MPD 002-13:
Transportation Air Quality Conformity Guidelines

Task Assignment Advertised to On-Call Contracts Awarded
Under ADOT Planning Bid/
Proposal Number ADOT11-00000507
Discipline #14: Air Quality

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AGENCY CONTRACT NUMBER: ADOT11-013150

Baker

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PROJECT UNDERSTANDING

Transportation conformity is an ever-changing field of expertise that can be a complicated process for staff and other stakeholders. Major challenges include revised National Ambient Air Quality Standards (NAAQS), new emissions models (MOVES), and revised federal technical and policy guidance. However complicated, federally approved transportation conformity determinations are critical to keeping Arizona's Plans, Programs, and Projects moving. The Arizona Department of Transportation (ADOT) has identified the need to organize, update and streamline current transportation air quality conformity procedures into a comprehensive, Complete Air Quality Management Guidebook (the Guidebook). The Guidebook will also contain a case study, which will serve as a step-by-step example.

Michael Baker Jr., Inc. and RBF Consulting (The Baker Team) are uniquely suited to this task, having assisted states and Metropolitan Planning Organizations (MPOs) in navigating the federal transportation conformity process for over 20 years. The Baker Team has organized, analyzed and documented transportation conformity determinations and developed air quality reference manuals for multiple states and MPOs. We have assisted multiple entities in performing qualitative and quantitative project-level analyses, updating interagency consultation procedures, migrating from the MOBILE model to MOVES, and identifying and quantifying project-specific emissions benefits.

The Baker Team will assist ADOT with simplifying the conformity process and establishing a general uniformity that stakeholders and approving agencies will come to recognize, resulting in a streamlining of the process.

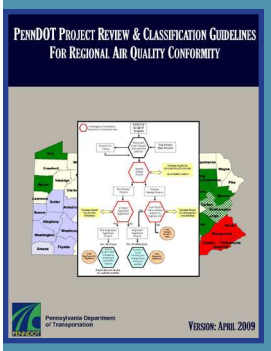
1. ORGANIZE (Tasks 1 & 2)	2. ANALYZE (Tasks 3 & 4)	3. DOCUMENT (Task 5)	√APPROVE

Simplifying the Transportation Conformity Process

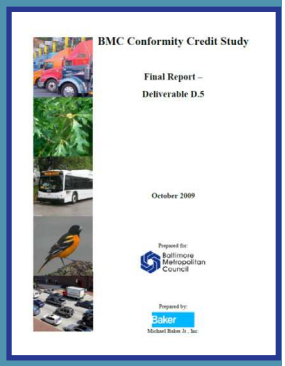
We will thoroughly engage all stakeholders continuously throughout the process by phone, electronic communication and personal visits. The following work plan outlines how the Baker Team will approach the development of the Guidebook; a user friendly, technically correct set of procedures, guidelines, models and post processor models, and a step-by-step example in the form of a case study.

PROJECT WORK PLAN

BAKER'S RELEVANT AQ EXPERIENCE



- MDOT Air Quality Reference Manual
- PennDOT Project Review & Classification Guidelines for Regional Air Quality Conformity
- BMC Conformity Credit Study
- VDOT $PM_{2.5}$ Hot-Spot Project Screening Process
- Assisted over 30 agencies with the MOBILE to MOVES Conversion
- Developed a windows-based methodology for calculating off-model project benefits



The following scope of services was based on the tasks included in the RFP and our team's knowledge of Arizona-specific air quality conformity needs. Baker will conduct a kick-off meeting with the ADOT Project Manager to guide the final preparations of the work plan, schedule, and budget, and to initiate discussions and gathering documents.

TASK 1 – OVERVIEW OF AIR QUALITY REQUIREMENTS IN ARIZONA

Background

The objective of Task 1 is to provide an overview of the air quality requirements in Arizona that will be an introduction / background section for the final Guidebook. The Baker Team will develop a summary of all nonattainment, maintenance and clean data (if any) areas in the state, including: the reason for each region's status, what each status means for transportation, and the associated requirements for developing State Implementation Plans (SIPs), and successfully demonstrating transportation conformity of transportation plans, programs and projects.

Task Approach

Subtask 1.1 – History of Arizona's Nonattainment Areas: Under this subtask, the Baker Team will document the history of Arizona's nonattainment, maintenance and clean data areas, beginning with a brief history of the NAAQS and how they have applied to and changed throughout the state. The documentation will focus on current nonattainment and maintenance status, and will be assembled with easy-to-read tables and maps, highlighting nonattainment areas by criteria pollutant, e.g., 8-hour ozone, particulate matter including both fine particles ($PM_{2.5}$) and inhalable coarse particles (PM_{10}), Carbon Monoxide (CO), and sulfur dioxide (SO_2). The documentation will identify the entities responsible for meeting the Clean Air Act (CAA) requirements for each current nonattainment, maintenance or clean data area.

Subtask 1.2 – Federal Regulations: The objective of this subtask is to document, briefly describe and provide internet links to federal laws, regulations and guidance that will be included in the final Guidebook for easy reference. Applicable references could include, but not be limited to the CAA of 1990 and applicable subsections (NAAQS, SIP development, transportation conformity, etc.), the Transportation Conformity Regulations (40 CFR Parts 51 and 93), technical guidance, federal and state policy guidance, and links to other non-federal entity information (i.e., AASHTO, AMPO). The electronic links will ensure that the Guidebook remains a relevant and dynamic document.

Subtask 1.3 – Transportation Conformity: Transportation conformity is required by the CAA to ensure that federal funding and approval are given to highway and transit projects that are consistent with the air quality goals established by a SIP. Demonstrating conformity means verifying that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards. Under this subtask, the Baker Team will further define transportation conformity, on both a regional and project-level basis, and identify how it applies in each nonattainment or maintenance area in Arizona, how often it must be performed, the approval process and the implications of failing to successfully demonstrate transportation conformity. A copy of the current Arizona Conformity SIP and any MOUs will be included.

Subtask 1.4 – Draft Working Paper 1: The Baker Team will create a draft of Working Paper 1 for ADOT/stakeholder review and comment. The deliverable will include the draft summaries of each of the above subtasks. The document will be delivered electronically to ADOT for review and written comments.

Subtask 1.5 – Final Working Paper 1: Overview of Air Quality Requirements in Arizona: Following the receipt of ADOT / stakeholder comments per Subtask 1.4, the Baker Team will create and electronically deliver a Final Working Paper 1.

