a 20-county geography, coincident with the 1997 ozone maintenance area.

The results of the emissions analysis for the eight-hour ozone maintenance area demonstrate adherence to the level of emissions necessary to meet the MVEBs contained in Georgia’s RFP SIP and the Ozone Maintenance Plan for the 1997 NAAQS. Table 5 and Figure 1 document the VOC and NOx emissions for each analysis year, as compared to the applicable MVEBs.

To maintain consistency between procedures used to estimate the motor vehicle emission budgets included in the ozone SIPs and the conformity analysis, ARC in consultation with GA EPD applies an off-model adjustment to emission results for the 13-county area to reflect an emissions debit resulting from a program to exempt senior citizens from the Inspection and Maintenance (I/M) program. This program was initiated by the Georgia General Assembly in 1996 (O.C.G.A Section 12-9). It exempts from emission testing vehicles ten years old or older driven fewer than 5,000 miles per year and owned by persons 65 years of age or older.

It was estimated that this senior I/M exemption increased VOC and NOx emissions by 0.05 and 0.03 tons per day respectively. These amounts are reflected in Table 5. This off-model adjustment is conservatively high and was applied to the emission results for VOC and NOx to produce final emission results for each analysis year in the 13-county area where the I/M program is in place. The same credit loss is assumed for each analysis year.

Table 5: 20-County Motor Vehicle Emissions Budget Test – 1997 Eight-Hour Ozone Standard

<table>
<thead>
<tr>
<th>Conformity Year / MVEB Plan</th>
<th>NOx (tons/day)</th>
<th>VOC (tons/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia’s RFP SIP</td>
<td>272.67</td>
<td>171.83</td>
</tr>
<tr>
<td>2020 Emissions Total</td>
<td>107.28</td>
<td>73.56</td>
</tr>
<tr>
<td>Georgia’s Ozone Maintenance Plan</td>
<td>126</td>
<td>92</td>
</tr>
<tr>
<td>2024 Emissions Total</td>
<td>65.74</td>
<td>56.93</td>
</tr>
<tr>
<td>2030 Emissions Total</td>
<td>44.74</td>
<td>41.27</td>
</tr>
<tr>
<td>2040 Emissions Total</td>
<td>31.86</td>
<td>31.00</td>
</tr>
</tbody>
</table>
Figure 1: 20-County Motor Vehicle Emissions Budget Test – 1997 Eight-Hour Ozone Standard

- NOx MVEB = 272.67 tpd\(^a\)
- VOC MVEB = 171.83 tpd\(^b\)
- NOx MVEB = 126 tpd\(^c\)
- VOC MVEB = 92 tpd\(^d\)

a – Georgia’s RFP SIP: 1997 Ozone Non-Attainment Area – NO\(_x\) budget for years before 2024
b – Georgia’s RFP SIP: 1997 Ozone Non-Attainment Area – VOC budget for years before 2024
c – Georgia’s Ozone Maintenance Plan for 1997 Ozone NAAQS – NO\(_x\) budget for years 2024 or later
d – Georgia’s Ozone Maintenance Plan for 1997 Ozone NAAQS – VOC budget for years 2024 or later
2008 Eight-Hour Ozone Standard

For the 2008 eight-hour ozone standard, updated travel model networks were created for each analysis year (2020, 2030 and 2040) to reflect projects as listed in the Atlanta Region’s Plan Amendment #5. The emissions were aggregated at a 15-county geography, coincident with the 2008 ozone maintenance area.

The results of the emissions analysis for the eight-hour ozone maintenance area demonstrate adherence to the level of emissions necessary to meet the MVEBs contained in Georgia’s Ozone Maintenance Plan for the 2008 NAAQS. Table 6 and Figure 2 document the VOC and NO\textsubscript{x} emissions for each analysis year, as compared to the applicable MVEBs.

To maintain consistency between procedures used to estimate the motor vehicle emission budgets included in the ozone SIPs and the conformity analysis, ARC in consultation with GA EPD applies an off-model adjustment to emission results for the 13-county area to reflect an emissions debit resulting from a program to exempt senior citizens from the Inspection and Maintenance (I/M) program. This program was initiated by the Georgia General Assembly in 1996 (O.C.G.A Section 12-9). It exempts from emission testing vehicles ten years old or older driven fewer than 5,000 miles per year and owned by persons 65 years of age or older.

It was estimated that this senior I/M exemption increased VOC and NO\textsubscript{x} emissions by 0.05 and 0.03 tons per day respectively. These amounts are reflected in Table 6. This off-model adjustment is conservatively high and was applied to the emission results for VOC and NO\textsubscript{x} to produce final emission results for each analysis year in the 13-county area where the I/M program is in place. The same credit loss is assumed for each analysis year.

