



CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

September 30, 2020
AGENDA ITEM #7

Discuss and consider approving a contract with
CDM Smith Inc. to perform traffic and revenue
engineering services

Strategic Plan Relevance: Regional Mobility
Department: Finance
Contact: Bill Chapman, Chief Financial Officer
Associated Costs: \$5,000,000 Not to Exceed
Funding Source: Various
Action Requested: Consider and act on draft resolution

Background -The Central Texas Regional Mobility Authority (the Authority) has a continuing need to monitor traffic and revenue (T&R) for its existing toll projects and for new projects. The studies the Authority receives as a result of T&R consulting services contain a variety of elements related to our toll facility's traffic and revenue including corridor travel demands, future growth characteristics, market capture and demand share. The Authority's Debt Indenture also requires T&R services. These services are used throughout the life of projects from planning, feasibility, financing, construction, and monitoring. The resulting studies vary in confidence levels from sketch level to investment grade. Investment grade studies are required for project financing.

Previous Actions/Brief History of the Project/Program - A Request for Qualifications to identify and obtain the services of a qualified engineering firm(s) to provide traffic and revenue engineering services was released on July 21, 2020. Three firms submitted responses to the RFQ. On August 26, 2020 the Board authorized the Executive Director to negotiate separate contracts for traffic and revenue engineering services with all qualified firms that submitted responses to the RFQ: C&M Associates, Inc., CDM Smith, and Stantec.

Staff Recommendation - Staff recommends approving a contract with CDM Smith for traffic and revenue engineering services for a term of 5 years with a not to exceed cumulative payment obligation of \$5,000,000.

Funding - Funding for the traffic and revenue consulting services will come from a variety of sources including the Operating Budget and Project Funding depending on the purpose of the T&R study.

Backup Provided: Draft Contract
 Draft Resolution

**GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY**

RESOLUTION NO. 20-0XX

**APPROVING A CONTRACT WITH CDM SMITH INC. FOR
TRAFFIC AND REVENUE ENGINEERING SERVICES**

WHEREAS, the Central Texas Regional Mobility Authority (Mobility Authority) has an ongoing need for traffic and revenue engineering services on its existing toll projects and to develop new toll projects; and

WHEREAS, by Resolution No. 20-051, dated August 29, 2020, the Board of Directors awarded a contract to CDM Smith Inc. for traffic and revenue engineering services and authorized the Executive Director to negotiate a contract with CDM Smith Inc.; and

WHEREAS, the Executive Director and CDM Smith Inc. have negotiated a proposed contract for traffic and revenue engineering services in an amount not to exceed \$5,000,000 which is attached hereto as Exhibit A and sets forth the scope of services, compensation and other terms; and

WHEREAS, the Executive Director recommends that the Board approve the contract with CDM Smith Inc. for traffic and revenue engineering services in the form or substantially the same form attached hereto as Exhibit A.

NOW THEREFORE, BE IT RESOLVED that the Board of Directors hereby approves the contract with CDM Smith Inc. for traffic and revenue engineering services; and

BE IT FURTHER RESOLVED that the Executive Director is hereby authorized to finalize and execute the contract with CDM Smith Inc. on behalf of the Mobility Authority in the form or substantially the same form attached hereto as Exhibit A.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 30th day of September 2020.

Submitted and reviewed by:

Approved:

Geoffrey Petrov, General Counsel

Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY
AGREEMENT FOR
TRAFFIC AND REVENUE ENGINEERING SERVICES

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**CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY
AGREEMENT FOR
TRAFFIC AND REVENUE ENGINEERING SERVICES**

This Professional Services Agreement (the “Agreement”) is made and entered into by and between the Central Texas Regional Mobility Authority (the “Authority” or “CTRMA”), a regional mobility authority and a political subdivision of the State of Texas, and CDM Smith, Inc (the “Consultant”) to be effective as of the 1st day of October, 2020 (the “Effective Date”) with respect to traffic and revenue engineering services to be performed by the Consultant, as an independent contractor, for the CTRMA.

WITNESSETH:

WHEREAS, pursuant to that certain Request for Qualifications dated July 22, 2020 (the “RFQ”), the CTRMA sought to identify and obtain the services of qualified engineering firm(s) to provide traffic and revenue engineering services for the CTRMA; and WHEREAS, three (3) firms submitted responses setting forth their respective qualifications for the work; and

WHEREAS, on August 26, 2020 the CTMRA Board authorized the Executive Director to negotiate separate contracts for Traffic and Revenue engineering services with each of the three (3) qualified providers; and

WHEREAS, this Agreement has been negotiated and finalized between those parties whereby the services shall be provided by the Consultant to the Authority at a fair and reasonable price;

NOW, THEREFORE, in consideration of payments hereinafter stipulated to be made to the Consultant by the Authority, the parties do hereby agree as follows:

**ARTICLE 1
THE SERVICES**

The Authority agrees to and hereby retains the Consultant, as an independent contractor, and the Consultant agrees to provide services to the Authority upon the terms and conditions provided in this Agreement. The Authority is the sole and exclusive client of the Consultant for the purposes of this Agreement, and this Agreement is exclusively between the Authority and the Consultant. The scope of services (the “Services”), which is described in detail in Appendix A attached hereto and incorporated herein, shall include, but not be limited to, rate/revenue analysis, traffic modeling, technical assistance, problem resolution assistance, project management duties, and duties imposed on the Traffic Consultant by Authority trust agreements. As directed by the Authority by separate Work Authorization, the Consultant shall perform such Services in relation to all CTRMA turnpike projects and potential projects, which may include, but are not limited to (1) the 183-A Turnpike; (2) 290 East Toll; (3) SH 71 Toll; (4) SH 45 Southwest Toll (5) 183 South Toll; and (6) 183 North Toll; (7) MoPac Express; and (8) MoPac South Toll.

The Consultant, as part of the Services, also shall assist the Authority in achieving the goals established in the CTRMA’s Strategic Plan, as adopted pursuant to Texas Transportation Code § 370.261 and as it may be amended from time to time by the CTRMA Board of Directors. For specific aspects of the Services, to the extent required by any trust agreement, the Consultant shall be expected to operate

independently from the Authority and without extensive oversight and direction. The Consultant shall commit the personnel and resources reasonably required to respond promptly and fully to the responsibilities and tasks assigned by the CTRMA throughout the term of the Consultant's performance of the Services described in this Agreement.

By written notice or order, Authority may, from time to time, order work suspension and/or make changes in the general scope of this Agreement, including, but not limited to, the services furnished to Authority by Consultant as described in the Scope of Work contained in the Work Authorization. If any such work suspension or change causes an increase or decrease in the price of said Work Authorization, or in the time required for its performance, Consultant shall promptly notify Authority thereof and assert its claim for adjustment within ten (10) calendar days after the change or work suspension is ordered, and an equitable adjustment shall be negotiated.

ARTICLE 2 "TRAFFIC CONSULTANTS" UNDER TRUST AGREEMENTS

Without limiting the provision of Article 1 above, and subject to a Work Authorization and the Work Authorization requirements found in subsection 3.b. herein, the Consultant shall perform the obligations of the "Traffic Consultants" under the Authority's current Master Trust Indenture, as amended, and, as agreed by the Parties, all supplemental, superceding, or additional trust agreements (collectively the "Trust Agreements"). The Authority has covenanted in Section 714 of the current Trust Agreement that, until the bonds issued in accordance with that Trust Agreement and the interest thereon shall have been paid or provision for such payment shall have been made, it will employ the Traffic Consultants for the purpose of performing and carrying out the duties imposed on it by the Trust Agreement. Those duties are summarized in the Scope of Services and provide a general, but not comprehensive, listing of the types of obligations the Consultant will be requested to perform under the Trust Agreements.

ARTICLE 3 COMPENSATION

Authorization for Consultant to perform the Services, compensation for Consultant's work, and other aspects of the mutual obligations concerning Consultant's work and payment therefore are as follows:

- a) Notwithstanding any provisions of this Agreement to the contrary, AUTHORITY and CONSULTANT mutually agree that AUTHORITY's maximum cumulative payment obligation (including obligation for CONSULTANT's profit) shall be Five Million and No/100 Dollars (\$5,000,000.00) which shall include all amounts payable to CONSULTANT for its subcontracts, leases, materials and costs arising from, or due to termination of this Agreement.
- b) BASIS FOR COMPENSATION. Subject to the terms of a Work Authorization issued pursuant to subsection 3.c. below, the Authority agrees to pay, and the Consultant agrees to accept as full and sufficient compensation and reimbursement for the performance of all Services as set forth in this Agreement, hourly rates for the staff working on the assignment computed as follows:

$$\text{Direct Labor Cost} \times (1.0 + \text{FAR}) \times 1.10$$

where Direct Labor Cost equals salary divided by 2080; FAR equals Consultant's most recent audited overhead rate under 48 C.F.R. Part 31, Federal Acquisition Regulations (FAR 31); and 1.10 reflects a 10 percent (10%) profit. Representative rates computed through this methodology as of the Effective Date of this Agreement are reflected in Appendix B. Rates will be revised annually to reflect adjustments to the Direct Labor Costs and audited FAR rates; no adjustment shall be made to the specified profit percentage. The first adjustment shall be considered in January 2021. All adjustments shall be agreed to by the parties prior to implementation, and the Authority shall have the right to review and/or audit Consultant's Direct Labor Costs and FAR rates upon written request and as provided in subsection (f) hereto. During the term of this Agreement Consultant shall provide to the Authority, prior to requesting any adjustment to rates, a copy of the report establishing a new FAR rate for Consultant.

The payment of the hourly rates and allowed costs shall constitute full payment for all Services, liaisons, products, materials, and equipment required to deliver the Services.

- c) **COMPENSATION FOR WORK AUTHORIZATIONS.** The Services to be performed by the Consultant pursuant to this Agreement shall be assigned by the Executive Director or designee and documented in a manner appropriate for the size and complexity of the specific tasks. Each activity, task, or project shall be performed pursuant to a separate Work Authorization, signed by the Executive Director or designee and the Consultant. Work shall be in accordance with the scope, schedule, and budget set forth in said Work Authorization. The standard form of Work Authorization is attached hereto and incorporated herein as Appendix C, which standard form may be modified during the term of this Agreement upon the reasonable request of the Executive Director or designee and agreement of the Consultant. Upon written directive from the Executive Director or designee (which may occur via electronic mail), the Consultant shall prepare the Work Authorization for the specific task, to be submitted for the Executive Director or designee's approval. No work shall begin on the activity until the Work Authorization is approved and fully executed. The basis for payment on each Work Authorization will be either (i) lump sum or (ii) hourly rate as computed pursuant to subsection 3.b. above, as stipulated in the Work Authorization. In neither case will the maximum be exceeded without prior written approval from the Authority. The costs associated with work performed on any Work Authorization will be tracked and reported to the Authority separately from other work performed by the Consultant. The monthly invoice to the Authority will include a progress summary of the work performed the previous month on each ongoing Work Authorization.
- d) **EXPENSES.** As indicated above, the compensation computed in accordance with subsections 3.b. and 3.c. is anticipated by the Authority and the Consultant to be full and sufficient compensation and reimbursement for the Services. Notwithstanding the foregoing, the Consultant shall be entitled to reimbursement for reasonable out-of-pocket expenses actually incurred by the Consultant that are necessary for the performance of its duties under this Agreement, said expenses being limited to travel costs incurred in conformance with the Authority's travel policy, printing costs, automobile expenses being reimbursed at the federal mileage rates for travel originating from the office of the applicable Consultant employee or subconsultant, application fees, delivery charges, and

other expenses directly approved, in advance, by the Authority. Except for automobile expenses paid at the federal mileage rate and travel paid at state approved rates (if available), all such reimbursement shall be at one-hundred percent (100%) of the actual cost thereof paid by the Consultant to unaffiliated entities; provided, however, that all non-travel related amounts in excess of \$2,000 for which the Consultant intends to seek reimbursement pursuant to this subsection 3.d. must be approved in advance and in writing by the Authority, except when such advance approval is impractical due to a bona fide emergency situation. The Authority shall not reimburse the Consultant for travel, lodging, and similar expenses incurred by the Consultant to bring additional staff to its local office or to otherwise reassign personnel to provide basic engineering and technical support of the Consultant's performance of the Services. The Consultant shall take all reasonable steps to acquire all goods and services subject to reimbursement by the Authority under this Agreement on a tax-free basis pursuant to the Authority's tax-exempt status described in subsection 3.i.