TASK 2 – UPDATE INTER-AGENCY CONSULTATION PROCEDURES

Background

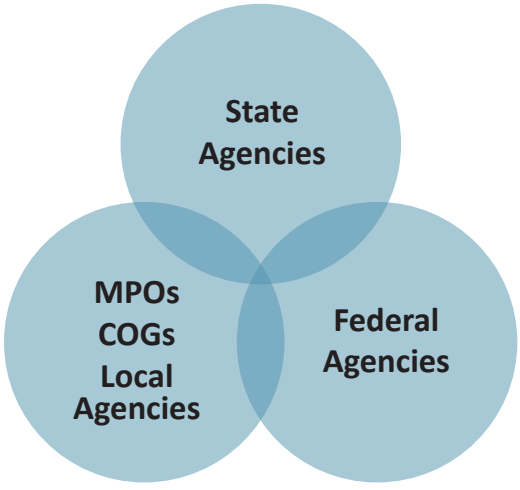
EPA's conformity SIP revision guidance regarding 40 CFR 93.105 is specific in its direction, yet provides significant latitude for Arizona to tailor consultation processes specific to its needs. The Baker Team will assist ADOT in creating processes that [1] meet or exceed federal requirements and are suitable for a SIP submission, [2] maximize the use of existing state and MPO processes, [3] are applicable to metropolitan and rural areas, [4] are flexible to meet future needs and opportunities, and [5] nest within existing ADOT processes to the maximum extent feasible. ADOT's ability to use a MOU approach, as opposed to the legislative or regulatory approach, allows for streamlined implementation.

The Baker Team will draw on its planning, project, and public involvement experience in Arizona, and our experience with CAA issues in other states, where we have designed procedures that created streamlined §93.105 procedures to meet the CAA's conformity requirements. Six subtasks will be used to complete this task.

Task Approach

Subtask 2.1 – ADOT Interview: The Baker Team will conduct an interview with the ADOT Project Manager and appropriate stakeholders to determine the goals and objectives of the consultation procedures and MOU. This discussion will guide the review of federal requirements and existing state and local practices, and ultimately the final products of this Task.

Subtask 2.2 – Review and Summarize Existing Requirements and Practices: The Baker Team will obtain and review documents that specify existing ADOT, ADEQ, MPO and COG practices regarding inter-agency consultation and public involvement relevant to §93.105. We will create a situational assessment matrix that compares the federal requirements and relevant state and local requirements and practices. This includes: [a] summarize federal requirements, [b] summarize ADOT and other state requirements and limitations, [c] summarize relevant sections of Arizona's existing conformity SIP, and [d] summarize existing MPO and COG consultation procedures. Telephone interviews will be conducted with ADOT, MPO and COG staff to clarify and expand on existing procedures. ADOT will assist The Baker Team in identifying and obtaining these documents. The assessment will be shared with ADOT/stakeholders via an electronic submittal.



Consultation: Effective, Efficient Intersection of Multiple Parties.

Subtask 2.3 – Review Other States' Consultation Procedures and Documents: Baker will obtain, review and summarize the approach used by three (3) states to comply with the five elements in 40 CFR 93.105 identified in the RFP. Activities include obtaining and summarizing the information and conducting an interview with a state DOT representative from each state. Information will be summarized in matrix form for ease of comparison, which will be shared with ADOT via an electronic submittal. A sample MOU will be obtained from states that use this approach

Subtask 2.4 – Interim Working Paper 2: The Baker Team will identify options based on the direction from ADOT/ stakeholders following Subtasks 2.1 - 2.3. The information will be compiled into an Interim Working Paper which outlines the requirements, options and recommended approach for each portion of §93.105 under this Task. This draft document will be shared with ADOT /stakeholders to guide the selection of approaches to be used for each of the five elements in Working Paper 2. ADOT will provide the format and base language, per Arizona law and ADOT practice, needed in an MOU.

Subtask 2.5 – Draft Working Paper 2: Based on the Interim Working Paper 2 and discussions among the ADOT / stakeholder and Baker Team, we will create a draft of Working Paper 2 for ADOT/stakeholder review and comment. The deliverable includes six distinct sub-deliverables:

1. General inter-agency consultation processes as applied to rural areas
2. ADOT inter-agency consultation procedures
3. Specific inter-agency consultation processes
4. Resolving conflicts
5. Public consultation procedures
6. MOU to implement the above 5 items

This document will be delivered electronically to ADOT for review and written comments

Subtask 2.6 – Final Working Paper 2: Following the receipt of ADOT / stakeholder written comments per Subtask 2.5, the Baker Team will create and deliver, via electronic means, a Final Working Paper 2.

Meeting 1: Following the finalization of Working Paper 2, the Baker Team will present the findings and deliverables of Working Papers 1 and 2 to meeting participants via webinar.

TASK 3 – CONFORMITY PROCEDURES

Background

The Baker Team will conduct a complete review of ADOT's emission analysis process with a focus on technical detail, efficiency and quality control. The Team will draw on their 20 years of experience supporting other state DOTs, MPOs and environmental agencies.

The release of EPA's MOVES2010 model has significant impacts on the tools and analysis procedures used for regional and project-level conformity determinations. Many states are dealing with those technical issues as they develop SIPs with MOVES-based Motor Vehicle Emission Budgets (MVEBs). The Baker Team has been at the forefront of MOVES integration, converting over 30 agencies to the new model, utilizing a variety of travel demand model platforms and assisting areas without travel models. The following subtasks will be used to complete this task. Our completed work will result in ADOT meeting the requirements in §93.109, 122 and 123, 122(a) (4) (ii), and 125(c).

Task Approach

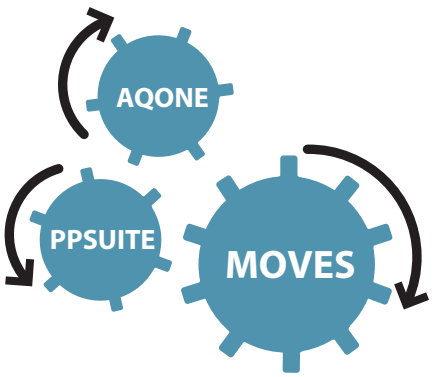
Subtask 3.1 – Technical Assessment of Regional Analysis Process: Baker will review methodologies and data used to conduct regional emission analyses. This includes the methodologies used for MOBILE6.2 and how those processes are impacted by MOVES.

The MOVES model uses more detailed traffic, vehicle and environmental data versus MOBILE6.2. Review of ADOT's current procedures will focus on utilizing available data to its maximum potential, considering staff resources, sensitivity to input parameters, and 40 CFR Part 93. Key process and data issues include:

- Travel Speeds – MOVES allows for the input of detailed travel speed distributions by hour and road type. The Baker Team will evaluate alternative methodologies to calculate speeds from available data sources, including regional travel models and HPMS.
- Vehicle Type Mapping – Mapping traffic counts and other available classification data to the MOVES vehicle types (e.g. source types) can have significant effects on emissions. The review will focus on available data and mapping schemes that accurately represent regional characteristics.
- Vehicle Population – The number of vehicles input to MOVES is important for the estimation of start and evaporative emissions - a large portion of future transportation emissions. The Baker Team will evaluate key data sources, including registration data, truck traffic counts, and travel models.

This subtask may require coordination with various bureaus within ADOT and ADEQ to assist with an assessment of available data.