Table 6: 15-County Motor Vehicle Emissions Budget Test – 2008 Eight-Hour Ozone Standard

<table>
<thead>
<tr>
<th>Conformity Year / MVEB Plan</th>
<th>NO\textsubscript{x} (tons/day)</th>
<th>VOC (tons/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia’s Ozone Maintenance Plan for the 2008 NAAQS for years before 2030</td>
<td>170.15</td>
<td>81.76</td>
</tr>
<tr>
<td>2020 Emissions Total</td>
<td>86.08</td>
<td>58.42</td>
</tr>
</tbody>
</table>

| Georgia’s Ozone Maintenance Plan for the 2008 NAAQS for years 2030 or later | 58 | 52 |
| 2030 Emissions Total | 39.47 | 35.79 |
| 2040 Emissions Total | 27.43 | 26.59 |
Figure 2: 15-County Motor Vehicle Emissions Budget Test – 2008 Eight-Hour Ozone Standard

a – Georgia’s 2008 Ozone Maintenance Plan – NOx budget for years before 2030
b – Georgia’s 2008 Ozone Maintenance Plan – VOC budget for years before 2030
c – Georgia’s 2008 Ozone Maintenance Plan – NOx budget for years 2030 or later
d – Georgia’s 2008 Ozone Maintenance Plan – VOC budget for years 2030 or later
2008 EIGHT-HOUR OZONE STANDARD PLANNING ASSUMPTIONS & MODELING INPUTS

General Methods and Assumptions

1) Modeling Methodology: Use the MOVES model in inventory mode to determine the total NOx and VOC emissions in the 15-county maintenance area.

2) Analysis Years: 2020, 2030, 2040

3) Conformity Test
   a. Motor Vehicle Emission Budget (MVEB) Test¹
      i. For years prior to 2030, 2014 MVEBs are used:
         1. NOx: 170.15 tpd
         2. VOC: 81.76 tpd
      ii. For years 2030 and later, 2030 MVEBs are used:
         1. NOx: 58 tpd
         2. VOC: 52 tpd

4) Modeling Start Date: February 2018. This start date is defined by the ARC as the initiation of the first model run for plan amendment/update.

Travel Demand Modeling Assumptions

1) Calibration Year: 2010 (with some 2015 interim validations and benchmarking thereafter)
   a. Model validated to the year 2010 using a comparison between estimated volumes and observed counts. See Appendix A for validation/calibration information.

2) Social/Economic Data: Same as used for the Atlanta Region’s Plan update. See Appendix B.

3) ARC’s Activity-Based Travel Model (ABM) is the basis for these runs. See Appendix C for an overview of ABM specifications.

Emissions Modeling Assumptions

1) Emissions Model: MOVES2014a – Database: movesdb20151028
   a. Emissions Process – use MOVES in inventory mode for a July weekday
      i. For the years 2020, 2030 and 2040 modeled travel data is used to calculate emissions
   b. Run separately for the 13-county and 2-county portions of the nonattainment area²
      i. 13-county area activity, vehicle population and other inputs are assigned to Fulton County while running MOVES
      ii. 2-county area activity, vehicle population and other inputs are assigned to Bartow County while running MOVES

¹ 2014 and 2030 MVEBs established as part of Georgia’s 2008 Ozone Maintenance State Implementation Plan for the Atlanta 8-Hour Ozone Nonattainment Area, effective June 2, 2017

² For the eight-hour ozone standard there are two sets of MOVES input files, one for the 13 counties that make up the former one-hour ozone nonattainment area in which a specific set of emission control measures is in place, and one for the 2 remaining ring counties (out of the 7 historically used for 20-county conformity)
2) MOVES Inputs
   a. Road Type Distribution – Processed from the travel demand model, GDOT HPMS counts and MOVES defaults. Summarizes VMT fraction by road type and source type for the 13 and 2 counties separately.
   b. Source Type Population
      i. Started with 2014 R.L. Polk & Co. registration data for the Atlanta nonattainment counties, updated in fall 2017
      ii. Future analysis year data is grown from 2014 based on the ratio of MPO population estimates
      iii. Since the population of vehicle type 62 (combination long-haul trucks) can easily be underrepresented in areas with lots of through traffic, the vehicle population for MOVES source type 62 was revised using MOVES default VMT/VPOP ratios and VMT for HPMS type 60 data
   c. Vehicle Type VMT
      i. HPMS VTypeYear - Processed from the travel demand model, GDOT HPMS Counts, and an EPA daily to annual VMT converter. Assigns total annual VMT by HPMS vehicle type.
      ii. Month VMT Fraction: MOVES defaults
      iii. Day VMT Fraction: MOVES defaults
      iv. Hour VMT Fraction: Derived from the travel demand model by source and road type. The fractions are determined separately for the 13 and 2 county areas.
   d. I/M Programs– Applied to the 13-county area only (See Appendix D)
   e. Age Distribution – Age data was derived from 2014 R.L. Polk & Co. registration data for the 13 and 2 counties separately for all vehicle types, except HDV8b (Source type 62) where MOVES defaults were used, this data was updated in fall 2017
   f. Average Speed Distribution – Processed from the travel demand model with HPMS VMT Adjustment factors applied. Calculates VHT by hour by speed bin by source. The distribution is determined separately for the 13 and 2 county areas.
   g. Ramp Fraction – Processed from the travel demand model. Calculates VHT by freeway and ramps by area type. The fraction is determined separately for the 13 and 2 county areas.
   h. Fuel – MOVES2014 defaults after 2015 do not match local fuel due to the removal/modification of Georgia summer fuel in the 45 county Atlanta region effective Oct 1, 2015
      i. Tier 3 Low Sulfur fuel (10ppm, 80ppm refinery gate and 95ppm downstream cap) for all counties
      ii. Summer Fuel reclassification
         1. 13 counties –
            a. Low Federal RVP summer requirements (June 1-Sept 15) for “designated volatility nonattainment areas” (40 CFR 80.27(a)(2)(ii))
b. Fuel region ID 170000000 kept but fuel formulations reflect region 178000000 for any model years after 2015