- e) **NON-COMPENSABLE TIME.** Time spent by the Consultant's employees or subconsultants to perform Services or functions capable of being carried out by other, subordinate personnel with a lower hourly rate shall be billed at a rate equivalent to that of the applicable qualified subordinate personnel. Time spent by the Consultant's personnel or subconsultants in an administrative or supervisory capacity not related to the performance of the Services shall not be compensable. Time spent on work that is in excess of what would reasonably be considered appropriate for the performance of such Services shall not be compensable. No compensation shall be made for revisions to the Consultant's or subconsultants' Services or deliverables required due in any way to the error, omission, or fault of the Consultant, its employees, agents, subconsultants, or contractors.

- f) **INVOICES AND RECORDS.** The Consultant shall submit two (2) copies of its monthly invoices certifying the fees charged and expenses incurred in providing the Services under this Agreement during the previous month, and shall also present a reconciliation of monthly invoices and the Work Authorization (and related estimates) to which the work relates. Each invoice shall be in such detail as is required by the Authority and, if the work is eligible for payment through a financial assistance agreement with the Texas Department of Transportation ("TxDOT"), in such detail as required by TxDOT, including a breakdown of Services provided on a project-by-project basis and/or pursuant to specified Work Authorizations, together with other Services requested by the Authority. Upon request of the Authority, the Consultant shall also submit certified time and expense records and copies of invoices that support the invoiced fees and expense figures. All invoices must be consistent with the rates represented in Appendix B, and direct labor costs for employees performing work for the Authority but not shown on Appendix B must be provided with any invoice reflecting such work. Unless waived in writing by the Executive Director or his designee, no invoice may contain, and the Authority will not be required to pay, any charge which is more than three (3) months old at the time of invoicing. All books and records relating to the Consultant's or subconsultants' time, out-of-pocket expenses, materials, or other services or deliverables invoiced to the Authority under this Agreement shall be made available during the Consultant's normal business hours to the Authority and its representatives for review, copying, and auditing throughout the term of this Agreement

and, after completion of the work, for three (3) years, or such period as is required by Texas or Federal law, whichever is longer.

- g) EFFECT OF PAYMENTS. No payment by the Authority shall relieve the Consultant of its obligation to deliver timely the Services required under this Agreement. If after approving or paying for any Service, product or other deliverable, the Authority determines that said Service, product or deliverable does not satisfy the requirements of this Agreement, the Authority may reject same and, if the Consultant fails to correct or cure same within a reasonable period of time and at no additional cost to the Authority, the Consultant shall return any compensation received therefore. In addition to all other rights provided in this Agreement, the Authority shall have the right to set off any amounts owed by the Consultant pursuant to the terms of this Agreement upon providing the Consultant prior written notice thereof.
- h) PLACE OF PAYMENT. Payments owing under this Agreement will be made by the Authority within thirty (30) days after receipt of the monthly invoice therefore, together with suitable supporting information, provided that if the payment is one eligible for reimbursement to the Authority from TxDOT, payment will be made within fifteen (15) business days of receipt by the Authority of the TxDOT payment. In the event the Authority disputes payment, the Authority will pay the undisputed portion when due. Payment shall be forwarded to the address shown for the Consultant:

CDM Smith Inc.
15036 Collections Center Drive,
Chicago, IL 60693

- i) TAXES. All payments to be made by the Authority to the Consultant pursuant to this Agreement are inclusive of federal, state, or other taxes, if any, however designated, levied, or based. The Authority acknowledges and represents that it is a tax-exempt entity under Sections 151.309, et seq., of the Texas Tax Code. Title to any consumable items purchased by the Consultant in performing this Agreement shall be deemed to have passed to the Authority at the time the Consultant takes possession or earlier, and such consumable items shall immediately be marked, labeled, or physically identified as the property of the Authority, to the extent practicable.
- j) AS-NEEDED BASIS. As provided for above, the Authority shall request that the Consultant perform specific Services on an as-needed basis and through the issuance of Work Authorizations. No representation or assurance has been made on behalf of the Authority to the Consultant as to the total compensation to be paid to the Consultant under this Agreement.
- k) COMPENSATION OF SUBCONSULTANTS. As noted in the Consultant's response to the RFQ, the Consultant will employ subconsultants providing Services under this Agreement. All subconsultants providing Services under this Agreement shall be subject

to, and compensated or reimbursed in accordance with, all requirements of this Article 3, provided that each subconsultant shall utilize its own actual hourly rates (computed using its own multiplier based on actual audited FAR rates or audited overhead rates if FAR rates are not available) provided that no such rates shall exceed the corresponding rates paid by the Consultant for its personnel of comparable grade, category and experience, and further provided that no Subconsultant's FAR rate or audited overhead rate may exceed that of the Consultant without the prior written consent of the Authority. The Consultant agrees to pay its subconsultants for satisfactory performance of their contracts no later than thirty (30) days from its receipt of payment from the CTRMA. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the CTRMA. This clause applies to payments to all subconsultants. Consultant is authorized to use those subconsultants identified in Appendix D attached hereto and incorporated herein, being those subconsultants identified in the response of Consultant to the RFQ. Additional subconsultants may only be utilized with the prior written consent of the Executive Director of the Authority.

- 1) **MOST FAVORED CUSTOMER.** The Consultant shall voluntarily and promptly disclose to the Authority, and immediately provide the Authority with, the benefits of any discounted hourly fees and rates offered by the Consultant to any public entity customer in the State of Texas for comparable traffic and revenue studies. The Consultant hereby represents to the Authority, as of the effective date of this Agreement and throughout the term thereof, that except as previously disclosed in writing it has and will have no contract or arrangement with any public entity customer in the State of Texas for comparable traffic and revenue studies that provides such customer with fees, or rates that are more favorable than those afforded the Authority under this Agreement. The Consultant shall make available to the Authority for review, copying, and auditing throughout the term of this Agreement and for three (3) years or such period as is required by Texas or Federal law, whichever is longer, after the expiration thereof all such books and records as shall be necessary for the Authority or its representatives to determine compliance with this provision.

ARTICLE 4 TIME OF PERFORMANCE

It is understood and agreed that the term of this Agreement shall be a maximum of five (5) years, commencing October 1, 2020, and concluding October 1, 2025, (the "Expiration Date") subject to the earlier termination of this Agreement pursuant to Articles 5 or 6 below or further extension upon agreement of both parties. The initial period of performance is three (3) years commencing on the Effective Date, and there shall be two (2) successive and (1) year renewal terms following the expiration of the initial three (3) year period. In addition to any termination rights set forth in this Agreement, either party may elect not to extend the term of one or both of the renewal years by providing sixty (60) days written notice to the other prior to the end of the initial term of the first renewal term. Absent such notice or termination pursuant to other provisions of this Agreement, the renewal terms will automatically take effect. If at any time during the contract term the Consultant cannot provide the requested Services within the time required by the CTRMA or for any other reason, the Authority reserves the unilateral right to procure the Services from any other source it deems capable of providing those Services.

ARTICLE 5
TERMINATION FOR DEFAULT

Time is of the essence with respect to the performance and completion of all the Services to be furnished by the Consultant pursuant to Work Authorizations issued and which specify an agreed-upon completion or delivery date. Without limiting the foregoing, the Consultant shall furnish all Services in such a manner and at such times as the development schedules of the Projects require so that no delay in the progression of the evaluation, funding, design, or construction of the Projects will be caused by or be in any way attributable to the Consultant. Should the Consultant at any time, in the reasonable opinion of the Authority, not carry out its obligations under this Agreement or not be progressing toward completion of the Services to be rendered hereunder in an expeditious manner, or if the Consultant shall fail in any manner to discharge any other of its obligations under this Agreement, the Authority may, upon providing the Consultant with thirty (30) days prior written notice pursuant to Article 5 hereof and opportunity to cure, terminate this Agreement effective on the date following said 30-day notice and cure period (the "Termination Date"). Such termination shall not constitute a waiver or release by the Authority of any claims for damages, claims for additional costs incurred by the Authority to complete and/or correct the work described in this Agreement, or any other claims or actions arising under this Agreement or available at law or equity which it may have against the Consultant for its failure to perform satisfactorily any obligation hereunder, nor shall such termination pursuant to this Article 5 or Article 6 below abrogate or in any way affect the indemnification obligations of the Consultant set forth in Article 17 hereof.

If the Authority shall terminate this Agreement as, provided either in this Article 5 or Article 6, no fees of any type, other than fees due and payable pursuant to Article 3 hereof for work performed and acceptable to the Authority, as of the Termination Date or Optional Termination Date, as applicable, shall thereafter be paid to the Consultant, and the Authority shall have a right to set off or otherwise recover any damages incurred by reason of the Consultant's breach hereof, together with the right to set off amounts owed to the Consultant pursuant to the indemnity provisions. In determining the amount of any payments owed to the Consultant, the value of the work performed by the Consultant prior to termination shall be no greater than the value that would result by compensating the Consultant in accordance with Article 3 hereof for all Services performed and expenses reimbursable in accordance with this Agreement.

ARTICLE 6
OPTIONAL TERMINATION

In addition to the process for termination described above, this Agreement may also be terminated as follows:

- a. **GENERALLY.** The Authority has the right to terminate this Agreement at its sole option, at any time with or without cause, by providing thirty (30) days written notice of such intention to terminate pursuant to this subsection 6.a. hereof and by stating in said notice the "Optional Termination Date". Upon such termination, the Authority shall enter into a settlement with the Consultant upon an equitable basis as determined by the Authority, which shall fix the value of the work performed by the Consultant prior to the Optional Termination Date. In determining the value of the work performed, the Authority in all events shall compensate the Consultant for any reasonable costs or expenses attributable to the exercise of the Authority's optional termination, including reasonable costs related to developing a transition plan and providing data as provided for in Article 7, provided, however, that no

consideration will be given to anticipated profit which the Consultant might possibly have made on the uncompleted portion of the Services.

- b. **NO FURTHER RIGHTS, ETC.** Termination of this Agreement and payment of an amount in settlement as described in this Article 6 shall extinguish all rights, duties, obligations, and liabilities of the Authority and the Consultant under this Agreement, and this Agreement shall be of no further force and effect, provided, however, such termination shall not act to release the Consultant from liability for any previous default either under this Agreement or under any standard of conduct set by common law or statute. Requirements that survive termination are outlined in Article 35.
- c. **NO FURTHER COMPENSATION.** If the Authority shall terminate this Agreement as provided in this Article 6, no fees of any type, other than fees due and payable as of the Optional Termination Date, shall thereafter be paid to the Consultant, provided that the Authority shall not waive any right to damages incurred by reason of the Consultant's breach thereof. The Consultant shall not receive any compensation for Services performed or expenses incurred by the Consultant after the Optional Termination Date, and any such Services performed or expenses incurred shall be at the sole risk and expense of the Consultant.