Subtask 3.2 – Efficiency Assessment of Regional Analysis Process: This subtask includes a detailed assessment of the analytical efficiency of ADOT's emissions modeling process, with a primary focus on the integration of MOVES. MOVES run times are much longer than MOBILE, a key consideration when conducting analyses for a large number of counties, years or pollutants. The Baker Team has developed automated processes to analyze traffic data, prepare traffic-related inputs to MOVES, run MOVES in batch mode, and process MOVES output data using custom MYSQL scripting language. The focus on batch processing (i.e., allowing for many runs to be conducted concurrently without using the MOVES interface) has been a key feature that allows agencies to efficiently complete emissions inventories. The focus on efficiency also includes support in setting up computer systems to take advantage of MOVES ability to use the Master–Worker concept.



Customized Software to Increase Efficiency

The backbone of the Baker Team's analytical work has included the application of customized software to assist in the SIP and conformity technical processes. The Baker Team has supported the development and application of the PPSUITE post processing software in multiple states, MPOs and rural areas. It has been utilized for over 15 years and has been updated to fully function with MOVES.

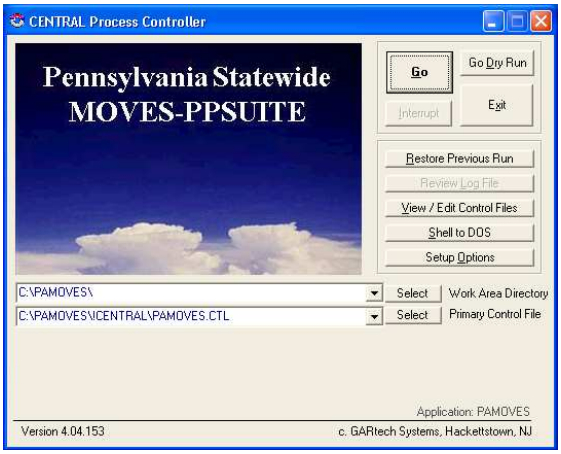
The output of this subtask is an evaluation of ADOT's existing and other available software options – including EPA conversion tools, customized EXCEL spreadsheets and other programming methods - to improve process efficiency and output accuracy.

Subtask 3.3 – Quality Control Assessment of Regional Analysis Process: This subtask will include a complete assessment of quality control within ADOT's current emission process and how that may integrate with the MOVES model. Recommendations will be included on options to improve the process for future applications.

Quality control checks and processes are an important part of the emission calculation process. Potential errors can occur at various stages of a MOVES run, and may be difficult to detect. Other computer network activity can create conflicts with MOVES operation.

The Baker Team has developed defined project directory and naming conventions to improve organization and management of the large number of data files needed.

Specialized software, including the CENTRAL batch software system, has been used to control analysis runs for multiple scenarios. CENTRAL provides a custom-defined user interface (within the WINDOWS framework) that allows users to control: scenario identification, file naming, run options (e.g. pollutants, data options, etc.), error capturing, and linkage to other custom routines.



Specialized Software to Control Emission Processes

We also use customized MYSQL scripts to provide quality control checks of MOVES results. These processes or routines are included as steps within the batch processing steps

Subtask 3.4 – Assessment of Project-Level Analysis Process: Project-level particulate matter (PM) hot-spot analyses are required for Projects of Air Quality Concern (POAQC), which include certain highway and transit projects that involve significant levels of diesel vehicle traffic. After December 2012, quantitative PM hot-spot analyses using MOVES will be required for such projects.

The Baker Team will review the procedures, data, and tools used for past CO and PM project-level analyses and will recommend changes or enhancements to those procedures to meet the new federal requirements. The Baker Team is currently involved with a MOVES project-level PM assessment in another state and is working with an interagency consultation group (FHWA, EPA, DOT, and state Department of Environmental Protection) to define the methods, data and tools for that analysis. The Team will draw from that experience, FHWA and EPA technical guidance, and the results of Subtasks 3.1-3.3 to recommend improvements to ADOT/stakeholders.

Subtask 3.5 – Assessment of Enforceable Measures: Transportation Control Measures (TCMs) are strategies included in the SIP or as a required project mitigation measure that reduce transportation-related emissions of criteria pollutants and/or their precursors. VMT, vehicle starts and roadway operations may be improved by these measures. DOT use of TCMs is an option unless RACM/BACT, project impact mitigation or state policy requires their use.

Under this subtask, the Baker Team will draft language regarding the enforceable written commitment requirements for control measures, defined in §93.122(a)(4)(ii) and §93.125(c) for regional, and project-level conformity, respectively. The goal of this subtask is to clearly define

these requirements and integrate them into the conformity procedures to ensure necessary written commitments are obtained prior to any conformity determination.

Subtask 3.6 – Draft Working Paper 3: Conformity Procedures: The Baker Team will create a draft of Working Paper 3 for ADOT/stakeholders review and comment. The deliverable will include three sections:

1. Air quality emissions analysis procedures
2. Enforceable written commitments required for emission reduction credits
3. Enforceability of design concept and scope for project-level mitigation and control strategies

This document will be delivered electronically to ADOT. ADOT/stakeholders will review the document and provide written comments to Baker.

Subtask 3.7 – Final Working Paper 3: Conformity Procedures: Following the receipt of written comments, the Baker Team will deliver an electronic copy of Working Paper 3 per Subtask 3.6.

TASK 4 – DEVELOPMENT OF MITIGATION MEASURES AND TRANSPORTATION CONTROL MEASURES (TCMS)

Background

Projects not analyzed using the regional transportation demand model ("off-model" projects) fall into one of the following categories:

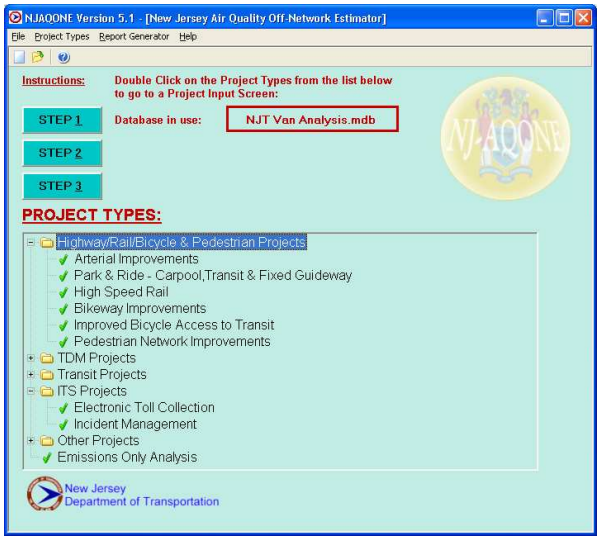
- TCMs which are approved projects included in the SIP. These must be analyzed to a high degree of accuracy, and tracked / prioritized per 40 CFR Part 93.

- Transportation Emission Reduction Measures (TERMs) may be regional or local projects. These measures are separate from TCMs (and other mitigation measures found in the TIP/Plan.) They are accounted for in the conformity analysis as a reduction from the baseline inventory. TERMs may be changed, rescheduled or deleted through the TIP/Plan process. TERMs should be calculated similar to TCM's.

