PLAN 2040 Conformity Determination Report

EXHIBIT 1A

Interagency Review of Planning Assumptions

Used in Regional Emissions Analysis

For Atlanta Eight-Hour Ozone Nonattainment Area

Interagency Consultation Meeting

Atlanta Regional Commission

The ARC will be conducting a conformity analysis under the eight-hour ozone standard as part of the conformity determination for the PLAN 2040 RTP / FY 2012-2017 TIP for the 20 county nonattainment area.

Below is a detailed listing of the procedures and planning assumptions for the upcoming conformity analysis of the PLAN 2040 RTP.

Section 1: General Methods and Assumptions

1) Modeling Methodology: Estimate link-level VMT and congested flow speeds using ARC 20-county travel demand model that corresponds to the 20-county eight-hour ozone nonattainment area

2) Conformity Test
   a) Nonattainment Classification - Moderate
   b) Motor Vehicle Emission Budget (MVEB) Test[1]
      i. NOx: 306.75 tpd
      ii. VOC: 172.27 tpd

3) Conformity Analysis Years: 2016, 2020, 2030, 2040

4) Modeling Start Date: March 2011. This start date is defined by the ARC as the initiation of the first model run for the Plan 2040 RTP, begun when all datasets needed for the model run were completed.

5) Interagency Consensus on Planning Assumptions: January 25, 2011.

Section 2: Travel Demand Modeling Assumptions

1) Calibration Year: 2000 (with some 2005 interim validations and benchmarking thereafter)
2) Project Listing: Project listings will be provided in electronic format to Interagency Consultation Group for review in the first quarter of 2011.
   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 Type[2]

[1] MVEB established as part of Atlanta Early Progress State Implementation Plan for year 2006. Federal Register notice of adequacy published April 9, 2007 (72 FR 17550), with an effective date of April 24, 2007.
[2] 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.

		Area Type							
	Facility Type	Urban Very High Density	Urban High Density	Urban Medium Density	Urban Low Density	Suburban	Exurban	Rural	Metered Ramps
0	Zone Centroid Connectors	7	11	11	11	11	14	14	
1	Interstate / Freeway Free Flow	55	58	58	61	61	63	65	
2	Parkway	50	50	55	55	57	60	60	
3	HOV Buffer Separated	55	58	58	61	61	63	65	
4	HOV Barrier Separated	55	58	58	61	61	63	65	
5	High Speed Ramp / CD Road	50	50	55	55	57	60	60	15
6	Medium Speed Ramp	50	50	50	50	50	50	50	10
7	Low Speed Ramp	40	40	40	40	40	40	40	10
8	Loop Ramp	30	30	30	30	30	30	30	10
9	Off Ramp w/ Intersection	25	25	25	25	25	25	25	
10	On Ramp w/ Intersection	40	40	40	40	40	40	40	5
11	Expressway	40	42	45	48	52	55	60	
12	Principal Arterial - Class I	26	30	33	36	42	46	55	
13	Principal Arterial - Class II	24	27	30	34	40	44	48	
14	Minor Arterial - Class I	22	25	28	31	38	42	45	
15	Minor Arterial - Class II	20	23	26	29	34	38	42	
16	HOV - Arterial (all classes)	20	27	30	33	36	39	42	
17	Major Collector	18	22	25	28	31	34	38	
18	Minor Collector	15	18	21	24	27	30	35	
19	Planned Ramps w/ Intersections	30	30	30	30	30	30	30	5
20	Planned Directional Ramps	45	45	45	45	45	45	45	10

5) Transit Modeling
   a) Model recalibrated to 2000 transit ridership estimates, provided by transit operators
   b) Reflects results from the 2001-2002 Transit On Board Survey, with preliminary adjustments from 2009 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 three nested logit models:
      (1) Home based work trips, which includes home based university trips;
      (2) Home based other trips, which include home based other, home based shopping and home based grade school; and
      (3) Non-home based trips.
   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) Fare structure and operating plans supplied by the local transit operators
      (1) Fares remain constant over time, across all network years
      (2) Fares reflect current transit operating plans
   ii) Transit fare structure uses a fare matrix on a zone to zone level with a universal fare structure (flat fare) for all bus and rail lines
      (1) Changes to the existing fare structure and service frequency are coded directly into the model
      (2) Current fare values in the model are weighted according to the percentage of riders using a discounted fare pass; changes to these assumptions can be incorporated directly into the model
      (3) Peak and off-peak fares are equivalent

f) 2009 Transit On Board Survey interim adjustments
   i) Update of regional transit travel targets based on a preliminary expansion of the raw 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