ARTICLE 7 TERMINATION, GENERALLY

The Authority's rights and options to terminate this Agreement, as provided in any provision of this Agreement, shall be in addition to, and not in lieu of, any and all rights, actions, options, and privileges otherwise available under law or equity to the Authority by virtue of this Agreement or otherwise. Failure of the Authority to exercise any of its said rights, actions, options, and privileges to terminate this Agreement as provided in any provision of this Agreement or otherwise shall not be deemed a waiver of any of said rights, actions, options, or privileges or of any rights, actions, options, or privileges otherwise available under law or equity with respect to any continuing or subsequent breaches of this Agreement or of any other standard of conduct set by common law or statute.

Upon request by the Executive Director of the Authority, and subject to Article 13 hereto, The Consultant shall develop a transition plan to be implemented upon termination of this Agreement with the Consultant for any reason or upon the release of any subconsultant so as to ensure a smooth, efficient, and uninterrupted transition to any successor Consultant or subconsultant. The plan shall anticipate the steps necessary to transfer documents, computerized data, plans, work tasks, etc. in possession of or to be provided by the Consultant or its subconsultant(s), as the case may be, and include a schedule of events necessary to complete the transition. The plan should include, but not be limited to, a list of original documents/data being held on behalf of the Authority by the Consultant or its subconsultants; the manner and form in which information is being held; accessibility to the information; the Consultant's records retention policy and/or plan; and strategy to minimize disruption of Services in the event of the release of a subconsultant. A copy of the plan shall be given to the Executive Director for review and approval within thirty (30) days of receipt of the Executive Director's request and shall be updated as necessary to reflect any changes in Consultant activity.

ARTICLE 8
SUSPENSION OR MODIFICATION OF SERVICES; DELAYS AND DAMAGES

In addition to the foregoing rights and options to terminate this Agreement, the Authority may elect to suspend any portion of the Services of the Consultant hereunder, but not terminate this Agreement, by providing the Consultant with prior written notice to that effect. Thereafter, the suspended Services may be reinstated and resumed in full force and effect upon receipt from the Authority of thirty (30) days prior written notice requesting same. Similarly, the Authority may expand, limit, or cancel any portion of the Services previously assigned to the Consultant in accordance with this Agreement. The Consultant shall not be entitled to any damages or other compensation of any form in the event that the Authority exercises its rights to suspend or modify the Services pursuant to this Article 8, provided, however, that any time limits established by the parties in any Work Authorization or otherwise for the completion of specific portions of the Services suspended pursuant to this Article 8 shall be extended to allow for said suspension or modifications thereof. Without limiting the foregoing, the Consultant agrees that no claims for damages or other compensation shall be made by the Consultant for any delays or hindrances occurring during the progress of any portion of the Services specified in this Agreement as a result of any suspension or modification of the Services or otherwise. Such delays or hindrances, if any, shall be provided for by an extension of time for such reasonable periods as the Authority may decide. It is acknowledged, however, that permitting the Consultant to proceed to complete any Services or any part of them after the originally specified date for completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the Authority or any of its rights herein.

ARTICLE 9
PERSONNEL, EQUIPMENT AND MATERIAL, GENERALLY

Consultant shall provide personnel and equipment as follows:

- a. **ADEQUATE PERSONNEL, ETC.** The Consultant shall furnish and maintain, at its own expense, adequate and sufficient personnel (drawn from its own employees or from approved subconsultants) and equipment, in the reasonable opinion of the Authority, to perform the Services with due and reasonable diligence customary of an engineering firm enjoying a favorable national reputation, and in all events without delays attributable to the Consultant which have a reasonable likelihood of adversely affecting the progress of others involved with one or more of the Projects or the progress of the feasibility evaluation, design or construction of any such Project. All persons, whether employees of the Consultant or of an approved subconsultant, providing the Services shall be fully licensed to the extent required by their professional discipline associations' codes or otherwise by law.
- b. **REMOVAL OF PERSONNEL.** All persons providing the Services, whether employees of the Consultant or of an approved subconsultant, shall have such knowledge and experience as will enable them, in the Consultant's reasonable belief, to perform the duties assigned to them. Any such person who, in the opinion of the Authority, is incompetent or by his/her conduct becomes detrimental to the provision of the Services shall, upon request of the Authority, immediately be removed from the Services. The Consultant shall furnish the Authority with a fully qualified candidate for the removed person within ten (10) days thereafter, provided, however, said candidate shall not begin work under this Agreement unless and until approved by the Authority.

- c. CONSULTANT FURNISHES EQUIPMENT, ETC. Except as otherwise specified or agreed to by the CTRMA, the Consultant shall furnish all equipment, transportation, supplies, and materials required for its Services under this Agreement.

ARTICLE 10 KEY PERSONNEL

The Consultant acknowledges and agrees that the individual(s) identified on Appendix E attached hereto and incorporated herein are key and integral to the satisfactory performance of the Consultant under this Agreement. Throughout the term of this agreement, the Consultant agrees that the identified individual(s), whether employee(s) of the Consultant or of an approved subconsultant, will remain in charge of the performance of the Services and shall devote substantial and sufficient time and attention thereto. The death or disability of any such individual, his/her disassociation from the Consultant or the approved subconsultant, or his/her failure or inability to devote sufficient time and attention to the Services shall require the Consultant promptly to replace said individual with a person suitably qualified and otherwise acceptable to the Authority. In no event shall the Consultant remove, transfer, or reassign any individual identified on Appendix E except as instructed by, or with the prior written consent of, the Authority, which consent shall not be reasonably withheld. The Consultant shall use its best efforts to enhance continuity in the key personnel, subconsultants, and other employees regularly performing the Services. Individuals may be added to Appendix E with the mutual consent of the Consultant and the Authority.

ARTICLE 11 BUSINESS OPPORTUNITY PROGRAM AND POLICY COMPLIANCE

It is the policy of the Authority's Board of Directors that disadvantaged and small business have the maximum practicable opportunity to participate in the awarding of Authority contracts and related subcontracts. To do so the Authority has developed a Business Opportunity Program and Policy ("BOPP"), which is incorporated herein by reference for all purposes. The Authority requires contractors to comply with the BOPP. The Consultant acknowledges that certain Services to be performed under this Agreement are subcontractable and will be subcontracted in accordance with the BOPP and as represented in Consultant's proposal in response to the RFQ. Consultant agrees to submit monthly subcontracting reports as part of its monthly invoices.

ARTICLE 12 PLANNING AND PERFORMANCE REVIEWS; INSPECTIONS

As directed by the Authority, key personnel shall meet with the Authority's Executive Director and/or his designee(s) upon request (a) to assess the Consultant's progress under this Agreement and performance of the Services; and (b) to plan staffing levels to be provided by the Consultant to the Authority for the upcoming calendar year. The Consultant shall permit inspections of its Services and work by the Authority or others, when requested by the Authority. Nothing contained in this Agreement shall prevent the Authority from scheduling such other planning and performance reviews with the Consultant or inspections as the Authority determines necessary.

ARTICLE 13
OWNERSHIP OF REPORTS

Ownership of reports and related materials prepared by Consultant (or any subconsultant) at the direction of the Authority shall be as follows:

- a. **GENERALLY.** All of the documents, reports, plans, surveys, estimates, computer records, discs and tapes, proposals, sketches, diagrams, charts, calculations, correspondence, memoranda, survey notes, opinions, maps, photographs, drawings, data, analyses and other data and materials, and any part thereof, created, compiled or to be compiled by or on behalf of the Consultant solely under this Agreement (“work product”), including all information prepared for or posted on the Authority’s website and together with all materials and data furnished to it by the Authority, shall at all times be and remain the property of the Authority and, for a period of three (3) years from completion of the Services or such period as is required by law, whichever is longer, if at any time demand be made by the Authority for any of the above materials, records, and documents, whether after termination of this Agreement or otherwise, such shall be turned over to the Authority without delay. The Authority hereby grants the Consultant a revocable license to retain and utilize the foregoing materials, said license to terminate and expire upon the earlier to occur of (a) the completion of Services described in this Agreement or (b) the termination of this Agreement, at which time the Consultant shall deliver to the Authority all such materials and documents. If the Consultant or a subconsultant desires later to use any of the data generated or obtained by it in connection with the Projects or any other portion of the work product resulting from the Services, it shall secure the prior written approval of the Authority. Notwithstanding anything contained herein to the contrary, the Consultant shall have the right to retain a copy of the above materials, records, and documents for its archives.
- b. **SEPARATE ASSIGNMENT.** If for any reason the agreement of the Authority and the Consultant set forth in subsection 13.a. above regarding the ownership of work product and other materials is determined to be unenforceable, either in whole or in part, the Consultant hereby assigns and agrees to assign to the Authority all right, title, and interest that Consultant may have or at any time acquire in said work product and other materials which are prepared solely for this Agreement, without royalty, fee or other consideration of any sort, and without regard to whether this Agreement has terminated or remains in force. The Authority hereby acknowledges, however, that all documents and other work product provided by the Consultant to the Authority and resulting from the Services performed under this Agreement are intended by the Consultant solely for the use for which they were originally prepared. Notwithstanding anything contained herein to the contrary, the Consultant shall have no liability for the use by the Authority of any work product generated by the Consultant under this Agreement on any project other than for the specific purpose and Project for which the work product was prepared. Any other reuse of such work product without the prior written consent of the Consultant shall be at the sole risk of the Authority.
- c. **USE OF CONSULTANT WORK PRODUCT.** Except for final versions of reports which are prepared in connection with project financings, the Authority will provide Consultant written advance notice prior to releasing Consultant’s work product to any third party. Upon

receipt of notice, Consultant will have a reasonable amount of time to review such disclosure and provide the Authority written notice of the completion of review prior to release.

The Authority acknowledges that the Consultant's work product will be developed using data that is available at the time of the execution of a given work order, and will not constitute any guarantee or other assurance of future events. The Consultant will prepare work product using practices that are standard procedures in the industry.

ARTICLE 14 SUBLETTING

The Consultant shall not sublet, assign, or transfer any part of the work or obligations included in this Agreement without the prior written approval of the Authority, which approval shall not be reasonably withheld. Responsibility for sublet, assigned or transferred work shall remain with the Consultant.

ARTICLE 15 APPEARANCE AS WITNESS AND ATTENDANCE AT MEETINGS

Consultant shall cooperate with the Authority and requests for attendance at meetings and in various types of proceedings as follows:

- a. **WITNESS.** If requested by the Authority or on its behalf, the Consultant shall prepare such traffic engineering, feasibility, or other exhibits as may be requested for all hearings and trials related to any of the Projects, the Services, or the Authority's activities generally and, further, it shall prepare for and appear at conferences at the offices of legal counsel and shall furnish competent expert engineering witnesses to provide such oral testimony and to introduce such demonstrative evidence as may be needed throughout all trials and hearings with reference to any litigation relating to the Projects, the Services, or the Authority's activities.
- b. **MEETINGS.** At the request of the Authority, the Consultant shall provide appropriate personnel for conferences at its offices, or attend meetings and conferences at (a) the various offices of the Authority, (b) at the district headquarters or offices of TxDOT, (c) the offices of the Authority's legal counsel, bond counsel, and/or financial advisors, (d) at the site of any Project, or (e) any reasonably convenient location. Without limiting the foregoing, the Consultant shall provide personnel for periodic meetings with underwriters, rating agencies, and other parties when requested by the Authority.
- c. **WORK AUTHORIZATION.** In the event that services under this section are not covered by an existing Work Authorization, the Authority will issue a Work Authorization, pursuant to Article 3 hereto, to cover such services.