- Reasonable/Best Available Control Measures (RACM/ RACT/BACM) are used specifically to determine if their implementation will advance an area's attainment date by at least one year, considering economic and other feasibility factors, and to achieve attainment as expeditiously as possible (CAA §172(a)(2)(A) and 181(a)). If a SIP submittal to EPA demonstrates that an attainment date can be advanced and the measures are feasible, then the state must commit to these. Projects become TCMs and are federally enforceable. As such, a high degree of accuracy is necessary.

- Finally, some projects do not correspond to the above categories, but require an emissions analysis to qualify for funding, i.e., CMAQ, or for project evaluation purposes. Emissions impacts may or may not be included in the conformity analyses.

Baker has developed the Air Quality Off-Network Estimator (AQONE) windows-based software analysis tool, which is used by multiple states and MPOs. This application provides the Baker Team with a unique, wide set of project analysis skills and a large collection of sample projects to draw from. AQONE is designed to evaluate the emissions reduction potential (for all criteria pollutants) of transportation projects that cannot be readily modeled with existing regional travel models or using traffic datasets. The 2011 update included a conversion to MOVES, a national review of analysis methodologies, and an expansion to include GHGs and MSATs. Appendices in the Users' Guide document all underlying calculations and summarize default data (local, state and MPO), providing a readily-available template. Baker also maintains spreadsheets that replicate the



Air Quality off-Network Estimator - Report Generator

calculations found in AQONE. Baker has continually supported several DOTs and MPOs with evaluations to support annual CMAQ reporting requirements, TERMS evaluations, RACM/BACT analyses, and similar studies and analyses. Baker has accumulated expertise in a full range of project air quality evaluations that employ MOVES, MOBILE, EMFAC, NONROAD, NMIN and multiple emission rate data sources (e.g., AP-42).

Task Approach

Subtask 4.1 – Assessment of Current Methodologies and Needs: The Baker Team will review existing ADOT methodologies, comparing them with current EPA, FHWA and other federal guidance to ensure all required project types are being addressed. The Baker Team will confer with ADOT and partner agencies to identify any additional project types needing analysis. A draft list of project types to be added or updated will be provided to ADOT for review prior to proceeding.

Subtask 4.2 – Research and Methodology Development: The Baker Team will research and review national best practices corresponding to the new and existing methodologies to be updated as identified in Subtask 4.1. Baker will reference recent federal guidance and TRB/ academic publications that apply, and identify the data requirements and make recommendations on preferred approaches. Baker will confer with ADOT staff, which will liaison with MPO, and state and local air quality agencies, prior to selecting the final approaches for inclusion in the Guidebook.

Subtask 4.3 – Draft Working Paper 4: Baker will draft the methodologies section for the Guidebook detailing the data requirements needed to analyze each project type, the methogology(ies), and sample calculations. Baker will develop a complimentary series of spreadsheets to accompany the Guidebook to assist analysts in applying certain methodologies (DOT may opt to have Baker develop a Windows-based application(s) for select project types; cost and schedule for this activity to be mutually determined). A working paper and any accompanying spreadsheets will be delivered electronically to ADOT. ADOT/stakeholders will review the materials and provide written comments to Baker.

Subtask 4.4 – Final Working Paper 4: The Baker Team will create and deliver, via electronic means, a Final Working Paper 4 and accompanying spreadsheets following the receipt of ADOT/stakeholder written input per Subtask 4.3.

Meeting 2: Following the finalization of Working Paper 4, the Baker Team will present the findings and deliverables of Working Papers 3 and 4 to meeting participants via webinar.

TASK 5 – COMPLETE AIR QUALITY MANAGEMENT GUIDEBOOK

Background

The Baker Team will compile and deliver the complete Air Quality Management Guidebook. The Guidebook will be designed as:

1. A tool for technical staff that can be used to conduct transportation conformity analyses and determination process, assess the benefits of SIP elements, and identify emission reduction projects to fulfill NAAQS requirements.

2. A directional resource for applicable transportation and air quality conformity guidance, regulations and policies. While the Guidebook will contain detailed examples and procedures, it will also lead users to resources that cannot be completely covered by the guide, are tangentially related, or that may change over time due to the topic's nature (revised NAAQS, new emissions models, etc.).

3. A standard template and flowchart that can be followed each time a conformity analysis is performed. Transportation conformity can be a complicated process for staff, elected officials, and other stakeholders. The guide will aid state and local stakeholders and staff through the process from inter-agency consultation to technical analysis to local approval to federal approval. This will establish a general uniformity that stakeholders and approving agencies will come to recognize, resulting in a streamlining of the process.

Task Approach

Subtask 5.1 – Compilation of Task Elements 1-4: The final document will incorporate all of the working documents and deliverables of the four previous tasks into a user guide.

The user guide will include:

1. An overview of the air quality requirements in Arizona.
2. An updated inter-agency consultation process.
3. Conformity procedures.
4. Project level mitigation emissions calculations and methodologies and TCM / RACM calculations.

Subtask 5.2 – The Nogales PM10 / $PM_{2.5}$ Nonattainment Area Case Study: In addition to the items in Subtask 5.1, the Guidebook will also include a case study of the Nogales PM10 / $PM_{2.5}$ nonattainment area. The case study will illustrate how to utilize the guide in a step-by-step example for the Nogales area and should be sufficient enough to be used for future conformity analyses.

Subtask 5.3 – Draft Air Quality Management Guidebook: The Baker Team will create a draft of the Guidebook for ADOT / stakeholder review and comment. The deliverable will include the draft summaries outlined under Subtask 5.1 and a draft of the Nogales case study, described in Subtask 5.2.