2. 2 counties –
   a. Standard Federal RVP summer requirements (June 1-Sept 15) for “designated volatility attainment areas” (40 CFR 80.27(a)(2)(i))
   b. Fuel region ID 170000000 kept but fuel formulations reflect region 100000000 for any model years after 2015

iii. Ethanol – The current assumption is an increasing percentage of ethanol fuel
   1. 2% in 2014, 28% in 2030 and 21% in 2040
   2. The rest of the gasoline blends with a larger percent of E15 with time:
      a. 0.8% in 2014, 19% in 2030 and 23% in 2050
   3. Remainder is E10

iv. Volatility waiver for E10 allows 1.0 psi RVP increase, but not in E15
   i. Meteorology – July 2014 weather for Hartsfield-Jackson Atlanta International Airport was used for this analysis consistent with the 2008 Eight Hour Ozone Maintenance SIP
   j. Starts – Processed from the travel model. Determines the number of trip starts in each of the 13 and 2 county areas. Applies only to the trips per day input. Defaults used for the rest of the start inputs.
   k. Hotelling – MOVES defaults

3) VMT HPMS Adjustment Factors
   a. Calculated for the year 2010 (See Appendix E)
   b. HPMS adjustment in base year of calibration in accordance with Section 93.122(b)(3) of the Transportation Conformity Rule which recommends that HPMS adjustment factors be developed to reconcile travel model estimates of VMT in base year of validation to HPMS estimates for the same period
   c. Summer (seasonal) adjustment to convert from average annual VMT to summer-season VMT
   d. Factors applied to VMT estimates generated by ARC travel demand model for 13-county portion and 2-county portion of 20-county modeling domain, separately
      a. Factors aggregated up to MOVES road types from base HPMS functional classifications

4) Off-Model Calculations
   a. Senior I/M Exemption (emissions debit)
      i. The Senior I/M Exemption calculated for year 2002 is conservatively high and will be added to the regional emission inventories for each analysis year

5) TCMs
   a. No additional credit is taken in the emissions modeling process for SIP TCMs

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3 Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources, Section 3.4.2.6, EPA420-R-92-009, USEPA Office of Air and Radiation, Office of Mobile Sources, 1992.
1997 EIGHT-HOUR OZONE STANDARD PLANNING ASSUMPTIONS & MODELING INPUTS

General Methods and Assumptions

1) Modeling Methodology: Use the MOVES model in inventory mode to determine the total NOx and VOC emissions in the entire former 20-county nonattainment area.
2) Analysis Years: 2020, 2024, 2030, 2040
3) Conformity Test
   a. Motor Vehicle Emission Budget (MVEB) Test
      i. For years prior to 2024⁴
         1. NOx: 272.67 tpd
         2. VOC: 171.83 tpd
      ii. For years 2024 and later⁵
         1. NOx: 126 tpd
         2. VOC: 92 tpd
4) Modeling Start Date: March 2015. This start date is defined by the ARC as the initiation of the first model run for plan amendment/update.

Travel Demand Modeling Assumptions

1) Calibration Year: 2010 (with some 2015 interim validations and benchmarking thereafter)
   a. Model validated to the year 2010 using a comparison between estimated volumes and observed counts (See Appendix A)
2) Social/Economic Data: Same as used for the Atlanta Region’s Plan update. See Appendix B.
3) ARC’s Activity-Based Travel Model (ABM) is the basis for these runs. See Appendix C for an overview of ABM specifications.