ARTICLE 16 COMPLIANCE WITH LAWS AND AUTHORITY POLICIES

The Consultant shall comply with all applicable federal, state, and local laws, statutes, ordinances, rules, regulations, codes and with the orders and decrees of any courts or administrative bodies or tribunals

in any matter affecting the performance under this Agreement, including, without limitation, workers' compensation laws, antidiscrimination laws, environmental laws, minimum and maximum salary and wage statutes and regulations, health and safety codes, licensing laws and regulations, the Authority's enabling legislation (Chapter 370 of the Texas Transportation Code), and all amendments and modifications to any of the foregoing, if any. The Consultant shall also comply with the Authority's policies and procedures related to operational and administrative matters, such as, but not limited to, security of and access to CTRMA information and facilities. When requested the Consultant shall furnish the Authority with satisfactory proof of compliance with said laws, statutes, ordinances, rules, regulations, codes, orders, and decrees above specified.

ARTICLE 17 AUTHORITY INDEMNIFIED

THE CONSULTANT SHALL INDEMNIFY AND SAVE HARMLESS THE AUTHORITY AND ITS OFFICERS, DIRECTORS, EMPLOYEES, AND AGENTS (WHICH, FOR PURPOSES OF THIS AGREEMENT, SHALL INCLUDE THE AUTHORITY'S GENERAL COUNSEL, BOND COUNSEL, AND FINANCIAL ADVISOR (S)), FROM ANY CLAIMS, COSTS OR LIABILITIES OF ANY TYPE OR NATURE AND BY OR TO ANY PERSONS WHOMSOEVER, ARISING FROM THE CONSULTANT'S NEGLIGENT ACTS, ERRORS OR OMISSIONS WITH RESPECT TO THE CONSULTANT'S PERFORMANCE OF THE WORK TO BE ACCOMPLISHED UNDER THIS AGREEMENT, WHETHER SUCH CLAIM OR LIABILITY IS BASED IN CONTRACT, TORT OR STRICT LIABILITY. IN SUCH EVENT, THE CONSULTANT SHALL ALSO INDEMNIFY AND SAVE HARMLESS THE AUTHORITY, ITS OFFICERS, DIRECTORS, EMPLOYEES, AND AGENTS (WHICH, FOR PURPOSES OF THIS AGREEMENT, SHALL INCLUDE THE AUTHORITY'S GENERAL COUNSEL, BOND COUNSEL, AND FINANCIAL ADVISOR (S)) FROM ANY AND ALL EXPENSES, INCLUDING REASONABLE ATTORNEYS' FEES, INCURRED BY THE INDEMNIFIED ENTITY (S) IN LITIGATING OR OTHERWISE RESISTING SAID CLAIMS, COSTS OR LIABILITIES. IN THE EVENT THE AUTHORITY, ITS OFFICERS, DIRECTORS, EMPLOYEES, AND AGENTS (WHICH, FOR PURPOSES OF THIS AGREEMENT, SHALL INCLUDE THE AUTHORITY'S GENERAL COUNSEL, BOND COUNSEL, AND FINANCIAL ADVISOR (S)) IS/ARE FOUND TO BE PARTIALLY AT FAULT, THE CONSULTANT SHALL, NEVERTHELESS, INDEMNIFY THE INDEMNIFIED ENTITY (S) FROM AND AGAINST THE PERCENTAGE OF NEGLIGENCE ATTRIBUTABLE TO THE CONSULTANT, ITS OFFICERS, DIRECTORS, EMPLOYEES, AGENTS, SUBCONSULTANTS, AND CONTRACTORS OR TO THEIR CONDUCT.

NOTWITHSTANDING THE FOREGOING, THE CONSULTANT SHALL NOT BE RESPONSIBLE FOR (A) CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, OR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE PROJECT UNLESS DEVELOPMENT OR OVERSIGHT OF SUCH MATTERS IS SPECIFICALLY ASSIGNED TO THE CONSULTANT; (B) THE FAILURE OF ANY CONTRACTOR, SUBCONTRACTOR, VENDOR, OR OTHER PROJECT PARTICIPANT, NOT UNDER CONTRACT TO THE CONSULTANT, TO FULFILL CONTRACTUAL RESPONSIBILITIES TO THE AUTHORITY OR TO COMPLY WITH FEDERAL, STATE OR LOCAL LAWS, REGULATIONS AND CODES; OR (C) PROCURING PERMITS, CERTIFICATES AND LICENSES REQUIRED FOR ANY CONSTRUCTION UNLESS SUCH PROCUREMENT RESPONSIBILITIES ARE SPECIFICALLY ASSIGNED TO THE CONSULTANT IN ACCORDANCE WITH THIS AGREEMENT.

**ARTICLE 18
CONFLICTS OF INTEREST**

The Consultant represents and warrants to the Authority, as of the effective date of this Agreement and throughout the term hereof, that it, its employees and subconsultants (a) have no financial or other beneficial interest in any contractor, engineer, product or service evaluated or recommended by the Consultant, except as expressly disclosed in writing to the Authority, (b) shall discharge their consulting engineering responsibilities under this Agreement professionally, impartially and independently, and after considering all relevant information related thereto, and (c) are under no contractual or other restriction or obligation, the compliance with which is inconsistent with the execution of this Agreement or the performance of their respective obligations hereunder. In the event that a firm (individually or as a member of a consortium) submits a proposal to work for the Authority, Consultant shall comply with the Authority's conflict of interest policies and shall make disclosures as if it were one of the key personnel designated under such policies.

**ARTICLE 19
INSURANCE**

Prior to beginning the Services designated in this Agreement, the Consultant shall obtain and furnish certificates to the Authority for the following minimum amounts of insurance:

- a. **WORKERS' COMPENSATION INSURANCE.** In accordance with the laws of the State of Texas, and employer's liability coverage with a limit of not less than \$500,000. A "Waiver of Subrogation" in favor of the Authority shall be provided.
- b. **COMMERCIAL GENERAL LIABILITY INSURANCE.** With limits not less than \$1,000,000 for bodily injury, including those resulting in death, and property damage on account of any one occurrence, with an aggregate limit of \$1,000,000. A "Waiver of Subrogation" in favor of the Authority shall be provided.
- c. **BUSINESS AUTOMOBILE LIABILITY INSURANCE.** Applying to owned, non-owned, and hired automobiles in an amount not less than \$1,000,000 for bodily injury, including death, to any one person, and for property damage on account of any one occurrence. This policy shall not contain any limitation with respect to a radius of operation for any vehicle covered and shall not exclude from the coverage of the policy any vehicle to be used in connection with the performance of the Consultant's obligations under this Agreement. A "Waiver of Subrogation" in favor of the Authority shall be provided.
- d. **ARCHITECTS AND/OR ENGINEERS PROFESSIONAL LIABILITY INSURANCE.** In the amounts normally carried for its own protection in the practice of providing general consulting services, but in no event less than \$3,000,000 per claim and aggregate. Coverage must be continuously maintained for a period of three (3) years beyond the Consultant's completion of the Services.
- e. **EXCESS UMBRELLA LIABILITY.** With minimum limits of \$1,000,000 per claim and in the aggregate, annually, as applicable excess of the underlying policies required at a.-d.

above. The Umbrella Policy shall contain the provision that it will continue in force as an underlying insurance in the event of exhaustion of underlying aggregate policy limits.

- f. **GENERAL FOR ALL INSURANCE.** The Consultant shall promptly, upon execution of this Agreement, furnish certificates of insurance to the Authority indicating compliance with the above requirements. Certificates shall indicate the name of the insured, the name of the insurance company, the name of the agency/agent, the policy number, the term of coverage, and the limits of coverage.

All policies are to be written through companies (a) registered to do business in the State of Texas; (b) rated: (i), with respect to the companies providing the insurance under subsections 19.a. through d., above, by A. M. Best Company as “A-X” or better (or the equivalent rating by another nationally recognized rating service) and (ii) with respect to the company providing the insurance under subsections 19.d. and e., a rating by A. M. Best Company or similar rating service satisfactory to the Authority and/or its insurance consultant; and (c) otherwise acceptable to the Authority.

All policies are to be written through companies registered to do business in the State of Texas. Such insurance shall be maintained in full force and effect during the life of this Agreement or for a longer term as may be otherwise provided for hereunder. Insurance furnished under subsections 19.b., and c., above, shall name the Authority additional insureds and shall protect the Authority, the Consultant, their officers, employees, directors, agents, and representatives from claims for damages for bodily injury and death and for damages to property arising in any manner from the negligent or willful wrongful acts or failures to act by the Consultant, its officers, employees, directors, agents, and representatives in the performance of the Services rendered under this Agreement. Applicable Certificates shall also indicate that the contractual liability assumed in Article 17, above, is included.

The insurance carrier shall include in each of the insurance policies required under subsections 19.a., b., c., d., and e., the following statement: “This policy will not be canceled or non-renewed during the period of coverage without at least thirty (30) days prior written notice addressed to the Central Texas Regional Mobility Authority, 301 Congress, Suite 650, Austin, TX 78701, Attention: Executive Director.”

ARTICLE 20 COORDINATION OF CONTRACT DOCUMENTS

The Statement of Qualifications for Traffic and Revenue Engineering Services and Appendices thereto, dated August 17, 2020, submitted by CDM Smith to the Authority (“Statement of Qualification”) is attached hereto and incorporated herein as Appendix F for all purposes, provided, however, that in the event of any conflict between said Statement of Qualifications and any other provision of, appendices or exhibits to this Agreement, the Statement of Qualifications shall be subordinate and the provision, appendices, or exhibits of this Agreement shall control.

ARTICLE 21
RELATIONSHIP BETWEEN THE PARTIES

Notwithstanding the anticipated collaboration between the parties hereto, or any other circumstances, the relationship between the Authority and the Consultant shall be one of an independent contractor. The Consultant acknowledges and agrees that neither it nor any of its employees, subconsultants, or subcontractors shall be considered an employee of the Authority for any purpose. The Consultant shall have no authority to enter into any contract binding upon the Authority, or to create any obligation on behalf of the Authority. As an independent contractor, neither the Consultant nor its employees shall be entitled to any insurance, pension, or other benefits customarily afforded to employees of the Authority. Under no circumstances shall the Consultant, or its employees, subconsultants, or subcontractors, represent to suppliers, contractors or any other parties that it is employed by the Authority or serves the Authority in any capacity other than as an independent contractor. The Consultant shall clearly inform all suppliers, contractors and others that it has no authority to bind the Authority. Nothing contained in this Agreement shall be deemed or construed to create a partnership or joint venture, to create the relationship of employee-employer or principal-agent, or to otherwise create any liability for the Authority whatsoever with respect to the liabilities, obligations or acts of the Consultant, its employees, subconsultants, or subcontractors, or any other person.

ARTICLE 22
DELIVERY OF NOTICES, ETC.

In each instance under this Agreement in which one party is required or permitted to give notice to the other, such notice shall be deemed given either (a) when delivered by hand; (b) one (1) business day after being deposited with a reputable overnight air courier service; or (c) three (3) business days after being mailed by United States mail, registered or certified mail, return receipt requested, and postage prepaid. Any notices provided under this Agreement must be sent or delivered to:

In the case of the Consultant:

CDM Smith Inc.
9430 Research Blvd., Suite 1-200, Austin, TX 78759

Attn: Christopher E. Mwalwanda, Vice President

In the case of the CTRMA:

Central Texas Regional Mobility Authority
3300 N. IH 35
Suite 300
Austin, TX 78705

Attn: Mike Heiligenstein, Executive Director

Either party hereto may from time to time change its address for notification purposes by giving the other party prior written notice of the new address and the date upon which it will become effective.