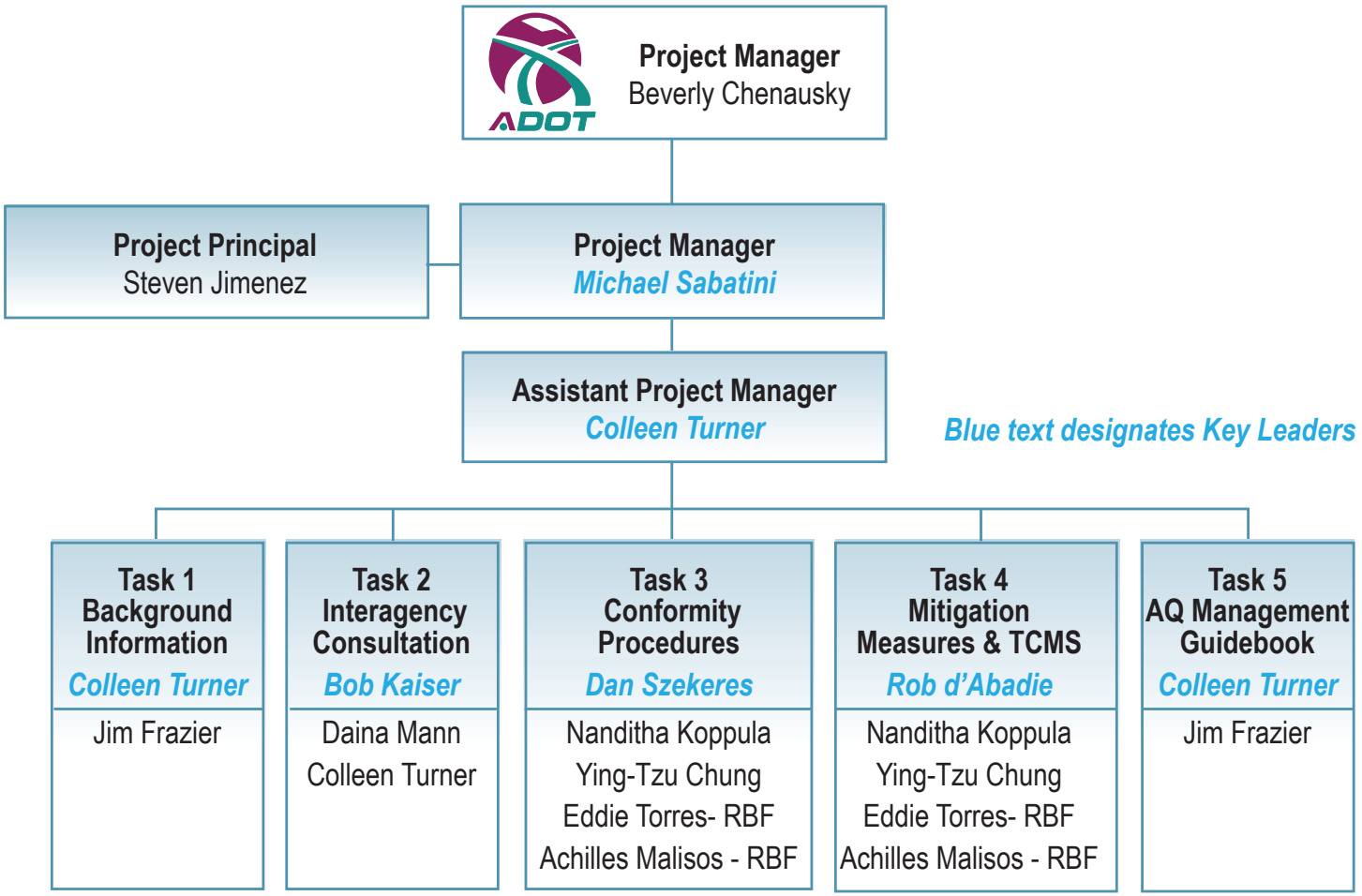
The document will be delivered electronically to ADOT/ stakeholders for written review and comments.

Subtask 5.4 – Final Air Quality Management Guidebook: Following the receipt of written comments on the draft Guidebook per Subtask 5.3, the Baker Team will create and electronically deliver a Final Air Quality Management Guidebook.

As stated in the RFP, the Baker Team will provide all electronic copies of the Guidebook, draft and final reports, presentations and all modeling results and data used for the projects.

Meeting 3: This meeting will be organized by Baker and conducted in person. The Baker Team will present the final Guidebook and the example conformity analysis (Nogales case study) for meeting attendees.

ORGANIZATIONAL CHART



FIRM PROFILE

Baker Michael Baker Jr., Inc. is a national full-service Planning, Architecture, Engineering, and Construction Management firm established in 1940 with more than 3,200 employees in over 100 offices throughout the United States. Since 1984, Baker has led and provided key services for many transportation initiatives that have supported Arizona's overall growth. Our team of transportation and environmental specialists have provided integrated, multi-disciplinary solutions for congestion, planning, smart growth and air quality modeling and support needs including:

- Regional and Project Conformity
- Travel Demand Modeling/Simulation
- MOBILE/MOVES/NONROAD
- Emissions Inventory
- State Implementation Plans
- Clean Air Act/SAFETEA-LU Compliance
- Policy and Technical Research

Subconsultants

RBF CONSULTING Founded in 1944, RBF Consulting (RBF), is a full service planning, engineering, and land surveying firm dedicated to providing clients with superior service on transportation and air quality related projects. RBF provides a full range of air quality analysis for public and private sector clients, in accordance with local, State, and Federal impact assessment criteria, including:

- Air Quality Assessments
- Health Risk Assessments
- Greenhouse Gas Assessments
- Criteria Pollutant Quantification
- Conformity Analyses
- Air Quality/Dispersion Modeling
- Peer Reviews

These services and techniques together with land use and project-specific data allow RBF to quantify existing and project future criteria pollutants associated with a project. With an expertise in all project aspects and phases, including short-term construction emissions and long-term operational emissions, RBF also develops mitigation measures necessary to reduce or avoid project and cumulative air quality impacts.

Relevant Experience

The Baker Team has performed numerous applicable air quality studies and modeling services, as demonstrated in the following projects.

Statewide Public Involvement and Public Relations Services

Client: Arizona Department of Transportation, Communication & Community Partnerships
Completion Date: On-going

Baker is providing public involvement and public relations services for transportation projects throughout the state through an on-call contract. Task assignments under this contract include: I-17, I-10 to Loop 101 Environmental Impact Statement (EIS), Wickenburg Trails Connectivity and Transportation Study, Public Participation Training for Decision Makers, and Loop 303, Happy Valley to I-17 Freeway Opening.

- Public Involvement Plan Development
- Planning and Implementing Public Meetings
- Comprehensive Public Surveys
- Government Relations

Conformity Credit Study

Client: Baltimore Metropolitan Council (BMC)
Completion Date: 2009

This study researched methods used by MPOs nationally to evaluate conformity credits for emission reduction projects.

- Research Regulatory and Analytical Approaches being used by MPOs Nationwide.
- Develop Case Studies and Best "Practice" Recommendations on Tracking and Crediting TERMs

Air Quality Off-Network Estimator (AQONE)

Clients: Maryland, New Jersey, and Pennsylvania Departments of Transportation
Completion Date: On-Going

AQONE is a windows-based, customized software package that estimates transportation and air quality impacts of TCM and TCM-like projects which either cannot or should not be analyzed using a traditional regional transportation model. AQONE analyzes a wide array of projects, including roadway and traffic signal improvements, transit projects,

transportation demand management (TDM), transit, and ITS projects. AQONE incorporates MOVES2010, the latest EPA/FHWA guidance and uses data developed from regional transportation models and other local sources. Baker has developed versions of AQONE for use in New Jersey, Pennsylvania, Maryland, Illinois and Virginia, representing over 11 years of continued development and refinement.

- Quantitative and Qualitative Analysis of TCMs, TERMs and CMAQ projects
- Evaluate Transportation Control Measures
- Evaluate TDM
- Emissions and Transportation Results

Maryland Air Quality Planning and Support

Client: Maryland Department of Transportation (MDOT)

Completion Date: On-Going

Since 1998, Baker has provided statewide technical assistance, policy review and planning requirements to fulfill MDOT's specific needs in addressing 8-hour ozone, $PM_{2.5}$, MSATs and greenhouse gases. Baker performed and reviewed TIP and Plan conformity analyses, developed SIPs, performed inter-agency consultation, conducted technical analyses, developed schedules, and coordinated public involvement components. Baker developed a comprehensive Air Quality Reference Manual for MDOT. The manual was designed as a living document, providing guidance on many topics including transportation conformity, SIP development and TERMs analysis. Baker transitioned MDOT to MOVES2010 and developed a technically robust process for producing transportation and emission estimates

- Air Quality Reference Manual
- Mobile Source Air Quality Analysis
- Transportation Conformity and SIP/ROP Analysis
- MOVES Emissions Modeling Process
- PPSUITE/Central Implementation
- Agency Coordination and Training

Air Quality and Climate Emissions Modeling 2011-2016

Client: Pennsylvania Department of Transportation (PennDOT)

Completion Date: On-Going

Through five contracts, spanning more than 24 years, Baker has provided technical, policy, and programmatic support for Pennsylvania's implementation of mobile-source requirements of the Clean Air Act, greenhouse gas inventories, and planning activities. Baker's efforts have resulted in 100-percent conformity compliance since 1992.