Section 3: Emissions Modeling Assumptions

1) Emissions Factor Model: MOBILE6.2.03
2) Eight Hour Ozone Standard MOBILE6.2.03 Inputs (13-county portion)[3]
   a) Average hourly temperature and relative humidity and average daily barometric pressure for the 10 highest ozone days, 2000 – 2002
   b) Stage II refueling
      i) Started in 1992
      ii) Three phase in years
      iii) 81% efficiency
   c) Anti-tampering program
      i) Started in 1982
      ii) Covers model years 1975 – 1995
      iii) All LDG vehicle types are covered
      iv) Annual program
      v) 97% compliance
      vi) Catalyst removal only
   d) I/M Program
      i) Exhaust and Evaporative (OBD and gas cap pressure test) for 1996 and newer vehicles
         (1) Began in 1982
         (2) Annual inspection required
         (3) Computerized test and repair OBD – Exhaust
         (4) Computerized test and repair OBD & GC - Evaporative
         (5) Applies to all LDG vehicle types
         (6) Three year grace period
         (7) 3% waiver rate for all vehicles – Exhaust test
         (8) 0% waiver rate for all vehicles – Evaporative test
         (9) 97% compliance
      ii) Exhaust and Evaporative test for 1975 – 1995 vehicles
         (1) Began in 1982
         (2) Annual inspection required
         (3) Computerized test and repair ASM 2525/5015 Phase-in – Exhaust
         (4) Computerized test and repair GC – Evaporative
         (5) Applies to all LDG vehicle types
         (6) 3% waiver rate for all vehicles – Exhaust
         (7) 0% waiver rate for all vehicles – Evaporative
         (8) 97% compliance
         (9) 25 year and older model years are exempt
   e) Fuel - Phase 2 Low Sulfur, Low RVP Georgia Gasoline[4]

[3] For the eight-hour ozone standard there are two sets of MOBILE6 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. For each set, the input files contain the same assumptions for all analysis years (2010, 2020, and 2030).

[4] In 2002, Georgia's two-phase gasoline sulfur control program limited average sulfur in gasoline sold in the 13-county Atlanta area and in 12 surrounding counties to 150 parts per million (ppm). In addition, there was a

i) 100% market share of 10% ethanol-blend gasoline (E10) assumed
ii) volatility waiver for E10 allows 1.0 psi RVP increase

f) 2002 regional fleet age distribution
i) Derived from R.L. Polk & Co. registration data for 13-county area
ii) Applied to 15 of the 16 MOBILE6.2.03 composite vehicle classifications – LDV, LDT1, LDT2, LDT3, LDT4, HDV2B, HDV3, HDV4, HDV5, HDV6, HDV7, HDV8, HDBS, HDBT, MC
(1) Default for HDV8B
(2) Default VMT fractions

3) Eight Hour Ozone Standard MOBILE6.2.03 Inputs (7-county portion)
a) Average hourly temperature and relative humidity and average daily barometric pressure for the 10 highest ozone days, 2000 – 2002
b) No Stage II refueling
c) No anti-tampering program
d) No I/M program
e) Fuel - Phase 2 Low Sulfur, Low RVP Georgia Gasoline
i) 100% market share of 10% ethanol-blend gasoline (E10) assumed
ii) volatility waiver for E10 allows 1.0 psi RVP increase

f) 2002 regional fleet age distribution
i) Derived from R.L. Polk & Co. registration data for 7 county area
ii) Applied to 15 of the 16 MOBILE6.2.03 composite vehicle classifications – LDV, LDT1, LDT2, LDT3, LDT4, HDV2B, HDV3, HDV4, HDV5, HDV6, HDV7, HDV8, HDBS, HDBT, MC
(1) Default for HDV8B
(2) Default VMT fractions

4) VMT adjustment factors
a) Calculated for year 2000
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[5]
d) 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.

VMT Adjustment Factors

Functional Class Name	Factor for 13 County Area	Factor for 7 County Area
Rural Interstate	0.67	0.89

seasonal (June 1 to September 15) 7.0 pounds per square inch (psi) Reid vapor pressure cap on gasoline sold in this Phase 1 area. In 2003, Phase 2 of Georgia's gasoline rule reduced average sulfur to 30 ppm year-round and added 20 additional counties to the sulfur and RVP control program.

[5] *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.

Rural Principal Arterial	1.02	0.99
Rural Min. Arterial	1.16	0.98
Rural Major Collector	0.88	1.81
Rural Minor Collector	1.07	1.81
Rural Local	0.64	1.10
Urban Interstate	1.05	0.86
Urban, Other Freeway	2.44	0.85
Urban Principal Arterial	0.67	0.97
Urban Minor Arterial	1.21	0.96
Urbanized Collector	1.21	1.80
Urbanized Local	0.95	1.06

5) 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.