**ARTICLE 23
REPORTS OF ACCIDENTS, ETC.**

Within twenty-four (24) hours after occurrence of any accident or other event which results in, or might result in, injury to the person or property of any third person (including an employee or subconsultant or employee of a subconsultant of the Consultant) which results from or involves any action or failure to act of the Consultant or any employee, subconsultant, employee of a subconsultant, or agent of the Consultant or which arises in any manner from the performance of this Agreement, the Consultant shall send a written report of such accident or other event to the Authority, setting forth a full and concise statement of the facts pertaining thereto. The Consultant also shall immediately send the Authority a copy of any summons, subpoena, notice, or other documents served upon the Consultant, its agents, employees, subconsultants, or representatives, or received by it or them, in connection with any matter before any court arising in any manner from the Consultant's performance of the Services under this Agreement.

**ARTICLE 24
AUTHORITY'S ACTS**

Anything to be done under this Agreement by the Authority may be done by such persons, corporations, firms, or other entities as the Authority may designate.

**ARTICLE 25
LIMITATIONS**

Notwithstanding anything herein to the contrary, all covenants and obligations of the Authority under this Agreement shall be deemed to be valid covenants and obligations only to the extent authorized by Chapter 370 of the Texas Transportation Code and permitted by the laws and the Constitution of the State of Texas, and no officer, director, or employee of the Authority shall have any personal obligations or liability thereunder.

The Consultant is obligated to comply with applicable standards of professional care in the performance of the Services. The Consultant makes no other representation or warranty, whether express or implied, and no warranty or guarantee is included or intended in this Agreement or in any "work product" or otherwise.

The Consultant shall be entitled to rely, without requirement of further investigation, on all information supplied to the Consultant by the Authority, together with any other materials, such as prior reports or analyses prepared by or on behalf of or for the benefit of Authority.

Neither Authority nor the Consultant shall in any event be liable for any consequential, incidental, indirect, punitive, exemplary or special damages including, without limitation; loss of profits, business or goodwill of any kind from any causes of action (whether arising in contract, tort or otherwise) unless caused by their willful misconduct, negligent act or omission, or other wrongful conduct. Each party to this Agreement is obligated to take commercially reasonable steps to mitigate any damages that it may incur. Nothing herein shall constitute a waiver of any other defenses that either party may have at law or in equity.

ARTICLE 26
CAPTIONS NOT A PART HEREOF

The captions or subtitles of the several articles, subsections, and divisions of this Agreement are inserted only as a matter of convenience and for reference, and in no way define, limit or describe the scope of this Agreement or the scope or content of any of its articles, subsections, divisions, or other provisions.

ARTICLE 27
CONTROLLING LAW, VENUE

This Agreement shall be governed and construed in accordance with the laws of the State of Texas. The parties hereto acknowledge that venue is proper in Travis County, Texas, for all disputes arising hereunder and waive the right to sue and be sued elsewhere.

ARTICLE 28
COMPLETE AGREEMENT

This Agreement sets forth the complete agreement between the parties with respect to the Services and, except as provided for in Article 20 above, expressly supersedes all other agreements (oral or written) with respect thereto. Any changes in the character, agreement, terms and/or responsibilities of the parties hereto must be enacted through a written amendment. No amendment to this Agreement shall be of any effect unless in writing and executed by the Authority and the Consultant. This Agreement may not be orally canceled, changed, modified or amended, and no cancellation, change, modification or amendment shall be effective or binding, unless in writing and signed by the parties to this Agreement. This provision cannot be waived orally by either party.

ARTICLE 29
TIME OF ESSENCE

As set forth in Article 5, with respect to any specific delivery or performance date or other deadline provided hereunder, time is of the essence in the performance of the provisions of this Agreement. The Consultant acknowledges the importance to the Authority of the project schedule and will perform its obligations under this Agreement with all due and reasonable care and in compliance with that schedule.

ARTICLE 30
SEVERABILITY

If any provision of this Agreement, or the application thereof to any person or circumstance, is rendered or declared illegal for any reason and shall be invalid or unenforceable, the remainder of this Agreement and the application of such provision to other persons or circumstances shall not be affected thereby but shall be enforced to the greatest extent permitted by applicable law.

ARTICLE 31
AUTHORIZATION

Each party to this Agreement represents to the other that it is fully authorized to enter into this Agreement and to perform its obligations hereunder, and that no waiver, consent, approval, or authorization

from any third party is required to be obtained or made in connection with the execution, delivery, or performance of this Agreement.

**ARTICLE 32
SUCCESSORS**

This Agreement shall be binding upon and inure to the benefit of the Authority, the Consultant, and their respective heirs, executors, administrators, successors, and permitted assigns.

**ARTICLE 33
INTERPRETATION**

No provision of this Agreement shall be construed against or interpreted to the disadvantage of any party by any court, other governmental or judicial authority, or arbiter by reason of such party having or being deemed to have drafted, prepared, structured, or dictated such provision.

**ARTICLE 34
BENEFITS INURED**

This Agreement is solely for the benefit of the parties hereto and their permitted successors and assigns. Nothing contained in this Agreement is intended to, nor shall be deemed or construed to, create or confer any rights, remedies, or causes of action in or to any other persons or entities, including the public in general.

**ARTICLE 35
SURVIVAL**

The parties hereby agree that each of the provisions in the Agreement are important and material and significantly affect the successful conduct of the business of the Authority, as well as its reputation and goodwill. Any breach of the terms of this Agreement, including but not limited to the provisions of Articles 13 and 18, is a material breach of this Agreement, from which the Consultant may be enjoined and for which the Consultant also shall pay to the Authority all damages which arise from said breach. The Consultant understands and acknowledges that the Consultant's responsibilities under Articles 13, 17, 18, and all other obligations of this Agreement related to maintaining records outlined in Article 3 shall continue in full force and effect after the Consultant's contractual relationship with the Authority ends for any reason.

**ARTICLE 36
FORCE MAJEURE**

Either party shall be excused from performing its obligations under this Agreement during the time and to the extent that it is prevented from performing by an unforeseeable cause beyond its control, including but not limited to: any incidence of fire, flood; acts of God; commandeering of material, products, plants or facilities by the federal, state or local government; national fuel shortage; or a material act or omission by the other party; when satisfactory evidence of such cause is presented to the other party, and provided further that such nonperformance is unforeseeable, beyond the control and is not due to the fault or negligence of the party not performing.

IN WITNESS WHEREOF, the parties have executed this Agreement effective on the date and year first written above.

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

CDM SMITH

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Date: _____

Date: _____

APPENDIX A

SCOPE OF SERVICES

I. Purpose

The Consultant shall be expected to support the Authority in its communications and interactions with the Authority's accountants, rating agencies, bond insurers and underwriters, governmental entities, and the public in accordance with the highest professional standards.

The Consultant shall provide qualified technical and professional personnel to perform the duties and responsibilities assigned under the terms of this Agreement. The Authority, at its option, may elect to expand, reduce, or delete the extent of each work element described in this Scope of Services document, provided such action does not alter the intent of this Agreement.

The Authority shall request Services on an as-needed basis. There is no guarantee that any or all of the Services described in this Agreement will be assigned during the term of this Agreement. Further, the Consultant is providing these Services on a nonexclusive basis. The Authority, at its option, may elect to have any of the Services set forth herein performed by other consultants or by the Authority's staff.

II. Services

The Consultant shall be responsible for conducting complex traffic modeling and forecasting, including forecasting of revenues for bond-financed toll projects, and rendering opinions and other analyses concerning traffic and revenue projections as required under the trust agreements governing CTRMA's revenue bond financing for current and future projects.

The Scope of Services to be provided by the Consultant may include, but not be limited to, the following:

- A. Perform all duties imposed on the Traffic Consultant by the Authority's current Trust Agreement, as amended, and all supplemental, superseding, or additional trust agreements, including providing certificates and opinions related to annual reviews, proposed changes in toll rate schedules or toll classifications, and periodic bond issuances.
- B. Develop traffic and revenue projections for the existing CTRMA projects annually and for proposed new projects as requested.
- C. Monitor traffic and toll revenue performance of all facilities open to traffic and respond to questions and inquiries from the Authority; develop pro forma models which would enable the estimation of traffic and toll revenue levels on these facilities on a plaza-by-plaza or gantry-by-gantry basis.
- D. Prepare evaluations, studies, and opinions as necessary to determine recommended toll rates and periodic toll rate adjustments for the Authority's turnpike projects.

- E. Provide and maintain traffic modeling tools pertinent to the CTRMA's projects and potential projects, working closely with the Capital Metropolitan Planning Organization ("CAMPO"), the Texas Department of Transportation ("TxDOT"), and other local planning organizations as necessary, to update economic, demographic, and land use data.
- F. Perform special studies or reports as requested, including peer review analyses, regarding traffic, toll revenues, mobility, toll collection methods, and strategies and related technology and industry trends.
- G. Monitor major economic and other activities which would have an effect of the Authority's traffic and toll revenue estimates; major resources that are consulted on a daily basis include local news, Internet websites, rating agency reports, and economic reports.
- H. Present reports and findings to the CTRMA Board of Directors, rating agencies and investors, local interested parties, or otherwise upon request.
- I. Work at the direction and supervision of the authority's Executive Director, Deputy Executive Director, Chief Financial Officer, and Director of Engineering. The Consultant will also be required to work cooperatively and collaboratively with other firms serving the Authority, including but not limited to the authority's General Engineering Consultant), General Counsel, financial advisors, and Bond Counsel.

III. Subcontracting

Services assigned to subconsultants must be approved in advance by the Authority. Notwithstanding said approval, all responsibility for subcontracted work shall remain strictly with the Consultant. The subconsultants must be qualified by the Authority to perform all work assigned to them.

In the event services of a subconsultant are authorized, the Consultant shall obtain a schedule of rate, and the Authority shall review and must approve, in its discretion, any rates, including overhead, to be paid to the subconsultant.

The Consultant shall be responsible for submitting monthly reports regarding its subcontracting activity including required BOPP reporting.

APPENDIX B

RATE SCHEDULE

PRIME PROVIDER NAME:

CDM Smith Inc.

Labor/Staff Classification	Year 1* Average Hourly Wage Rate (A)	Overhead G & A (B) 168.77%	Profit (C) 10%	Fully Burdened Hourly Labor Rate (Columns A+B+C)
Project Principal/Senior Advisor (15+ Yrs)	\$128.00	\$216.03	\$34.40	\$378.43
Project Director (12+ Yrs)	\$112.00	\$189.02	\$30.10	\$331.12
Project Manager (10+ Yrs)	\$96.00	\$162.02	\$25.80	\$283.82
Engineer III (15+ Yrs)	\$82.00	\$138.39	\$22.04	\$242.43
Engineer II (8-14 Yrs)	\$70.00	\$118.14	\$18.81	\$206.95
Engineer I (1-7 Yrs)	\$36.00	\$60.76	\$9.68	\$106.44
Senior GIS/CADD Technician III (15+ Yrs)	\$49.00	\$82.70	\$13.17	\$144.87
GIS/CADD Technician II (9-14 Yrs)	\$42.00	\$70.88	\$11.29	\$124.17
GIS/CADD Technician I (0-8 Yrs)	\$32.00	\$54.01	\$8.60	\$94.61
Planner/Modeler III (15 + yrs)	\$89.00	\$150.21	\$23.92	\$263.13
Planner/Modeler II (9 -15 yrs)	\$66.00	\$111.39	\$17.74	\$195.13
Planner/Modeler I (0 - 8 yrs)	\$35.00	\$59.07	\$9.41	\$103.48
Senior Toll System Specialist (> 10 yrs)	\$80.00	\$135.02	\$21.50	\$236.52
Toll System Specialist (< 10 yrs)	\$59.00	\$99.57	\$15.86	\$174.43
Senior Project Controls Specialist (>10 yrs)	\$64.00	\$108.01	\$17.20	\$189.21
Project Controls Specialist (1-10 yrs)	\$46.00	\$77.63	\$12.36	\$135.99
Senior Project Administrator/Contract Manager (>10 yrs)	\$46.00	\$77.63	\$12.36	\$135.99
Project Administrator/Contract Manager (1-10 Yrs)	\$40.00	\$67.51	\$10.75	\$118.26
Admin/Clerical (1-5 Yrs)	\$27.00	\$45.57	\$7.26	\$79.83

*Year 1 is from January 1, 2020 through December 31, 2020.