Baker provides all mobile-source portions of statewide and local emissions inventories, SIPs, and related analyses, including attainment plans, RACM and ROP analyses, and attainment demonstrations. Baker developed and maintains a statewide system of VMT inventories and forecasts used for NEI and SIP emissions estimates.

- MOVES2010 model Statewide implementation
- Transportation conformity planning, processes, SIP, and Technical Analyses
- Travel Modeling Technical Support
- Emissions Modeling
- Mobile Source Modeling and I/M Programs

Technical Support for Travel Demand Modeling and Air Quality Planning

Client: New Jersey Department of Transportation (NJDOT)

Completion Date: Ongoing

Under the fourth consecutive agreement, Baker continues to provide technical assistance to NJDOT in air quality analysis, transportation planning, and energy planning and carbon/greenhouse gas emissions issues, and travel demand modeling. Baker has provided NJDOT with analyses, software and policy guidance to ensure the agency succeeds in maintaining compliance with air quality regulations. Baker analyzed, evaluated and ranked projects and programs as part of the RACM submission. Baker assisted NJDOT, NJDEP and the MPOs transition to MOVES2010 and developed procedures for quantitative $PM_{2.5}$ and PM_{10} hotspot analysis.

- Quantitative / Qualitative Air Quality and Emissions Analysis
- Travel Demand Modeling Support
- Policy and Program Review
- Evaluate TCMs, TDM Strategies and RACM

Transportation Clean Air Measures Support and Analysis

Client: North Jersey Transportation Planning Authority
Completion Date: 2008

Identified, screened, and evaluated high profile transportation-related projects to improve air quality in the NJTPA region. Projects included travel demand management, trip reductions, vehicle technology and intelligent transportation systems. Researched and utilized local and national best practices to quantify project impacts. It included an evaluation matrix used for final project selection. The completed analysis was designed as a tool that the NJTPA Board could use for future federal CMAQ funding applications.

- Quantitative and Qualitative Analysi
- Evaluation of Innovative Transportation Control Measures
- Evaluation of Transportation Demand Management Strategies
- Estimation of Emissions

Interstate 5 HOV Lane Extension Air Quality Assessment (RBF)

Client: Orange County Transportation Authority (OCTA)
Completion Date: 2015

RBF worked with the OCTA, Caltrans District 12 and San Clemente, Dana Point and San Juan Capistrano to prepare a project level Air Quality Assessment for 5.7 miles of mainline widening of Interstate 5 (I-5) from Avenida Pico to San Juan Creek Road. The Assessment evaluated the proposed project and two alternatives for reconstruction of a key interchange and public outreach efforts. The assessment was prepared in accordance with the current Caltrans and FHWA/EPA quantitative hot-spot and GHG protocols, including qualitative/quantitative particulate matter (PM_{10} and $PM_{2.5}$) analysis to determine if it would be considered a Project of Air Quality Concern. PM control measures were developed to avoid potential adverse impacts due to construction and/or operations.

- Mobile source modeling and I/M regulatory requirements
- Particulate Matter Assessment
- Transportation Conformity Analysis
- Alternatives Analysis
- Community Outreach

State Route 241 Loma Segment Widening Air Quality Assessment (RBF)

Client: Orange County, California
Completion Date: 2017

RBF was responsible for preparation of the Air Quality Assessment for the widening of the CA SR 241 mainline. The Assessment was prepared in accordance with the current Caltrans and FHWA/EPA quantitative hot-spot and GHG protocols, including qualitative/quantitative particulate matter (PM_{10} and $PM_{2.5}$) analysis to determine if it would be considered a Project of Air Quality Concern. Control measures were developed for dust, diesel particulate matter, and re-entrained road dust. An MSAT analysis was also performed.

- EMFAC2007/AP-42 Modeling
- Mobile source modeling and I/M regulatory requirements
- Qualitative/Quantitative PM Assessments
- Transportation Conformity Analysis
- Project-level Transportation Control Measures

KEY PERSONNEL

MICHAEL SABATINI, PE

Project Role: Project Manager
Labor Classification: Sr. Project Manager

Mr. Sabatini offers more than 35 year of experience, including 18 years with the Maricopa County Department of Transportation (MCDOT). He spent 15 years at MCDOT as the Engineering and Transportation Planning Division Manager, and 5 years as the Long Range Planning Branch Manager for the Pima Association of Governments Transportation Planning Division (PAGTPD). His Divisions and Branches were responsible for compliance with Federal planning guidelines; travel demand modeling, environmental compliance, air quality conformance, corridor studies, modal planning/programming, policy research and development, and public involvement.

Pima Association of Governments Transportation

Planning Division, *Regional Transportation Plan.* Branch Manager. Utilized Mobile to post process travel demand model output to develop projections for region wide air quality emissions.

Pima Association of Governments Transportation Planning Division, *Conformity Analysis.* Branch Manager. Utilized CAL3QHC to conduct hot spot carbon monoxide analysis for congested intersections.

Maricopa County Department of Transportation, *Various Air Quality Policy Development and Implementation Initiatives.* Developed shoulder paving program to mitigate PM_{10} due re-entrained dust on paved roads, develop speed limit protocol on unpaved roads to minimize PM_{10} emissions due to excessive speeds.

BOB KAISER

Project Role: Task Manager / Quality Control
Labor Classification: Sr. Consultant

Mr. Kaiser specializes in mobile source AQ regulatory compliance and analyses for criteria pollutants and greenhouse gases. This includes development of SIPs, policies, handbooks, and technical and policy procedures for interagency consultation; strategic planning; conformity analyses; and emissions controls. He has a 20 year, 100% successful track record on conformity and SIP approvals.

Pennsylvania DOT, *Air Quality Modeling.* Project Manager. Leads mobile source air quality modeling and analyses. Developed original and 2010 Conformity SIPs, which involve PennDOT, PaDEP, two subcategories of MPOs and rural areas. Led development of PennDOT Air Quality Handbook and two subsequent updates, $PM_{2.5/10}$ Screening Guide and $PM_{2.5/10}$ Quantitative Analysis Template. Developed and implemented PennDOT conformity procedures, differentiated for MPOs with strong capabilities, small MPOs and RPOs with limited capabilities. Managed transitions from MOBILE5 to 6.2 to MOVES2010b.