6) TCMs
   a) No additional credit is taken in the emissions modeling process for SIP TCMs
   b) Listed below is a TCM status report

Description	ARC Project #	GDOT PI #	TIP	Status
HOV LANES Sponsor – GDOT	AR 073B	713760	98-00, 99-01	Under construction*
I-85N from Chamblee-Tucker Rd to SR 316 (HOT Lanes), I-85 @ SR 316, Interchange Reconstruction	GW-AR 053A GW-AR 053B	110530	01-03 02-04 03-05 05-10	Implemented Implemented
ATLANTIC STATION, 17th STREET BRIDGE Sponsor – City of Atlanta A – Bridge and Southbound off ramps C – Northside Dr over Norfolk Southern Railroad to Atlantic Station D – Northbound off ramp to 17th Street Bridge, Williams St Relocation	AT-AR 224A AT-AR 224C AT-AR 224D	714190 0001297 0001298	00-02 01-03 02-04 03-05 05-10	A – Implemented C – Implemented D – Implemented
CLEAN FUEL BUSES Sponsors – MARTA and CCT	M-AR 232	N/A	94-95	Implemented
EXPRESS BUS ROUTES Sponsor – MARTA	M-R 160 M-R 162	770632 770632	94-96	Implemented
IMPROVE / EXPAND BUS SERVICE Sponsor – MARTA	M-R 161	770633	96-98	Implemented
INTERSECTION UPGRADE, COORDINATION &	AT 089	04Y108	93-95	Implemented

Description	ARC Project #	GDOT PI #	TIP	Status
COMPUTERIZATION Sponsor(s) – GDOT in partnership with local Jurisdictions	CL 094	770600	94-96	Implemented
	CO 249	770601	94-96	Implemented
	DK 118	770603	94-96	Implemented
	FN 086	770605	94-96	Implemented
	FS 068	770605	94-96	Implemented
	GW 135	170950	94-96	Implemented
	R 098	04418	93-95	Implemented
	R 098	770391	94-96	Implemented
ITS – ADVANCED TRAFFIC MANAGEMENT SYSTEM / INCIDENT MANAGEMENT PROGRAM Sponsor – GDOT I-75/I-85 within I-285, Northern portion of I-285 between I-75 and I-85	R 098	770391	94-96	Implemented
CLEAN FUELS REVOLVING LOAN PROGRAM Sponsor – GEFA	R 195	770790, 770795	96-98	Implemented
HOV LANES Sponsor – GDOT I-75 and I-85 within I-285	R 174	320H94	94-96	Implemented
PARK & RIDE LOTS Sponsor(s) – Douglas & Rockdale Counties Douglas County – Chapel Hill @ I-20, Rockdale County – Sigman @ I-20	DO 211C		94-96	Implemented
REGIONAL COMMUTE OPTIONS & HOV MARKETING PROGRAMS Sponsor(s) – GDOT	R 159	770631	94-96	Implemented
SIGNAL PREEMPTION Sponsor – MARTA	M-R 164	770636	94-96	Implemented
TRANSIT INCENTIVES PROGRAM Sponsor - MARTA	M-AR 231A M-AR 231B	771031 771119	98-00 99-01 00-02	Implemented
TRANSPORTATION MANAGEMENT ASSOCIATIONS Sponsor – ARC	AR 221A AR 221B AR 221C AR 221E AR 221F	771033 771140 771141 0000570 0000571	98-00 99-01 00-02 01-03	Implemented
UNIVERSITY RIDESHARE PROGRAM Sponsor - ARC	AR 220A AR 220B AR 220C AR 220D AR 200E	771032 771113 0000351 0000567 0000568	98-00 99-01 00-02 01-03 02-04	Implemented

* This project was substituted for the HOV lane. The substitution was adopted on November 5, 2009 by EPA's concurrence letter.

EXHIBIT 1B

Interagency Review of Planning Assumptions

Used in Regional Emissions Analysis

For Atlanta PM2.5 Nonattainment Area

Interagency Consultation Meeting

Atlanta Regional Commission

The ARC will be conducting a conformity analysis under the PM2.5 standard as part of the conformity determination for the PLAN 2040 RTP / FY 2012-2017 TIP for the 20 county nonattainment area.

Below is a detailed listing of the procedures and planning assumptions for the upcoming conformity analysis of the PLAN 2040 RTP.