Negotiated Offsite Year 1 OH Rate:	168.77%
Negotiated Profit Rate:	10.00%

SUBPROVIDER NAME:

C J Hensch and Associates, Inc.

Labor/Staff Classification	Year 1*	Overhead G & A (B) 120.00%	Profit (C) 10%	Fully Burdened Hourly Labor Rate (Columns A+B+C)
	Average Hourly Wage Rate (A)			
Support Project Manager (10-20 Yrs)	\$55.00	\$66.00	\$12.10	\$133.10
Senior Traffic Technician (15+ Yrs)	\$25.00	\$30.00	\$5.50	\$60.50
Traffic Technician (5-15 Yrs)	\$20.00	\$24.00	\$4.40	\$48.40
Junior Traffic Technician (0-5 Yrs)	\$17.50	\$21.00	\$3.85	\$42.35
Admin/Clerical	\$22.00	\$26.40	\$4.84	\$53.24

*Year 1 is from January 1, 2020 through December 31, 2020.

Negotiated Offsite OH Rate: 120.00%
 Negotiated Profit Rate: 10.00%

Data Collection Expenses	Unit of Measure	Average Rates (1)
Turning Movement Counts		
2-hour Turning Movement Count, Major Intersection, Weekday	per intersection	\$ 405.00
2-hour Turning Movement Count, Major Intersection, Weekend	per intersection	\$ 425.00
2-hour Turning Movement Count, Minor Intersection, Weekday	per intersection	\$ 230.00
2-hour Turning Movement Count, Minor Intersection, Weekend	per intersection	\$ 250.00
13-hour Turning Movement Count Major Intersection	per intersection	\$ 1,300.00
13-hour Turning Movement Count Minor Intersection	per intersection	\$ 750.00
24-Hour Video System Classification Counts - Major Intersection	per intersection	\$ 1,500.00
24-Hour Video System Classification Counts - Minor Intersection	per intersection	\$ 1,000.00
Intersection Turning Movement Counts - Minor (additional turning movement count hours)	per hour	\$ 200.00
Intersection Turning Movement Counts - Major (additional turning movement count hours)	per hour	\$ 110.00
Intersection Video	per day	\$ 250.00
24-Hour Counts		
24-Hour Automated Tube Counts - Volume	per direction/ per counter/day	\$ 180.00
24-Hour Automated Tube Counts - Speed or Class	per direction/ per counter/day	\$ 275.00
24-Hour Volume Mainlane Video/Radar Count	per lane/day	\$ 175.00
24-Hour 3 Vehicle Classification Main Lane Count	per lane/day	\$ 250.00
24-Hour 13 Vehicle Classification Main Lane Count	per lane/day	\$ 360.00
Additional Traffic Control (no lane closures/detour)	day	\$ 1,500.00
Additional Traffic Control (lane closures/detour)	day	\$ 2,500.00
Speed Surveys		
Curve Speed Survey	per curve	\$ 500.00
Spot Speed Survey	per location	\$ 210.00
Travel Times		
Travel Time Runs in DMI-Equipped Vehicle (Includes labor and mileage on site; processing labor not included)	hour	\$ 210.00
Travel Time- MAC Address Capture	per hour/unit	\$ 90.00
Origin Destination		
72-Hour Bluetooth O/D Main Lane	per unit	\$ 1,100.00
72-Hour Bluetooth O/D Arterial	per unit	\$ 550.00

(1) Calendar Year 2020 rates, which will be updated to include annual escalation for subsequent years.

SUBPROVIDER NAME:

GRAM Traffic North Texas, Inc.

Labor/Staff Classification	Year 1*	Overhead G & A (B)	Profit (C)	Fully Burdened Hourly Labor Rate (Columns A+B+C)
	Average Hourly Wage Rate (A)			
Principal	\$35.00	\$50.75	\$8.58	\$94.33
Field Supervisor (10+ Yrs)	\$35.00	\$50.75	\$8.58	\$94.33
Senior Traffic Technician (15+ Yrs)	\$30.00	\$43.50	\$7.35	\$80.85
Traffic Technician (5-15 Yrs)	\$25.00	\$36.25	\$6.13	\$67.38
Junior Traffic Technician (0-5 Yrs)	\$25.00	\$36.25	\$6.13	\$67.38
Admin/Clerical	\$28.00	\$40.60	\$6.86	\$75.46

*Year 1 is from January 1, 2020 through December 31, 2020.

Negotiated Offsite OH Rate: 145.00%
 Negotiated Profit Rate: 10.00%

Direct Expenses:	Unit of Measure	Average Rates
Mileage	Per Mile	\$ 0.575
Data Collection Expenses	Unit of Measure	Average Rates (1)
One-Way Volume Tube Count (24-hrs)	per location	\$ 120.00
Additional 24-hrs One-Way Volume Tube Count	per location	\$ 80.00
Bi-directional Volume Tube Count (24-hrs)	per location	\$ 140.00
Additional 24-hrs Bi-directional Volume Tube Count	per location	\$ 90.00
Speed, Gap or Classification Tube Counts (24-hrs)	per counter	\$ 150.00
Additional 24-hrs Speed, Gap or Classification Tube Counts	per counter	\$ 100.00
Speed, Gap or Classification Tube Counts - Rural Highways	per direction/per day	\$ 500.00
Video ATRs - basic classification (2-lane road)	per location/per day	\$ 215.00
Video ATRs - basic classification - each additional lane	per lane/per day	\$ 80.00
Video ATRs - premium classification (2-lane road)	per location/per day	\$ 275.00
Video ATRs - premium classification - each additional lane	per lane/per day	\$ 110.00
Video ATRs - Hwy Mainlane - basic classification	per lane/per day	\$ 110.00
Video ATRs - Hwy Mainlane - premium classification	per lane/per day	\$ 165.00
Pedestrian/Bicycle Pathway count (bi-directional)	per day	\$ 240.00
24-Hr Video TMC w/ Bi-D ATR Data - basic class	per intersection	\$ 795.00
24-Hr Video TMC w/ Bi-D ATR Data - premium class	per intersection	\$ 895.00
Additional 24-hrs of bicycles & pedestrians	per intersection	\$ 110.00
Turning Movement Counts - basic class	per hour	\$ 60.00
Turning Movement Counts - basic class with Ped. Junction count	per hour	\$ 90.00
Turning Movement Counts - premium class	per hour	\$ 70.00
Turning Movement Counts - premium class with Ped. Junction count	per hour	\$ 100.00
Pedestrian Pathway Junction count (stand-alone)	per hour	\$ 40.00
Roundabouts - small	per hour	\$ 85.00
Roundabouts - small	per 24-hr	\$ 1,400.00
Roundabouts - large (added Supervisor for >= 5intersections)	per hour	\$ 170.00
Roundabouts - large (added Supervisor for >= 5intersections)	per 24-hr	\$ 1,700.00
Other manual counts	per hour/per counter	\$ 60.00
Speed Studies (Radar or Tube)	per direction	\$ 150.00
Speed Studies (freeway tubes) - additional	per lane	\$ 100.00
Digital Photographs	per intersection	\$ 40.00
Travel Time Runs	per hour	\$ 75.00
Travel Time Runs (GPS TTRs with Video)	per hour	\$ 125.00
Video License Plate Capture with O-D	per lane/per hour	\$ 400.00
Video Traffic Surveillance	per hour	\$ 25.00
Expedited Processing - Video data collection (24-hr) - additional	per hour	\$ 15.00

(1) Calendar Year 2020 rates, which will be updated to include annual escalation for subsequent years.

SUBPROVIDER NAME:**Baez Consulting, LLC**

Labor/Staff Classification	Year 1*			Fully Burdened Hourly Labor Rate (Columns A+B+C)
	Average Hourly Wage Rate (A)	Overhead G & A (B)	Profit (C)	
		155.85%	10%	
Senior Advisor	\$111.82	\$174.27	\$28.61	\$314.70
Senior Transportation Modeler	\$70.19	\$109.39	\$17.96	\$197.54
Administration/Clerical	\$26.50	\$41.30	\$6.78	\$74.58

*Year 1 is from January 1, 2020 through December 31, 2020.

Negotiated Offsite OH Rate: 155.85%
 Negotiated Profit Rate: 10.00%

SUBPROVIDER NAME:

Bomba Consulting, LLC

Labor/Staff Classification	Year 1*	Overhead G & A (B)	Profit (C)	Fully Burdened Hourly Labor Rate (Columns A+B+C)
	Average Hourly Wage Rate (A)			
Senior Economist/Demographer	\$78.00	120.00%	\$17.16	\$188.76
Planner	\$40.00	\$48.00	\$8.80	\$96.80

*Year 1 is from January 1, 2020 through December 31, 2020.

Negotiated Offsite OH Rate: 120.00%
Negotiated Profit Rate: 10.00%

SUBPROVIDER NAME:

Resource Systems Group

Labor/Staff Classification	Year 1*	Overhead G & A (B) 180.71%	Profit (C) 10%	Fully Burdened Hourly Labor Rate (Columns A+B+C)
	Average Hourly Wage Rate (A)			
Senior Advisor	\$137.41	\$248.31	\$38.57	\$424.29
Senior Director	\$97.63	\$176.43	\$27.41	\$301.47
Director	\$76.87	\$138.91	\$21.58	\$237.36
Senior Consultant	\$50.08	\$90.50	\$14.06	\$154.64
Consultant	\$41.08	\$74.24	\$11.53	\$126.85
Senior Analyst	\$35.94	\$64.95	\$10.09	\$110.98
Analyst	\$28.32	\$51.18	\$7.95	\$87.45

*Year 1 is from January 1, 2020 through December 31, 2020.

Negotiated Offsite OH Rate: 180.71%
 Negotiated Profit Rate: 10.00%

APPENDIX C

**WORK AUTHORIZATION
(WORK AUTHORIZATION NO. _____)**

This Work Authorization is made as of this _____ day of _____, _____, under the terms and conditions established in the AGREEMENT FOR TRAFFIC AND REVENUE ENGINEERING SERVICES, dated as of _____, _____ (the "Agreement"), between the Central Texas Regional Mobility Authority ("Authority"), represented by the Executive Director or designee, and _____ ("Consultants"). This Work Authorization is made for the following purpose, consistent with the services defined in the Agreement:

[Brief description of the Project elements to which this Work Authorization applies]

Section A. – Scope of Services

A.1. Consultant shall perform the following Services:

Refer to attached scope letter.