Emissions Modeling Assumptions

1) Emissions Model: MOVES2014a – Database: movesdb20151028
   a. Emissions Process – use MOVES in inventory mode for a July day
      i. For the years 2020, 2024, 2030 and 2040 modeled travel data is used to calculate emissions
   b. Run separately for the 13-county and 7-county portions of the nonattainment area⁶
      i. 13-county area activity, vehicle population and other inputs area assigned to Fulton County while running MOVES

⁴ MVEB established as part of Georgia’s 15% Reasonable Further Progress State Implementation Plan for the Atlanta 8-Hour Ozone Nonattainment Area, March 26, 2009
⁵ MVEB established as part of the Georgia Redesignation Request and Maintenance Plan for the Atlanta Ozone Nonattainment Area for the 1997 8-Hour Ozone NAAQS, March 21, 2012
⁶ For the eight-hour ozone standard there are two sets of MOVES input files, one for the 13 counties that make up the former one-hour ozone nonattainment area in which a specific set of emission control measures is in place, and one for the seven ring counties.
ii. 7-county area activity, vehicle population and other inputs are assigned to Bartow County while running MOVES

2) MOVES Inputs
   a. Road Type Distribution – Processed from the travel demand model, GDOT HPMS counts and MOVES defaults. Summarizes VMT fraction by road type and source type for the 13 and 7 counties separately.
   b. Source Type Population
      i. Started with 2014 R.L. Polk & Co. registration data for the Atlanta nonattainment counties, updated in fall 2017
      ii. Future analysis year data is grown from 2014 based on the ratio of MPO population estimates
      iii. Since the population of vehicle type 62 (combination long-haul trucks) can easily be underrepresented in areas with lots of through traffic, the vehicle population for MOVES source type 62 was revised using MOVES default VMT/VPOP ratios and VMT for HPMS type 60 data
   c. Vehicle Type VMT
      i. HPMS VTypeYear - Processed from the travel demand model, GDOT HPMS Counts, and an EPA daily to annual VMT converter. Assigns total annual VMT by HPMS vehicle type.
      ii. Month VMT Fraction: MOVES defaults
      iii. Day VMT Fraction: MOVES defaults
      iv. Hour VMT Fraction: Derived from the travel demand model by source and road type. The fractions are determined separately for the 13 and 7 county areas.
   d. I/M Programs – Applied to the 13-county area only (See Appendix D)
   e. Age Distribution – Age data was derived from 2014 R.L. Polk & Co. registration data for the 13 and 7 counties separately for all vehicle types, except HDV8b (Source type 62) where MOVES defaults were used, this data was updated in fall 2017
   f. Average Speed Distribution – Processed from the travel demand model with HPMS VMT Adjustment factors applied. Calculates VHT by hour by speed bin by source. The distribution is determined separately for the 13 and 7 county areas.
   g. Ramp Fraction – Processed from the travel demand model. Calculates VHT by freeway and ramps by area type. The fraction is determined separately for the 13 and 7 county areas.
   h. Fuel – MOVES2014 defaults after 2015 do not match local fuel due to the removal/modification of Georgia summer fuel in the 45 county Atlanta region effective Oct 1, 2015
      i. Tier 3 Low Sulfur fuel (10ppm, 80ppm refinery gate and 95ppm downstream cap) for all counties
      ii. Summer Fuel reclassification
         1. 13 counties –
a. Low Federal RVP summer requirements (June 1-Sept 15) for “designated volatility nonattainment areas” (40 CFR 80.27(a)(2)(ii))
b. Fuel region ID 170000000 kept but fuel formulations reflect region 178000000 for any model years after 2015

2. 7 counties –
   a. Standard Federal RVP summer requirements (June 1-Sept 15) for “designated volatility attainment areas” (40 CFR 80.27(a)(2)(i))
   b. Fuel region ID 170000000 kept but fuel formulations reflect region 100000000 for any model years after 2015

iii. Ethanol – The current assumption is an increasing percentage of ethanol fuel
   1. 2% in 2014, 28% in 2030 and 21% in 2040
   2. The rest of the gasoline blends with a larger percent of E15 with time:
      a. 0.8% in 2014, 19% in 2030 and 23% in 2050
   3. Remainder is E10

iv. Volatility waiver for E10 allows 1.0 psi RVP increase, but not in E15
   i. Meteorology – Meteorological data from the 2009 Reasonable Further Progress (RFP) SIP were used to represent the ozone season for all analyses before the year 2024. The RFP SIP meteorological input file was developed using 2000-2002 data. Meteorological conditions from the ten worst ozone days were averaged to produce the final input. For all analyses representing the year 2024 or later, 2008 summer meteorological data was used from the 2012 Ozone Maintenance Plan.
   j. Starts – Processed from the travel model. Determines the number of trip starts in each of the 13 and 7 county areas. Applies only to the trips per day input. Defaults used for the rest of the start inputs.
   k. Hotelling – MOVES defaults