Section 1: General Methods and Assumptions

1) Modeling Methodology
   a) Estimate link-level VMT and congested flow speeds using ARC 20-county travel demand model that corresponds to the 20 *full-county* portion of the PM2.5 nonattainment area
   b) Estimate VMT for Heard and Putnam *partial-county* areas using historical traffic count data derived from GDOT's Annual Traffic Count (ATC) program database
      i) ATC data provided by county by traffic count station
      ii) Traffic count growth trends for each analysis year estimated through linear regression using the most recent six years of consecutive traffic count data available
   c) Estimate congested flow speeds for Heard and Putnam *partial-county* areas using VMT-weighted speed by HPMS functional class, extrapolated from ARC travel demand model for each analysis year
2) Conformity Test
   a) Nonattainment Classification - Basic
      i) No-Greater-Than-Base-Year interim emissions test
         (1) 2002 base year
         (2) Base year emissions to be developed as part of conformity analysis as provided for in preamble to the eight-hour ozone and PM2.5 Transportation Conformity Rule[6]. Base year emissions will be established using the same modeling methodology presented above.
3) Conformity Analysis Years: 2016, 2020, 2030, 2040
4) Modeling Start Date: March 2011. This start date is defined by the ARC as the initiation of the first model run for the PLAN 2040 RTP Update and FY 2008-2013 TIP, begun when all datasets needed for the model run were completed.
5) Interagency Consensus on Planning Assumptions: January 25, 2011

Section 2: Travel Demand Modeling Assumptions

1) Calibration Year: 2000 (with some 2005 interim validations and benchmarking thereafter)
2) Project Listing: Project listings will be provided in electronic format to Interagency Consultation Group for review in the first quarter of 2011.
   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 Type[7]

[6] Federal Register, Vol. 69, No.126, July 1, 2004, p. 40015, first column.

[7] 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.

		Area Type							
	Facility Type	Urban Very High Density	Urban High Density	Urban Medium Density	Urban Low Density	Suburban	Exurban	Rural	Metered Ramps
0	Zone Centroid Connectors	7	11	11	11	11	14	14	
1	Interstate / Freeway Free Flow	55	58	58	61	61	63	65	
2	Parkway	50	50	55	55	57	60	60	
3	HOV Buffer Separated	55	58	58	61	61	63	65	
4	HOV Barrier Separated	55	58	58	61	61	63	65	
5	High Speed Ramp / CD Road	50	50	55	55	57	60	60	15
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8	Loop Ramp	30	30	30	30	30	30	30	10
9	Off Ramp w/ Intersection	25	25	25	25	25	25	25	
10	On Ramp w/ Intersection	40	40	40	40	40	40	40	5
11	Expressway	40	42	45	48	52	55	60	
12	Principal Arterial - Class I	26	30	33	36	42	46	55	
13	Principal Arterial - Class II	24	27	30	34	40	44	48	
14	Minor Arterial - Class I	22	25	28	31	38	42	45	
15	Minor Arterial - Class II	20	23	26	29	34	38	42	
16	HOV - Arterial (all classes)	20	27	30	33	36	39	42	
17	Major Collector	18	22	25	28	31	34	38	
18	Minor Collector	15	18	21	24	27	30	35	
19	Planned Ramps w/ Intersections	30	30	30	30	30	30	30	5
20	Planned Directional Ramps	45	45	45	45	45	45	45	10

5) Transit Modeling
   a) Model recalibrated to 2000 transit ridership estimates, provided by transit operators
   b) Reflects results from the 2001-2002 Transit On Board Survey, with preliminary adjustments from 2009 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 three nested logit models:
         (1) Home based work trips, which includes home based university trips;
         (2) Home based other trips, which include home based other, home based shopping and home based grade school; and
         (3) Non-home based trips.
      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) Fare structure and operating plans supplied by the local transit operators
         (1) Fares remain constant over time, across all network years
         (2) Fares reflect current transit operating plans
      ii) Transit fare structure uses a fare matrix on a zone to zone level with a universal fare structure (flat fare) for all bus and rail lines
         (1) Changes to the existing fare structure and service frequency are coded directly into the model
         (2) Current fare values in the model are weighted according to the percentage of riders using a discounted fare pass; changes to these assumptions can be incorporated directly into the model
         (3) Peak and off-peak fares are equivalent
   f) 2009 Transit On Board Survey interim adjustments
      i) Update of regional transit travel targets based on a preliminary expansion of the raw 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

Section 3: Emissions Modeling Assumptions

1) Emissions Factor Model: MOBILE6.2.03
2) PM2.5 Standard MOBILE6.2.03 Inputs (13-county portion)[8]