- A.2. The following Services are not included in this Work Authorization, but shall be provided as Additional Services if authorized or confirmed in writing by the Executive Director or designee.
- A.3. In conjunction with the performance of the foregoing Services, Consultant shall provide the following submittals/deliverables (Documents) to the Executive Director or designee: To be determined.

Section B. – Schedule

Consultant shall perform the Services and deliver the related Documents (if any) according to the following schedule: To be determined.

Section C. – Compensation

- C.1. In return for the performance of the foregoing obligations, the Authority shall pay to Consultant the amount not to exceed \$_____, based on the attached fee estimate. Compensation shall be in accordance with the Agreement.
- C.2. Compensation for Additional Services (if any) shall be paid by the Authority to Consultant according to the terms of a future Contract Amendment.

Section D. – Authority’s Responsibilities

The Authority shall perform and/or provide the following in a timely manner so as not to delay the Services of the Consultant. Unless otherwise provided in this Work Authorization, the Authority shall bear all costs incident to compliance with the following:

Section E. – Other Provisions

The parties agree to the following provisions with respect to this specific Work Authorization:

Except to the extent expressly modified herein, all terms and conditions of the Agreement shall continue in full force and effect.

AUTHORITY:

CONSULTANT:

CENTRAL TEXAS REGIONAL

CDM SMITH

MOBILITY AUTHORITY

By: _____
 Name: _____
 Title: _____
 Date: _____

By: _____
 Name: _____
 Title: _____
 Date: _____

APPENDIX D

SUBCONSULTANTS

C J Hensch & Associates:

*Carol Hensch
President
5215 Sycamore Avenue
Pasadena, TX 77503
Ph: (281) 487-5417*

Gram Traffic NTX:

*Stephanie Swenson
President
1120 W Lovers Ln
Arlington, TX 76013
Ph: (817) 265-8968*

Baez Consulting, LLC:

*Gustavo A. Baez
President
706 Nocona Court
Allen, TX 75013
Ph: (214) 864-9619*

Bomba Consulting, LLC:

*Michael S. Bomba, Ph.D.
President
3410 Far West Blvd., Suite - 254
Austin, TX 78731
Ph: (512) 217-8411*

Resource Systems Group:

*Mark Fowler
Director
180 Battery St., Suite - 350
Burlington, VT 05401
Ph: (802) 861-0504*

APPENDIX E

KEY PERSONNEL

Title	Employee Name
Principal in Charge/Project Director	Christopher E. Mwalwanda
Project Manager	Phani Rama Jammalamadaka
QA/QC Director	Hugh W. Miller
Technical Advisor	Kamran A. Khan
Principal Modeler	Mustafa Kamal
Investment Grade Advisor	Kamran A. Khan
Task Manager/T&R Forecasting	Bikash Gautam

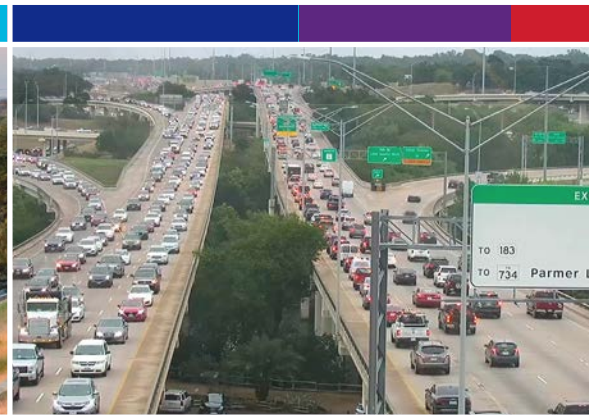
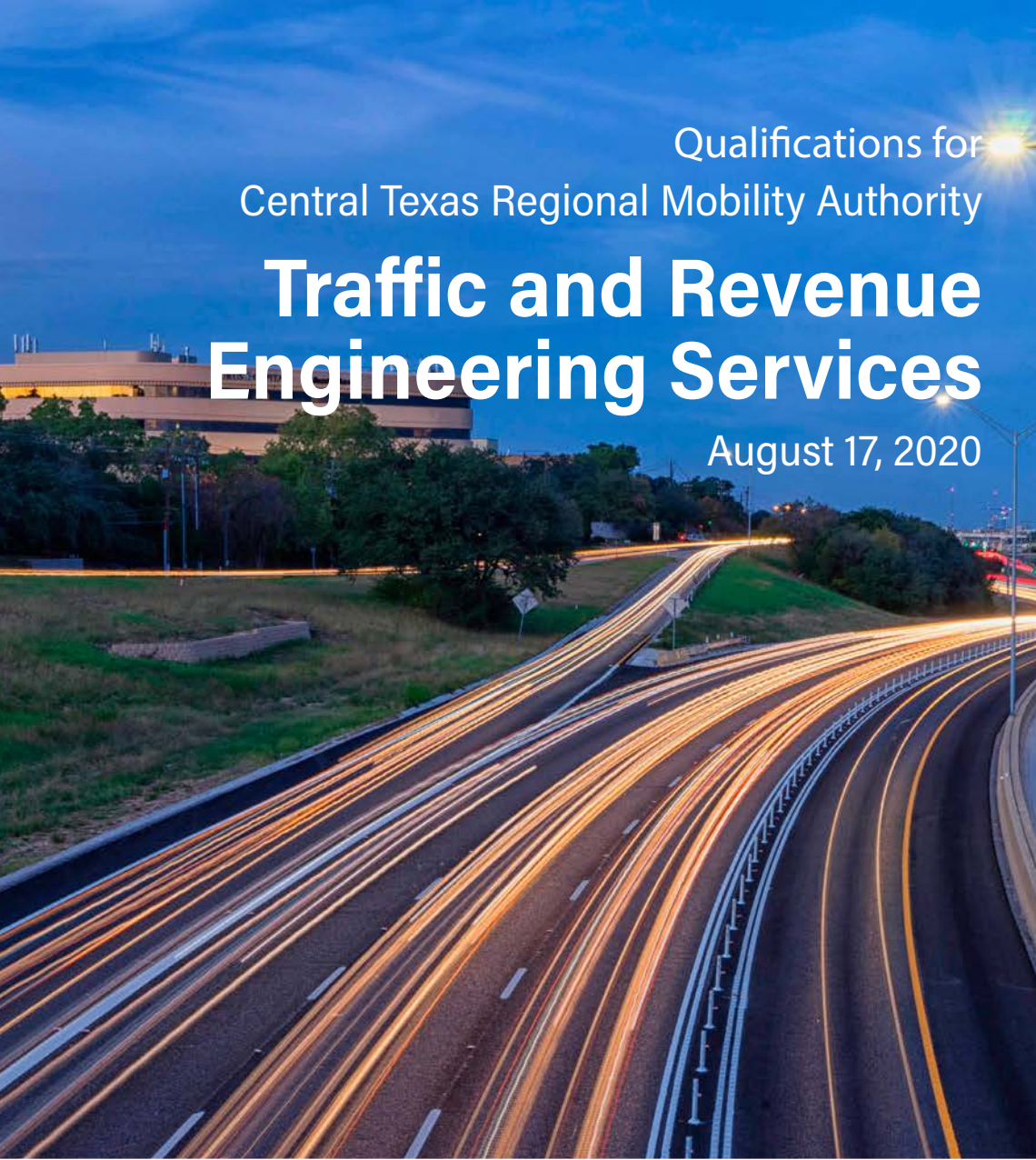
APPENDIX F

CONSULTANT STATEMENT OF QUALIFICATION

Qualifications for
Central Texas Regional Mobility Authority

Traffic and Revenue Engineering Services

August 17, 2020



**CDM
Smith**

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August 17, 2020

Mr. William Chapman
Central Texas Regional Mobility Authority (CTRMA)
3300 N IH 35, Suite 300, Austin, TX 78705

Subject: Traffic and Revenue (T&R) Engineering Services

Dear Mr. Chapman,

Thank you for the opportunity to submit our response to the RFQ for T&R consulting and traffic engineering services for the CTRMA. As a toll industry leader, CDM Smith believes we are the best team for the job. For more than six decades, CDM Smith has been providing our toll agency clients with reliable information and thoughtful solutions. Our T&R forecasts have **supported more than \$120B** in critical transportation improvements worldwide. We provide trust indenture services and routine monitoring and traffic engineering services to several public toll agencies across the U.S. **We have worked closely with CTRMA over the past 11 years, supporting several T&R studies within the Central Texas region, traffic engineering and T&R monitoring services, dynamic pricing evaluation, express lanes operation analysis, and technical assistance, and we look forward to building upon this successful relationship.**

We understand that fulfillment of your mission necessitates the retention of a nationally-recognized T&R engineer for independent T&R studies and certifications supporting toll revenue bond sales, refundings, and refinancings to finance the agency's operations, maintenance, and capital programs. The T&R Engineer also plays a critical role in annual budgeting, financial reporting, traffic operations and safety, and certification of all changes in toll rates. We recognize that the T&R Engineer role extends well beyond these responsibilities. As your current T&R engineer, we bring many of the warranted attributes and we place a high value on serving as CTRMA's trusted advisor—providing a link to the world of transportation finance and

policy, forecasting, planning, and innovations in technology and operations. In this capacity, we provide independent, objective advice with the benefit of national expertise, while being mindful of the local and regional context—we are locally-based, regionally-focused, with a national reach.

An effective T&R Engineer must be able to quickly respond to the rapidly-evolving challenges and opportunities presented to CTRMA. This can only be achieved through effective communication between the T&R Engineer and CTRMA. The T&R Engineer must be a partner and source of reliable information primarily for the Finance Department, while supporting the Project Delivery, Communications/Public Affairs, and Maintenance Departments. We bring to you a team that has been effective and successful in achieving this. The strong working relationships we have built are made possible by having a team of transportation and tolling professionals located near your headquarters. With local tolling staff in the Austin region with reliable and relevant expertise, we will continue to offer CTRMA the dependable level of service you have come to trust in supporting your program.

LEADERS IN TRANSPORTATION

CDM Smith is a regionally-located, global engineering firm with experts who work together—in teams and in partnership with our clients—to solve transportation challenges. Our breadth of services enables us to take transportation projects from conceptual ideas to constructed reality.

BENEFITS OF THE CDM SMITH TEAM TO CTRMA



PROVEN T&R SERVICE
Trusted partners with nationwide successes and lessons learned.



INSTITUTIONAL KNOWLEDGE
More than 11 years of dependable regional support.



FINANCIAL CREDIBILITY
Reliable forecast methodologies that instill confidence.



TRUSTED LEADERSHIP
Proven and direct CTRMA experience.



LOCAL RESOURCES
Dedicated to quality and timely delivery.



DELIVERED INNOVATION
Creative tools and processes for T&R services.

CDM Smith's local, trusted team's deep understanding of the region, technical expertise, national tolling experience, and thought leadership will help ensure successful delivery of CTRMA programs. We will support CTRMA to position itself to meet future challenges and achieve your vision.

Our History: In 1947, Camp Dresser & McKee Inc. was formed to serve clients with high-quality engineering services. Over time, our firm has grown, and joined forces with Wilbur Smith Associates in 2012 to expand our capabilities and resources as a leader in the transportation industry. With a combined 140 years of engineering excellence, we now provide multidisciplinary consulting, engineering, operations, and construction services with a staff of nearly 5,200 across 125 offices worldwide.

Our Proven Track Record: Since entering the toll industry in the 1950s, we have performed tolling services in 46 states for dozens of transportation clients. As the national leader in T&R forecasting and managed lane projects, we have [completed T&R studies for bond issuances representing 60 percent of the industry and supported more than \\$120 billion in bond issuances.](#)



Our Staff Capabilities: With more than 85 staff devoted almost exclusively to the US toll industry, our tolling capabilities span the gamut of CTRMA's needs. This includes

T&R forecasting, economics and finance, and toll technology and operations planning to develop regional strategies, toll facility planning, and evaluating pricing mechanisms to manage congestion and improve mobility.