3) VMT HPMS Adjustment Factors
   e. Calculated for the year 2010 (See Appendix E)
   f. HPMS adjustment in base year of calibration in accordance with Section 93.122(b)(3) of the Transportation Conformity Rule which recommends that HPMS adjustment factors be developed to reconcile travel model estimates of VMT in base year of validation to HPMS estimates for the same period
   g. Summer (seasonal) adjustment to convert from average annual VMT to summer-season VMT
   h. Factors applied to VMT estimates generated by ARC travel demand model for 13-county portion and 7-county portion of 20-county modeling domain, separately
      a. Factors aggregated up to MOVES road types from base HPMS functional classifications

4) Off-Model Calculations
   a. Senior I/M Exemption (emissions debit)

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7 Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources, Section 3.4.2.6, EPA420-R-92-009, USEPA Office of Air and Radiation, Office of Mobile Sources, 1992.
i. The Senior I/M Exemption calculated for year 2002 is conservatively high and will be added to the regional emission inventories for each analysis year

5) TCMs
   a. No additional credit is taken in the emissions modeling process for SIP TCMs
2010 Daily Estimated vs. Observed Traffic Volumes

\[ R^2 = 0.9543 \]
APPENDIX B – Socioeconomic Data for the Travel Model

ARC periodically revises its population and employment forecasts based on best available current information. Each revision is a multi-step process. First, new region-level forecasts are produced, followed by county-level forecasts. These then become region-level controls for census tract and traffic analysis zone (TAZ) forecasts.

The most current region-level control forecasts will serve as a foundation for The Region’s Plan, adopted in spring of 2016. The regional series, known as Series 15.0, was completed in late spring of 2015. The charts at the end of this section summarize the new updated population and employment controls for the 20-county study area.

Development of the most current draft regional forecast began in January of 2015. This forecast was developed from a calibration of a standard forecast for the 20-County Area by the Regional Econometric Models Inc. (REMI) econometric model, build 3.6.5R. This model was released by REMI in October 2014, and included 21 specific regions consisting of the 20 counties in ARC’s MPO, plus the rest of the state of Georgia. Forecasts are produced for over 6,000 economic and demographic variables.

ARC staff was assisted in the development of these regional forecasts by a Technical Advisory Committee (TAC) of nationally known, local experts on the Atlanta Regional Economy. The committee met three times in late winter and early spring of 2015. TAC members advised staff on REMI model calibration, policy variable development, and related iterative revisions to model runs. The TAC then recommended the final regional forecasts for use in the Region’s Plan forecasts.

In February of 2015 (in parallel to the TAC process), Research and Analytics division staff began a series of 23 meetings to meet with MPO member jurisdictions to collect “local expert” information that would be used in assessment of the draft regional forecasts and refinement of the county and subcounty forecasts of population and employment making up the entirety of series 15.0. These ‘local outreach’ meetings directly reviewed a previous series of forecasts (the ‘Needs Assessment’ or series 14.0) of households and total employment. These meetings also refined the region’s Unified Growth Policy Map (UGPM), which is a key input to the generalized zoning that influences land development in the small area allocation model.

A subsequent step in The Region’s Plan forecast process was development of county-level control totals. Regression analysis, third-party datasets, and input from the outreach meetings were core resources in arriving at these county control totals. The REMI model’s regional forecast was then recalibrated to mirror/reflect the county control totals. The county level controls for series 15.0 were finalized in mid-summer, 2015.

The final step in the forecasting process uses mathematical models to disaggregate the region-level/county-level control population and employment forecasts to “small areas”: the superdistrict, census tract and traffic analysis zone (TAZ) level. TAZs are nested within census tracts. Census tracts nest within superdistricts. The mathematical models underlying the region-level controls have evolved and become more complex, but ARC’s basic approach is the same today as in 1975.

The Production, Exchange, Consumption, and Allocation System (PECAS) model is being used as part of The Region’s Plan disaggregation of regional and county controls to small areas. This PECAS model runs annually and iteratively to produce not only a small-area allocation of population and households, but
labor dollars by industry, that serve as direct inputs to the travel model sets. Further, REMI model output at the county level provided detailed age distribution data that served as direct input to the travel model's population synthesizer. The process is integrated with the ARC travel demand model, as impedances (travel costs) from the travel model are a significant influence on small-area allocation of population and job growth.

Population and job levels from each successive single-year forecast become the base for forecasts in the next model year. First, the Activity-Based Model (ABM) analyzes base year traffic patterns and produces accessibility measures (impedances or travel costs) within the 20-county forecasted area. Then, the PECAS model develops socioeconomic forecasts using the previous year’s composite impedances from the TDM; the economic activity forecast by its Activity Allocation (AA) module, and resultant built space produced in response to that economic activity (and construction prices/rents) by its Spatial Development (SD) module. The PECAS output is translated into household income by size and job by sector forecasts at the TAZ level, which then become the input used by the ABM to produce the impedance(s) measure that drives the next iteration of the integrated model run.