New Jersey DOT. *Air Quality Support.* Senior Advisor. Led task orders to analyze statewide and local TCMs/TERMs, RACM analysis for O_3 and PM, O_3 and $PM_{2.5}$ inventories. Developed conformity SIP and regulatory language for NJDOTs provision to NJDEP.

Utah DOT. *$PM_{2.5}$ SIP Development.* Led mobile source modeling, regulatory and policy options analyses for development of new SIP for PM_{10} needs. Resulted in EPA approval of PM_{10} attainment and maintenance plan for greater Salt Lake City area.

COLLEEN TURNER

Project Role: Assistant Project Manager
Labor Classification: Planner

Ms. Turner's focus is on regulatory compliance, policy analysis, quantitative analysis and public outreach. Individual assignments have included review, analysis and reporting on diverse transportation and air quality issues including CMAQ, climate change, SIP development, TERMs, development of Long Range Transportation Plans, RACM, NAAQS revisions, and regional and project-level (hot-spot) conformity. Ms. Turner is highly skilled in the application of air quality models including MOVES, EMFAC, MOBILE6, NONROAD, AP-42 and AQONE for emissions analyses.

Baltimore Metropolitan Council (BMC), *Conformity Credit Study.* Task Manager. Researched regulatory and analytical approaches being employed by MPOs nationwide in transportation conformity analyses. Developed case studies that highlighted best practices, lessons learned, and successes. Developed recommendations for calculating conformity emissions credits to assist BMC in refining its methods for tracking and crediting transportation emission reduction projects through the regional conformity process for ozone and $PM_{2.5}$.

Virginia DOT, *Statewide Air Quality Services.* Environmental Associate. Researched current federal, state, and local interagency consultation requirements in order to assist VDOT for the creation of an interagency consultation process which would address $PM_{2.5}$ project-level conformity in the Northern VA Participated in development of $PM_{2.5}$ hot-spot screening and qualitative analysis documents.

Maryland DOT, *Air Quality Planning and Support.* Environmental Specialist. Managed the development of the first MDOT Air Quality Reference Manual; a living document that details transportation air quality planning activities including NAAQS designations, conformity

(regional and project-level), SIP development, CMAQ and NEPA. Participated in interagency working group to assist MDOT and MDE with policy decisions. Performed regional conformity analyses and authored transportation conformity documents for MDOT, including those for the Washington Co. $PM_{2.5}$, and the Cecil Co. and Kent & Queen Anne's Co. 8-hour O_3 areas.

DANIEL SZEKERES

Project Role: Task Manager
Labor Classification: Sr. Planner

Mr. Szekeres is a technical manager specializing in air quality analysis, travel demand modeling, and other planning studies. He has led technical work efforts related to air quality conformity and inventory assessments, mobile source modeling, travel demand model development and application, and MPO long range transportation plans.

Pennsylvania DOT, *Air Quality Modeling.* Task Manager. Provides air quality technical and policy support to PennDOT, the PaDEP, and MPOs and RPOs. Leads technical conformity determinations for MPOs and RPO, and provides on-call technical support for two very large MPOs. Support has included the integration of EPA's MOVES software for areas with and without regional travel demand models (18 MPOs and RPOs). Developed regional and project-level $PM_{2.5}$ /PM_{10} in the PennDOT Air Quality Handbook and is key participant on the state interagency consultation group.

Texas DOT, *Multiple Environmental Studies – SH99 Segment B and C, Loop 1604.* Task Manager. Performed project-level air quality analyses for multiple environmental studies. Work included CO analyses, $PM_{2.5}$ quantitative hot-spot analyses, and qualitative MSATs technical reports.

Virginia DOT, *$PM_{2.5}$ Project-Level Hot-spot Screening Process.* Task Manager. Assisted VDOT develop guidance for screening highway projects to determine if a $PM_{2.5}$ hot-spot analysis is required. Conducted presentations at interagency consultation meetings involving DOT, FHWA, EPA, and MPOs.

ROBERT d'ABADIE

Project Role: Task Manager
Labor Classification: Sr. Planner

Mr. d'Abadie is a technical manager providing assistance and policy interpretation on air quality, conformity, greenhouse gas, and travel demand management (TDM) measures; as well as travel demand modeling development/application and bicycle/pedestrian studies. He has directed the development of multiple versions of the Air Quality Off-Network Estimator (AQONE) software tool used by state DOTs and MPOs for quantifying the impacts of TCMs, TERMs, and CMAQ and other projects.

New Jersey DOT, *On-Call Technical Support for Air Quality Planning and Travel Demand Modeling.* For over 12 years as project manager, he has provided analytical support to NJDOT on AQ, GHG and energy needs issues. Work includes technical support on policy and technical issues related to $PM_{2.5}$ and ozone conformity; project hot-spot analysis; and CMAQ, TCM, TERM and RACM analyses. He led the transition of NJDOT, DEP and MPOs to the MOVES model for inventories SIPs (ozone, CO and $PM_{10/2.5}$), and for regional and project level conformity. Innovative work includes smart growth impacts on air quality.

Pennsylvania DOT, Maryland DOT, *New Jersey DOT, Off-Network Analysis Estimator (AQONE) Software.* Developed successive versions of off-network emissions software tool that analyzes a wide range of transportation projects including highway improvements, ITS, park/ride lots, bikeway and walkway improvements, transit improvements, high-speed rail, and transit programs. Updated software to MOVES.

North Jersey Transportation Planning Authority. *Transportation Clean Air Measures Support and Analysis.* Identified, screened, and evaluated high profile transportation-related projects to AQ. Researched and utilized local and national best practices to quantify project benefits. Developed evaluation matrix and created an evaluation metric sensitive to multiple pollutants.

JIM FRAZIER
Project Role: Sr. Air Quality Modeler
Labor Classification: Sr. Planner

Mr. Frazier leads emissions analyses related to transportation planning, conformity, emissions inventories, and control strategies. He is a certified Project Management Professional and manages projects related to air quality and transportation planning, TIP/LRP conformity and SIP development.

Maryland Department of Transportation, *Air Quality and Modeling Support.* Project Manager. Led MDOT's migration to EPA's new MOVES emissions model and developed a process for the state inventory requirements. Provided policy support, control strategy analysis, conformity and emissions modeling support to the MDOT, MPOs and MDE.

City of Hagerstown, Maryland, *HEPMPO Long Range Transportation Plan Update.* Hagerstown/Eastern Panhandle MPO. Project Manager. Led the project team to update the regional LRTP and validate the new TRANSCAD travel demand model.

Pennsylvania Department of Transportation, *Air Quality Modeling and Program Support.* Task Leader. Responsible for various tasks related to SIP development, emissions inventories, conformity determinations, technical assistance, and I/M regulatory analysis.

NANDITHA KOPPULA
Project Role: Air Quality Modeler / Analyst
Labor Classification: GIS / Technical / Analyst

Ms. Koppula (M.S., Transportation Engineering) is a planner in the transportation planning / air quality group with over 10 years of experience. She specializes in air quality and travel demand modeling. Ms. Koppula is an expert user of MOVES, MOBILE, OFFROAD, AP-42, and post-processing programs for conformity, control strategies, emissions inventories and SIPs.