Annual averages of the hourly average temperature and relative humidity for each hour of each month; and annual average of the daily average barometric pressure for each month; 2000 – 2002

a) Stage II refueling
   i) Started in 1992
   ii) Three phase in years
   iii) 81% efficiency
b) Anti-tampering program
   i) Started in 1982
   ii) Covers model years 1975 – 1995
   iii) All LDG vehicle types are covered
   iv) Annual program
   v) 97% compliance
   vi) Catalyst removal only
c) I/M Program
   i) Exhaust and Evaporative (OBD and gas cap pressure test) for 1996 and newer vehicles
      (1) Began in 1982
      (2) Annual inspection required
      (3) Computerized test and repair OBD – Exhaust
      (4) Computerized test and repair OBD & GC - Evaporative
      (5) Applies to all LDG vehicle types
      (6) Three year grace period
      (7) 3% waiver rate for all vehicles – Exhaust test
      (8) 0% waiver rate for all vehicles – Evaporative test
      (9) 97% compliance
   ii) Exhaust and Evaporative test for 1975 – 1995 vehicles
      (1) Began in 1982
      (2) Annual inspection required
      (3) Computerized test and repair ASM 2525/5015 Phase-in – Exhaust
      (4) Computerized test and repair GC – Evaporative
      (5) Applies to all LDG vehicle types
      (6) 3% waiver rate for all vehicles – Exhaust
      (7) 0% waiver rate for all vehicles – Evaporative
      (8) 97% compliance

[8] For the PM2.5 standard there are two sets of MOBILE6 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 plus the portions of Heard and Putnam counties. For each set, the input files contain the same assumptions for all analysis years (2010, 2020, and 2030).

(9) 25 year and older model years are exempt

d) Fuel[9]
   i) 2002 Base Year: Annual average sulfur and Reid Vapor Pressure (RVP) based on caps in Georgia's Low Sulfur, Low RVP gasoline marketing rule (June – September) and on the monthly sulfur and RVP values in USEPA's National Mobile Inventory Model (NMIM)[10] database (October – May)
   ii) 2010 and later: Phase 2 Low Sulfur (30ppm) Georgia Gasoline year-round; annual average RVP based on caps in Georgia's gasoline marketing rule (June-September) and on the monthly RVP values in the NMIM database (October-May)
   iii) Diesel sulfur: average of the monthly values in USEPA's NMIM database for each analysis year

e) 2002 regional fleet age distribution
   i) Derived from R.L. Polk & Co. registration data for 13-county area
   ii) Applied to 15 of the 16 MOBILE6.2.03 composite vehicle classifications – LDV, LDT1, LDT2, LDT3, LDT4, HDV2B, HDV3, HDV4, HDV5, HDV6, HDV7, HDV8, HDBS, HDBT, MC
      (1) Default for HDV8B
      (2) Default VMT fractions

3) PM2.5 Standard MOBILE6.2.03 Inputs (7-county and partial-county portions)

g) Annual averages of the hourly average temperature and relative humidity for each hour of each month; and annual average of the daily average barometric pressure for each month; 2000 – 2002

h) No Stage II refueling

i) No anti-tampering program

j) No I/M program

k) Fuel
   i) 2002 Base Year[11]: Annual average sulfur and RVP based on caps in Georgia's Low Sulfur, Low RVP gasoline marketing rule (June – September) and on the monthly sulfur and RVP values in USEPA's NMIM database (October – May)
   ii) 2010 and later: Phase 2 Low Sulfur (30ppm) Georgia Gasoline year-round; annual average RVP based on caps in Georgia's gasoline marketing rule (June-September) and on the monthly RVP values in the NMIM database (October-May)
   iii) Diesel sulfur: average of the monthly values in USEPA's NMIM database for each analysis year

l) 2002 regional fleet age distribution

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[9] In 2002, Georgia's two-phase gasoline sulfur control program limited average sulfur in gasoline sold in the 13-county Atlanta area and in 12 surrounding counties to 150 parts per million (ppm). In addition, there was a seasonal (June 1 to September 15) 7.0 pounds per square inch (psi) Reid vapor pressure cap on gasoline sold in this Phase 1 area. In 2003, Phase 2 of Georgia's gasoline rule reduced average sulfur to 30 ppm year-round and added 20 additional counties (including Putnam) to the sulfur and RVP control program. Because MOBILE6 shows no effect of oxygenate (e.g., ethanol) on PM2.5, ethanol-blend gasoline was not modeled for the PM2.5 regional emissions analysis.