All these models are carefully calibrated based on the best and most current data available. Data used in the current small-area modeling effort include 2010 United States Census results, economic data from IMPLAN and REMI, parcel level datasets from local jurisdictions, joined assessor’s data, third-party datasets on real estate development and construction costs, ARC annual major jurisdiction estimates of population (using a hybrid method involving building permit information, birth and death data, and American Community Survey data), and ARC semi-annual estimates of employment by industry for counties, superdistricts, tracts and TAZs/blockgroups from the state of Georgia unemployment insurance base file. National forecasts of employment and population were derived from the REMI TranSight model. The results of ARC travel surveys (including the 2011 Household Travel survey, the 2009-2010 Transit On-Board survey, the 2010 Hartsfield air passenger survey, travel time studies, speed studies, and others) shape travel model parameters. Highway projects and the schedule for their completion (primary inputs to the ABM model networks) are developed as part of an extensive discussion between ARC staff, local planners, Georgia Department of Transportation and various federal agencies. Likewise, ARC staff coordinates with local transit and shuttle providers (such as MARTA, GRTA, CCT, GCT, etc) to update and maintain transit networks and schedules.

The area modeled by ARC for transportation/air quality purposes expanded from ten (10) to twenty (20) counties over the last 15 years. To meet current and future data needs, ARC produced employment estimates by county and census block group for the state of Georgia beginning in 2008, and continues to produce these estimates on a semi-annual basis. The county coverage by land-use data produced in the LandPro program expands as needed. Going forward, ARC’s population forecast program area will be expanded as required from the current 20 counties, using the decennial and intercensal Census estimates, as well as other available information, as data baselines.

Post-processing adjustments are made to the ARC forecasts to account for expected large scale changes and policy priorities that would not be reflected in model output driven by historical data. Events such as expected construction of a new highway or policy input restricting development within the region are accounted for directly in the PECAS model with parameter changes to the AA module. Factors such as expected job and household growth from the completion of known major development projects (e.g. Atlantic Station) or transit-oriented development are incorporated as post processing adjustments to the model output or via specific site development changes to the parcel layers in the SD module.
Projected Population and Employment Growth for the 20-County Area

- Population:
  - 2010: 3,074 in Thousands
  - 2015: 5,279 in Thousands
  - 2020: 7,934 in Thousands
  - Projected to 4,627 in Thousands by 2040

- Employment:
  - 2010: 1,000 in Thousands
  - 2015: 2,000 in Thousands
  - 2020: 3,074 in Thousands
  - Projected to 4,627 in Thousands by 2040
APPENDIX C – Model Inputs

In 2016, ARC switched from its 4-step trip-based aggregate regional travel demand model to its newly developed, and recently calibrated disaggregate activity-based model (ABM). The ABM now serves as the major travel forecasting tool in the ARC region. This model has been developed to ensure that the regional transportation planning process can rely on forecasting tools that will be adequate for new socioeconomic environments and emerging planning challenges. It is equally suitable for conventional highway projects, transit projects, and various policy studies such as highway pricing and HOV / HOT analysis. The ARC ABM is based on the CT-RAMP (Coordinated Travel Regional Activity-Based Modeling Platform) family of Activity-Based Models. This model system is an advanced, but operational, AB model that fits the needs and planning processes of ARC.

The ABM has been tailored specifically to meet ARC planning needs, considering current and future projects and policies and also taking into account the special market segments that exist in the Atlanta region. The model system addresses requirements of the metropolitan planning process, relevant federal requirements, and provides support to ARC member agencies and other stakeholders.

1) Calibration Year: 2010 (with some 2015 interim validations and benchmarking thereafter)
2) Project Listing: Project listings will be provided in electronic format to Interagency Consultation Group for review in March 2017 and include:
   a. Regionally Significant and Federally Funded
   b. Regionally Significant and Non-Federally Funded
3) Demographic Data: Provided as separate attachment
4) Speed Data: Free-flow Speed by Area Type and Facility Type8

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8 Within the ARC travel demand and emission modeling process, free flow speeds are adjusted to reflect the increase in delay and travel time on a roadway segment as traffic volumes build and congestion levels increase. Link-level congested flow speeds are used to estimate NOx and VOC emissions as required by Sections 93.122(b)(i)-(iv) and 93.122(b)(2) of the Transportation Conformity Rule.
5) Transit Modeling
   a. Model recalibrated to 2010 transit ridership estimates, provided by transit operators
   b. Reflects results from the 2009-2010 Transit On Board Survey
   c. Routes updated to reflect current operating plans
   d. Transit mode split is estimated using the mode choice model
      i. Estimates individual modal trips from the person trip movements developed in the trip distribution model
      ii. Composed of 15 modes, including auto by occupancy and toll/non-toll choice, walk and bike non-motorized modes, and walk and drive access to different transit line-haul modes:
         1. Auto SOV (Free)
         2. Auto SOV (Pay)
         3. Auto 2-Person (Free)
         4. Auto 2-Person (Pay)
         5. Auto 3+ Person (Free)
         6. Auto 3+ Person (Pay)
         7. Walk
         8. Bike
         9. Walk-All-Transit
         10. Walk-Premium-Only
         11. PNR-All-Transit (PNR = Park and Ride)
         12. PNR-Premium-Only
         13. KNR-All-Transit (KNR = Kiss and Ride)
         14. KNR-Premium-Only
         15. School Bus
      iii. The mode choice model is organized in terms of seven characteristics:
         1. Mathematical structure;
         2. Trip purposes and choice sets;
         3. Limitations on choice sets;
         4. Analysis of transit access;
5. Treatment of HOV lanes;  
6. Stratification by income groups; and  
7. Analysis of alternative transit paths.