YING-TZU CHUNG
Project Role: Air Quality Modeler / Analyst
Labor Classification: GIS / Technical / Analyst

Ying-Tzu Chung (M.E.M., Environmental Economics and Policy) is an environmental associate in the transportation and air quality planning group. She is an expert user of MOVES, MOBILE, OFFROAD, AP-42, and post-processing programs for conformity, control strategies, emissions inventories and SIPs. She has integrated post processing software into MOVES for the implementation of the MOVES model statewide for Pennsylvania and Maryland, and has recently completed the integration of TransCAD- and TPPLUS-based travel demand models with MOVES for conformity analyses for six MPOs in Pennsylvania, Maryland and West Virginia.

EDDIE TORRES, REA, INCE (RBF)
Project Role: Senior Air Quality Analyst
Labor Classification: Project Manager

Mr. Torres is the Director of Technical Studies for RBF Consulting, with a specialty in Acoustics, Air Quality, Climate Change, and Visual Impact Assessments. His work involves transportation-related air quality assessments, including MSATs, CO hot-spots, general conformity, and PM project level analyses. He has experience in addressing project level hot-spot conformity through detailed emissions modeling and analysis. His extensive experience with air quality conformity at the project level includes specific analysis of traffic data for projects determined not to be a project of air quality concern per 40 CFR 93.123, with associated NEPA documentation.

ACHILLES MALISOS, REA (RBF)
Project Role: Air Quality Analyst
Labor Classification: Technical Writer

Mr. Malisos is an environmental analyst with a specialty in transportation-related air quality and climate change. He has performed air quality, conformity, and CMAQ modeling using EPA, FHWA, and California Air Resources Board (CARB)-approved models and methodologies for various pollutants,

including $PM_{2.5}$, PM_{10}, CO, MSATs, and greenhouse gases. Mr. Malisos has prepared project level particulate matter (PM_{10} and $PM_{2.5}$) hot-spot assessments for POAQC projects, for which detailed emissions modeling and analyses are required.

DAINA MANN

Project Role: Interagency Consultation / Public Involvement Specialist
Labor Classification: Technical Writer

Ms. Mann (B.A. Public Relations and Print Journalism) has more than 20 years of experience in community relations in the government, non-profit, agency, and corporate sectors. She has helped develop and implement community relations and public involvement programs for some of the largest transportation infrastructure projects in the metropolitan Phoenix region, including ADOT freeway projects and the METRO regional light rail system. Her experience encompasses all facets of community relations activities, including developing public involvement plans, developing public information materials and Web sites, public meeting/ hearing coordination, stakeholder outreach, public relations strategies and campaigns, and issues management.

BREAKDOWN OF DELIVERABLE PRODUCTS AND METHOD OF RESULTS DOCUMENTATION

WORK TASK	DELIVERABLE	PERCENTAGE OF OVERALL COST
Work Task 1	Working Paper 1	10%
Work Task 2	Working Paper 2 & Meeting 1	20%
Work Task 3	Working Paper 3	40%
Work Task 4	Working Paper 4 & Meeting 2	20%
Work Task 5	Final Document & Meeting 3	10%
	Total	**100%**

As specified in the RFP, the Baker Team will provide electronic copies of the Guidebook, draft and final reports, presentations, and all modeling results and data used for the project. The Baker Team will ensure that each deliverable includes the ADOT specified disclaimer. Documents will be prepared using Microsoft Word, Excel, and PowerPoint where applicable. Additional software that may be used to develop and / or document findings of this work effort includes; ARC GIS, ADOBE, PPSUITE / Central, and AQONE.

WORK PLAN SCHEDULE

ON-GOING PROJECTS

Agency	Project Title	Agency PM Name	Consultant Staff Member	% of Time Committed
ADOT MPD	Meridian Road Corridor Study	Charla Glendening	Michael Sabatini	10%
ADOT MPD (Baker is sub to Ayres Associates)	Somerton Comprehensive Transportation Plan	Mark Hoffman	Michael Sabatini	10%
PennDOT	Air Quality and Climate Emission Modeling	Michael Baker	Robert Kaiser Colleen Turner Dan Szekeres Jim Frazier Nanditha Koppula Ying-Tzu Chung	25% 10% 25% 10% 20% 20%
PennDOT	WO-3 DEP I/M Alternative Analysis	Kristen Singer	Robert Kaiser Colleen Turner Jim Frazier Ying-Tzu Chung	10% 15% 15% 10%
PennDOT	WO-5 DEP Modeling Assistance	Michael Baker (PennDOT) Chris Trostle (PaDEP)	Robert Kaiser Colleen Turner Dan Szekeres Jim Frazier Nanditha Koppula Ying-Tzu Chung	10% 10% 15% 10% 20% 10%
Maryland DOT	Statewide Planning and AQ	Howard Simons	Robert Kaiser Colleen Turner Dan Szekeres Jim Frazier Nanditha Koppula Ying-Tzu Chung Rob Dabadie	5% 25% 10% 25% 15% 15% 5%
New Jersey DOT	Statewide Transportation and Air Quality	Jamie DeRose	Robert Kaiser Rob d'Abadie Nanditha Koppula Ying-Tzu Chung	5% 35% 5% 5%
Naval Facilities Engineering Command (NAVFAC)	Sustainability Action Plan for Naval Support Activity Bethesda	Natasha Behbahany	Colleen Turner	5%
Caltrans/Orange County Transportation Authority	I-5 Widening Project from SR-73 to El Toro Road	Karen Cohoe	Eddie Torres Achilles Malisos	15% 15%

ON-GOING PROJECTS CONTINUED

Agency	Project Title	Agency PM Name	Consultant Staff Member	% of Time Committed
Transportation Corridor Authority	Tesoro Extension Project	Valerie McFall	Eddie Torres Achilles Malisos	5% 15%
Riverside County Transportation and Land Management Agency	Gilman Springs Road	Frances Segovia	Achilles Malisos	20%
Caltrans/Riverside County Transportation and Land Management Agency	Interstate 10/ Jefferson Street Interchange	Cindi Wachi	Eddie Torres	5%
Porsche Cars of North America	Porsche Driving Experience Center	James Taylor	Eddie Torres	10%
METRO (Baker is sub to Kiewit/ Mass Electric, dba Valley Transit Constructors)	Central Mesa Light Rail Extension	Howard Steere (METRO) Spencer Cruse (VTC Project Manager)	Daina Mann	25%
City of Peoria	75th Ave. and Thunderbird Intersection Improvements	Geoff Zinnecker	Daina Mann	10%
Connecticut DOT	CTfastrack (New Britain to Hartford BRT)	Michael Sanders	Daina Mann	15%

COOPERATIVE FEATURES

To assist in the facilitation of this Task assignment, Michael Baker Jr., Inc. has enlisted the assistance of RBF Consulting. RBF will assist with project level aspects of Work Tasks 3 and 4. A letter of commitment and a justification letter for our newly added sub-consultant firm, RBF are included in the Appendix.

APPENDIX