[10] http://www.epa.gov/oms/nmim.htm

[11] For the 2002 base year *only*, separate emission factors were run for Putnam County because the Low-Sulfur, Low RVP Georgia Gasoline program was not implemented in the county until 2003. This resulted in a fuel blend in Putnam County in 2002 that is not low-sulfur and that has a higher average annual RVP.

i) Derived from R.L. Polk & Co. registration data for 9 counties (Carroll, Bartow, Hall, Barrow, Walton, Newton, Spalding, Heard, and Putnam)
ii) Applied to 15 of the 16 MOBILE6.2 composite vehicle classifications – LDV, LDT1, LDT2, LDT3, LDT4, HDV2B, HDV3, HDV4, HDV5, HDV6, HDV7, HDV8, HDBS, HDBT, MC
   (1) Default for HDV8B
   (2) Default VMT fractions

4) VMT adjustment factors
   a) Calculated for year 2000
      i) Reflects 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.
      ii) 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.

VMT Adjustment Factors

Functional Class Name	Factor for 13 County Area	Factor for 7 County Area
Rural Interstate	0.64	0.85
Rural Prin. Arterial	1.00	0.97
Rural Min. Arterial	1.14	0.97
Rural Major Collector	0.87	1.80
Rural Minor Collector	1.06	1.80
Rural Local	0.64	1.09
Urb. Interstate	1.03	0.85
Urb. Other Fwy	2.38	0.85
Urb. Prin. Arterial	0.68	0.97
Urb. Min. Arterial	1.22	0.97
Urbanized Collector	1.24	1.80
Urbanized Local	0.97	1.09

5) 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.
6) TCMs
   a) No additional credit is taken in the emissions modeling process for SIP TCMs
   b) Listed below is a TCM status report

Description	ARC Project #	GDOT PI #	TIP	Status
HOV LANES Sponsor – GDOT I-85N from Chamblee-Tucker Rd to SR 316 (HOT Lanes), I-85 @ SR 316, Interchange Reconstruction	AR 073B	713760	98-00, 99-01	Under construction*
	GW-AR 053A GW-AR 053B	110530	01-03 02-04 03-05 05-10	Implemented Implemented
ATLANTIC STATION, 17th STREET BRIDGE Sponsor – City of Atlanta A – Bridge and Southbound off ramps C – Northside Dr over Norfolk Southern Railroad to Atlantic Station D – Northbound off ramp to 17th Street Bridge, Williams St Relocation	AT-AR 224A AT-AR 224C AT-AR 224D	714190 0001297 0001298	00-02 01-03 02-04 03-05 05-10	A – Implemented C – Implemented D – Implemented
CLEAN FUEL BUSES Sponsors – MARTA and CCT	M-AR 232	N/A	94-95	Implemented
EXPRESS BUS ROUTES Sponsor – MARTA	M-R 160 M-R 162	770632 770632	94-96	Implemented
IMPROVE / EXPAND BUS SERVICE Sponsor – MARTA	M-R 161	770633	96-98	Implemented
INTERSECTION UPGRADE, COORDINATION & COMPUTERIZATION Sponsor(s) – GDOT in partnership with local Jurisdictions	AT 089	04Y108	93-95	Implemented
	CL 094	770600	94-96	Implemented
	CO 249	770601	94-96	Implemented
	DK 118	770603	94-96	Implemented
	FN 086	770605	94-96	Implemented
	FS 068	770605	94-96	Implemented
	GW 135	170950	94-96	Implemented
	R 098	04418	93-95	Implemented
	R 098	770391	94-96	Implemented
ITS – ADVANCED TRAFFIC MANAGEMENT SYSTEM / INCIDENT MANAGEMENT PROGRAM Sponsor – GDOT I-75/I-85 within I-285, Northern portion of I-285 between I-75 and I-85	R 098	770391	94-96	Implemented
CLEAN FUELS REVOLVING LOAN PROGRAM Sponsor – GEFA	R 195	770790, 770795	96-98	Implemented
HOV LANES Sponsor – GDOT I-75 and I-85 within I-285	R 174	320H94	94-96	Implemented
PARK & RIDE LOTS Sponsor(s) – Douglas & Rockdale Counties Douglas County – Chapel Hill @ I-20, Rockdale County – Sigman @ I-20	DO 211C		94-96	Implemented
REGIONAL COMMUTE OPTIONS & HOV MARKETING PROGRAMS Sponsor(s) – GDOT	R 159	770631	94-96	Implemented
SIGNAL PREEMPTION Sponsor – MARTA	M-R 164	770636	94-96	Implemented