e. Transit Fare Modeling
   i. Transit fares are based on information provided by the local transit operators throughout the Atlanta region
   ii. The base year for the travel demand model is year 2010; therefore, any costs of traveling incurred within the model are representative of year 2010 dollars
      1. The base year calibration utilized transit fares that were in place in 2010; however the majority of local operators have implemented a fare increase since 2010. To reflect these fare increases while maintaining year 2010 dollars, the year 2015 fares were adjusted using the Consumer Price Index (CPI) online calculator\(^9\) which accounts for inflation to calculate the cost of goods.\(^{10}\)
      iii. A CPI adjustment was applied to all the operator fares and is carried forward for all model years from 2015 and beyond
      iv. The current ARC transit coding approach enables fares to be coded by mode and operator (cases where an operator has a different fare for different modes).
      v. The transit fare structure includes additional fares incurred from transferring from one operator to another
      vi. The fare structure results in a fare matrix which includes the total fare of the trip on a zone-to-zone level
   
   f. 2009-2010 Transit On Board Survey Calibration
      i. Update of regional transit travel targets based on expansion of the on-board survey data
         1. Modifications to express bus and BRT transfer constants
         2. Modifications to travel demand model estimates of zero-car transit work trips
         3. Modifications to travel demand model estimates of kiss-and-ride passenger access and use of transit system
         4. Overall evaluation of all modal constants
         5. Refinement to park-and-ride lot assumptions
         6. Updated walk connector and percent walk procedures
      ii. Modified transit skimming procedures
      iii. Re-calibrated air passenger model
      iv. Assessment of travel demand model understanding of market segments and travel patterns relative to the on-board survey records

\(^9\) http://data.bls.gov/cgi-bin/cpicalc.pl
\(^{10}\) For example, the current year 2015 one-way MARTA fare of $2.50 translates to approximately $2.30 in year 2010 dollars. In other words, the MARTA fare increase from $2.00 to $2.50 outpaces inflation. So, using the consumer price index calculator, the 2015 MARTA fare in year 2010 dollars is $2.30.
Appendix D – I/M Program

- Exhaust and Evaporative (OBD and gas cap pressure test) for 1996 and newer vehicles
  - Annual inspection required
  - Computerized test and repair OBD – Exhaust
  - Computerized test and repair OBD & GC - Evaporative
  - Applies to all LDG vehicle types
  - Three year grace period
  - 3% waiver rate for all vehicles – Exhaust test
  - 0% waiver rate for all vehicles – Evaporative test
  - 97% compliance rate

- Exhaust and Evaporative test for 1975 – 1995 vehicles
  - Annual inspection required
  - Computerized test and repair ASM 2525/5015 Phase-in – Exhaust
  - Computerized test and repair GC – Evaporative
  - Applies to all LDG vehicle types
  - 3% waiver rate for all vehicles – Exhaust
  - 0% waiver rate for all vehicles – Evaporative
  - 97% compliance rate
  - 25 year and older model years are exempt
## Appendix E – VMT Adjustment Factors

### Ozone VMT Adjustment Factors

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MEETING SUMMARY

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1. Transportation Planning Updates
   a. ARC

   David Haynes, ARC, updated the committee on ARC planning activities. The public comment period for TIP Amendment #3 just wrapped up. It ran from June 21 – July 20. ARC held a couple of open houses to share information about the plan: one in the Peachtree Center Mall food court and one at GDOT’s office. In total, about 85 people participated in the open houses. ARC staff is reviewing the one set of public comments received and preparing remarks that will be distributed to TCC by Friday, July 28th ahead of any TCC or policy board action on the amendment. GDOT is pulling together some information to support ARC’s response as well. TIP Amendment #3 will go through formal adoptions in August with GRTA Board approval planned for September.

   Due to the passage of several SPLOSTS, the More MARTA referendum in Atlanta and the current ARC TIP Solicitation another amendment is likely by the end of this year or in the first quarter of 2018. The amendment will likely be conformity-triggering. The exact nature of the amendment, whether it will be split into a #4 and a #5, and whether ARC will seek to turn these series of substantial amendments into a new full-fledged RTP is still up for debate. ARC staff will provide more information to Interagency when it becomes available.
Interagency Consultation Group
October 24, 2017

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1. Transportation Planning Updates
   a. ARC
      i. Amendment #4
         Jean Hee Barrett, ARC, updated the committee on ARC’s planning schedule for the next few months. ARC staff is working on finalizing project selection from the solicitation earlier this year. Staff plan on incorporating funding recommendations that do not trigger an emissions analysis in Amendment #4. This amendment will rely on a short conformity form and will allocate funds for the CMAQ, STBGP and TAP programs. Interagency members should expect an updated short conformity form, along with a project list, in late November for their review ahead of the opening of public comment in December. ARC is seeking committee approvals in February with GRTA approval in March.

      ii. Future Amendments
          David Haynes, ARC, followed by explaining plans for the beginning of 2018. Staff is anticipating another amendment to cover solicitation projects that trigger an emissions analysis along with updates to long-range state as well as local TSPLOST projects. Staff is targeting adoption for this update by the end of June 2018. Interagency will be involved with planning assumptions and draft conformity determinations in the winter and spring.
Interagency Consultation Group  
January 23, 2018

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1. Transportation Planning Updates
   a. ARC
      i. Amendment #4 Update
         Jean Hee Barrett, ARC, updated the committee on ARC’s schedule to wrap up Amendment #4. Public comment closed on January 16. ARC received 29 comments via email. ARC staff is reviewing and preparing responses to those comments to release by January 26. Comments were varied, with some reflecting the new project evaluation procedures, some related to transit expansion and some more general.

         Amendment #4 will begin moving through ARC committees in February. It’s scheduled to be in front of TCC on February 9 and TAQC on February 15. GRTA is scheduled to act on the amendment on March 14.

      ii. Amendment #5 Update
         Barrett continued the conversation into Amendment #5. ARC provided planning assumptions and a modeling list to Interagency last week and hope to receive comments by February 1. ARC staff hopes to complete the runs by early March with a goal of the amendment going out to a 30-day public comment period on March 21. ARC committees are scheduled to act in May with GRTA providing a conditional approval in May as well. Amendment #5 includes some FY’18 funds so ARC staff is eager to get that allocated ASAP.
Amendment #5 includes a mix of solicitation projects, project scope and costs changes, and TSPLOST locally funded projects.

b. CBMPO
   No Update.

c. GHMPO
   Sam Baker, GHMPO, updated the committee on planning activities in Hall County. GHMPO has recently completed two planning studies: a regional freight study and a Green Street traffic improvement study. This year, GHMPO is starting several new studies: two trail routing studies to connect existing segments and a traffic improvement study on Dawsonville Hwy. GHMPO staff is also actively working on an update to their UPWP for FY'19. GHMPO staff is gearing up to start their next RTP update, which is due by mid-2020. Staff is planning to kick-off work for that product later this year.

   Baker noted that GHMPO is preparing an application for additional PL funding from GDOT to prepare an update to the Jackson County CTP. If granted they hope the project will begin in July and finish by the end of 2019.

   Finally, GHMPO staff are working on a resolution and agreement with GDOT to incorporate statewide safety performance measures and targets into their planning process.
MEETING SUMMARY

Attendees

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1. Transportation Planning Updates
   a. ARC
      i. Amendment #4 Update
         Jean Hee Barrett, ARC, updated the committee on ARC’s schedule to wrap up Amendment #4. Public comment closed on January 16, and ARC’s TCC and TAQC have taken action to approve the amendment. ARC’s Board is scheduled to take action on February 28. GRTA’s board is scheduled to take it up on March 14 before USEPA/USDOT can take action. This amendment allocates FY’18 funds for projects associated with ARC’s 2017 project solicitation, among other changes.

      ii. Amendment #5 Update
         Barrett continued the conversation into Amendment #5. ARC is still coordinating with GRTA and GDOT on the amendment, which is scheduled to go to public comment on March 21 for 30 days. ARC staff are finishing up model coding and emission modeling on the project list. After the close of public comment, ARC committees will take action in May followed by GRTA action in June, before the close of FY’18.

   b. CBMPO
      No Update.

   c. GHMPO
Sam Baker, GHMPO, updated the committee on planning activities in Hall County. GHMPO recently passed a resolution to support the state’s safety targets. Otherwise, all planning activities they discussed in January’s meeting are still ongoing.

2. Air Quality Updates
   a. 2008 Ozone Implementation Plan Ruling

   D’Onofrio explained that on February 16, the DC Circuit Court of Appeals vacated portions of the EPA’s 2008 Ozone Implementation Rule. Among those components vacated are the revocation of transportation conformity requirements for the 1997 ozone standard.

   Interagency had a roundtable discussion on this topic and its potential implications. EPA staff were only able to offer that they would provide more information to the group as soon as they received it from headquarters. As of now, the exact impacts of this ruling on the region’s transportation planning process remains unknown.