Description	ARC Project #	GDOT PI #	TIP	Status
TRANSIT INCENTIVES PROGRAM Sponsor - MARTA	M-AR 231A M-AR 231B	771031 771119	98-00 99-01 00-02	Implemented
TRANSPORTATION MANAGEMENT ASSOCIATIONS Sponsor – ARC	AR 221A AR 221B AR 221C AR 221E AR 221F	771033 771140 771141 0000570 0000571	98-00 99-01 00-02 01-03	Implemented
UNIVERSITY RIDESHARE PROGRAM Sponsor - ARC	AR 220A AR 220B AR 220C AR 220D AR 200E	771032 771113 0000351 0000567 0000568	98-00 99-01 00-02 01-03 02-04	Implemented

* This project was substituted for the HOV lane. The substitution was adopted on November 5, 2009 by EPA's concurrence letter.

EXHIBIT 1C

Interagency Review of

Population & Employment Planning Assumptions

Used in Regional Emissions Analysis

For Atlanta Eight-Hour Ozone and PM2.5 Nonattainment Areas

Interagency Consultation Meeting

Atlanta Regional Commission

Final IAC Approval: 3/1/11

The ARC will be conducting a conformity analysis under the PM2.5 standard as part of the conformity determination for the PLAN 2040 RTP / FY 2012-2017 TIP for the 20 county nonattainment area.

Below is a detailed listing of the procedures and planning assumptions for the upcoming conformity analysis of the PLAN 2040 RTP.

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

The most current region-level control forecasts (PLAN 2040) were completed in spring of 2009. The accompanying table summarizes the new population and employment controls for the updated, 20-county study area.

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. Chair of the Committee was Dr. Donald Ratajczak, Regents Professor Emeritus of Economics at Georgia State University. Dr. Ratajczak served as director of the Economic Forecasting Center in the J. Mack Robinson College of Business at Georgia State University from 1973 until June 2000 and as a professor of economics in the Andrew Young School of Policy Studies until he retired in 2000. The committee recommended the final adopted forecasts for use by the Commission in 2009.

The second step in the forecasting process uses mathematical models to disaggregate the region-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 TAZ Disaggregator (TAZ-D) model has been used in Plan2040 to disaggregate the regional controls to small areas. This model runs annually and iteratively (unlike the five-year iterative sequence of the previous model small area model, DRAM/EMPAL). The process is fully integrated with the ARC travel demand model, as impedances (travel costs) from the travel model are a significant influence layer for spatial 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 Cube/TP+ model analyze base year traffic patterns and produces accessibility measures (impedances or travel costs) within the 20-county forecasted area. Then, the TAZ-D model uses the composite impedances; Superdistrict-level distribution of base-year population, employment and land use; and other spatial influence layers (e.g. like land use, interchange locations, major arterials, transit stations, etc.) to develop grid-level forecasts one year into the future. The size of the grid areas in the TAZ-D model vary by geographic area of the region, as do the weights assigned to various spatial influence factors for growth. The Unified Growth Policy Map (UGPM) was used by the TAZ-D as the baseline source to generate household and job density and/or intensity levels to allocate future growth. The grid-level forecasts are then aggregated back up to the TAZ, tract, and superdistrict levels. The TAZ-

level forecasts then become the input used by the Cube/TP+ model to produce the impedances 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 effort include 2000 United States Census results, ARC annual estimates of population (using the building permit method from 2000 Census base) for superdistricts and census tracts, ARC annual estimates of employment by industry for superdistricts, tracts and TAZs from the state of Georgia unemployment insurance base file. National forecasts of employment and population were derived from the REMI Policy Insight+ model. The results of ARC travel surveys included the SMARTRAQ household travel survey, transit on-board survey, Hartsfield air passenger survey, travel time studies, speed studies, and others. Highway projects and the schedule for their completion (primary inputs to the Cube/TP+ model) are developed as part of an extensive discussion between ARC staff, local planners, Georgia Department of Transportation and various federal agencies.

The area modeled by ARC for transportation/air quality purposes expanded from ten (10) to twenty (20) counties over the last 15 years. The 2010 Census and federal conformity analysis requirements may result in further expansion of the nonattainment area. 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 annually. The counties covered by land-use data produced in the LandPro program is expanded as needed. ARC's population estimates' program area will be expanded as required, from the current 20 counties, using the 2010 Census as a data baseline.

ARC produced tract-level 2010 estimates of population and 2009 small-area estimates of employment for the 20-county study area to support initial iterations of the TAZ-D model. Development of the annual estimates and of the year 2000 calibration database for the nonmember counties was coordinated with the affected county governments and the Regional Development Centers of which they are members.

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 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 models with the spatial influence layers or density limitations. Factors such as expected job and household growth from the completion of a major development project (i.e. Atlantic Station) or transit-oriented development are incorporated as post processing adjustments to the model output.

The forecasts will be used as part of the 2011 RTP (Plan2040/FY 2012-2017 TIP), scheduled for adoption in August 2011.

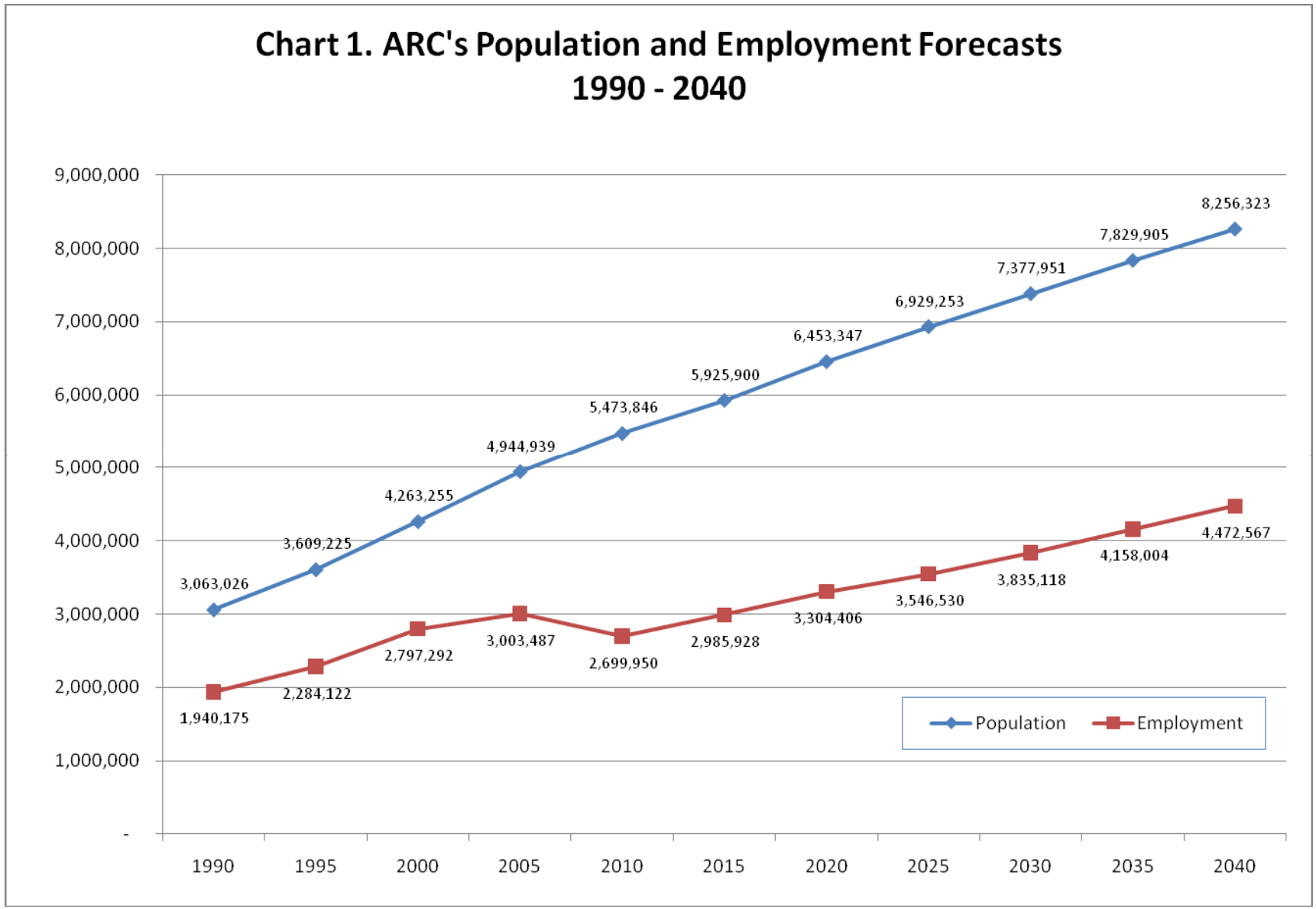
Chart 1. ARC's Population and Employment Forecasts
1990 - 2040
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
-
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
2040
3,063,026
3,609,225
4,263,255
4,944,939
5,473,846
5,925,900
6,453,347
6,929,253
7,377,951
7,829,905
8,256,323
1,940,175
2,284,122
2,797,292
3,003,487
2,699,950
2,985,928
3,304,406
3,546,530
3,835,118
4,158,004
4,472,567
Population
Employment