Project Plan, Methodology & Approach

The majority of our services will be provided by our Austin and other Texas office staff—our local transportation experts encompass transportation finance, forecasting, technology and operations, and traffic engineering. A majority of our staff that assist CTRMA are long-time residents of the area with a deep understanding of transportation issues in Central Texas. Estimation of future travel demand is greatly aided by this knowledge of the local transportation network, economics, land use, and political influences. Our long-term relationships with municipalities and local and regional transportation authorities result in an exceptional understanding of local technical resources and challenges. Overall, CDM Smith employs more than

CDM Smith has Served as CTRMA's Trusted Partner for More than 11 Years

RESPONSIVE

Whether asked for a traffic impact estimate in just days or a T&R report in months, we produce memos, white papers, and reports with the accuracy and quality that you deserve and expect. This is made possible due to our dedicated local expertise and national industry perspective, which allows us to respond quickly and with confidence.

TRUSTWORTHY

We are viewed favorably by toll bond underwriters, rating agencies, and other transportation agencies, meaning that when CTRMA needs a reliable representative, you can trust our independent, expert opinions. Having supported more than half of all U.S. toll revenue bond sales over the last decade, our T&R forecasts continue to be trustworthy in the financial community.

VERSATILE

We provide extensive services outside of the traditional T&R Engineer role, including commercial vehicle usage evaluations, public outreach assistance, and traffic operations analyses. We have a strong track record of fulfilling your specific needs, and we will continue to meet or exceed your expectations for product quality and technical expertise.



INNOVATIVE

We remain at the forefront of technological advances for mobility alternatives and transportation options in the near future. We are part of the national conversation regarding advancements in transportation funding solutions and delivery. In addition, we are involved in studying the broader-scale implementation of connected and autonomous vehicles and are building those impacts into our traffic projections and analyses.

ACCURATE

Drawing upon decades of experience in the tolling industry with dozens of agencies, CDM Smith delivers dependable forecasts that build trust with rating agencies and investors. The accuracy of our forecasts provides a strong foundation upon which CTRMA develops budgets and plans for capital programs, which enhances CTRMA's infrastructure and operations.

85 nationally-recognized toll industry experts in Texas, Washington, Florida, Illinois, and Connecticut—more toll experts than our competitors combined.

SPECIFIC SERVICES—CONTINUOUSLY DELIVERED

Your RFQ identifies several key areas in which the T&R engineer is expected to support CTRMA. As one of your current T&R engineers, CDM Smith successfully carries out all duties prescribed under the scope of work, while supporting CTRMA's frequent/day-to-day services, periodic/routine services, and long-term/specialized services.

Commitment to Business Diversity

We are committed to meeting CTRMA's DBE/HUB commitments. GRAM NTX, C J Hensch & Associates, and Baez Consulting are DBE/HUB firms on our team. In addition, several key staff on this contract are women and/or minorities.

Summary

As you review the enclosed response, we encourage you to consider the following differentiators that set CDM Smith apart:

- Local Austin and Texas team with a deep regional understanding and a bench of more than 85 T&R consulting experts dedicated to this unique field
- Technical excellence and knowledge having supported more than 1,000 tolling studies nationwide, including more than 200 investment grade studies for existing and start-up toll facilities
- Unparalleled express lane T&R, pricing, and operational analyses support having supported more than half of operating express lane facilities

Office from which the project will be managed:

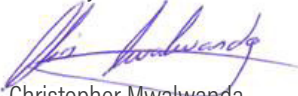
9430 Research Boulevard, Suite 1-200, Austin, TX 78759
Phone: 512.346.1100

- Financial community credibility having supported approximately 60 percent of all toll revenue bond issues in the U.S. over the last decade
- A team that supports all the major toll agencies within the state of Texas and has been instrumental in the financing of the majority of toll infrastructure within the state

CDM Smith has assembled a team of which you will have immediate and unlimited access. These professionals will provide CTRMA with responsive, high-quality advice and services, leveraging lessons learned from previous successes within the region and the state. Our diverse staff, broad scope of service offerings, and teaming partners allow us to adapt quickly as your needs evolve.

We sincerely appreciate the opportunity to submit our qualifications and look forward to assisting CTRMA in planning and building sustainable transportation infrastructure to help meet anticipated demand, provide economic stability, and benefit future generations. I will serve as the primary contact for this response. Should you have any questions or concerns, please do not hesitate to contact me at mwalwandace@cdmsmith.com or 512.652.5355.

Sincerely,



Christopher Mwalwanda
Vice President
CDM Smith Inc.

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Statement of Qualifications

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Section I The Firm

For 60+ years, CDM Smith has provided consulting engineering services to tolling agencies across the country for planning, design, construction, and operations projects. The depth of our tolling experience—totaling 1,000+ studies—and the successful delivery of comprehensive T&R analyses is unparalleled in the industry.

CDM Smith is an employee-owned corporation providing lasting and integrated solutions in transportation, water, environment, energy, and facilities to public and private clients worldwide. As a full-service consulting, engineering, construction, and operations firm, we deliver exceptional client service, quality results, and value across the entire project life-cycle.

In T&R specifically, we have a strong record of accomplishments spanning more than six decades of toll facility support, totaling more than \$120B in bond finance.

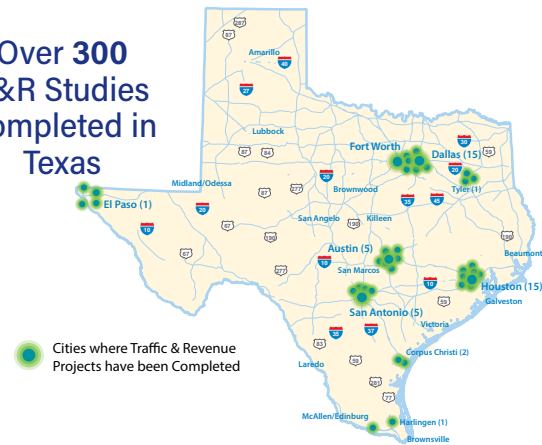
We provide independent forecasts and maintain respect and credibility with rating agencies and the financial community. Our T&R expertise involves a range of services covering economics, travel profiles, detailed travel modeling, behavioral research, and much more.

PROVEN T&R SERVICE

CDM SMITH: 60+ Years of Transportation/Tolling Experience

We are the nation's leading T&R expert, serving the country's largest tolling agencies and supporting multi-million-dollar capital budgets. CDM Smith has worked with 50+ tolling agencies for more than 1,000 T&R activities. Our efforts with these clients inform our national perspective for peer toll systems and the industry. We are working in many states to help address transportation funding challenges—we assist DOTs and tolling agencies in developing statewide strategies and toll facility planning and in evaluating pricing mechanisms to manage congestion and improve mobility. Our public-private partnership (P3) division has played a role in nearly every major toll privatization initiative in the U.S. since 1980, with P3 experience in 20 states. We have staff members who are industry leaders and experts in all modes of transportation.

Over 300 T&R Studies Completed in Texas

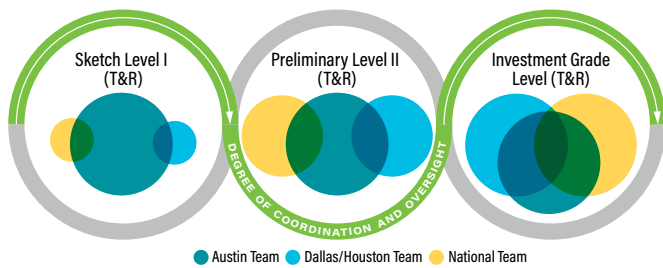


CDM Smith is also considered a leader in toll industry innovations—we supported our clients in pioneering many firsts that include the ETC systems implemented, followed by open road tolling, high-occupancy toll (HOT) lanes, variable pricing, and conversion to cashless toll collections.

In addition, CDM Smith has provided services for nearly all the operational managed lanes in the country. **We have tolling service experience in 46 states, with bonds issued using CDM Smith studies in 25 states. We have evaluated over 300 T&R studies in Texas, with work on a majority of toll road and express lane facilities in Texas.**

A. Capabilities and Resources of Principal Office and Personnel

Our Austin office will serve as the principal office responsible for performing this work. This office consists of over 10 T&R experts and is part of a large nationwide division with more than 85 staff members dedicated to providing specialized services to the toll industry located in Dallas, and Houston in Texas; California/Washington; Hartford, Connecticut; Lisle, Illinois; and Maitland, Florida. Our T&R staff deal exclusively in T&R analysis and bring a broad range of experience in the areas of complex travel demand modeling, toll revenue estimation, toll sensitivity analyses, toll rate adjustment analyses, congestion pricing assessments, traffic engineering, economic trending, and data collection and analysis that includes speed and delay, traffic counts, origin/destination, and behavioral stated preference surveys. On investment grade studies, where more detailed coordination to meet the quality and expectations of the financial community is needed, staff from various offices will be involved, while sketch and preliminary level analyses are predominately performed by our Austin office.



This represents the level of coordination anticipated between the regional Texas offices and other various CDM Smith offices and the level of oversight that will be implemented for each project as it moves through the toll feasibility levels.

Christopher Mwalwanda, the designated project principal/director in Austin, has a master's degree in traffic modeling with more than 20 years of experience in traffic engineering, complex travel demand modeling, traffic simulation, report writing, public presentations, and creation of innovative tools for toll traffic demand modeling applications and has supported over \$18 billion in T&R bond financing. Our project manager **Phani Jammalamadaka**, currently serving as PM for the existing CTRMA T&R contract, has a master's degree in transportation and more than 16 years of experience in leading complex toll road and express lane projects across the nation, supporting more than \$15 billion in toll road financing/refinancing for both public and private agencies for numerous toll projects including the MoPac North and MoPac South Express Lanes, NTTA System facilities, HCTRA System facilities, Grand Parkway System, several express lane facilities in Florida, E-470 in Denver and Oklahoma Turnpike System.

The CDM Smith team has also worked on many projects within the state, including the MoPac North Express Lanes, MoPac South Express Lanes, CTTS Peer Review, US 183 Express Lanes, US 290 Peer Review, SH 130 Segments 5 & 6, Trans-Texas Corridor 35 (TTC-35), and RM 2222 and many more within the Central Texas region, the I-35E Express Lanes, LBJ Express Lanes, North Texas Tollway Authority System, and North Tarrant Expressway (NTE) in the Dallas region; Toll 49 initial system and Segment 4 projects in Tyler; and the bulk of all major corridors within the Houston region. **An organizational chart and details of key Texas office personnel is provided in Section II.**

B. Experience Providing Complex Traffic Modeling and Forecasting Tools

The firm is currently involved in a similar capacity as being sought by CTRMA with the following major Texas toll authorities: HCTRA,

NTTA, NET RMA, BCTRA, MCTRA, FBCTRA, and the Texas Department of Transportation (TxDOT). As traffic consultants to these agencies, CDM Smith has performed a wide variety of traffic and revenue related services that include: traffic modeling and annual toll revenue forecasting and monitoring, trust indenture reviews and certification, toll rate structure recommendations, toll covenant safeguards, peer review services for Transportation Infrastructure Finance and Innovation Act (TIFIA) applications, local technical coordination, and overall transportation system monitoring. The support for more than \$120 billion in toll bond finance, including bond issuance for start-up and mature systems, is a testament to CDM Smith's continued success.

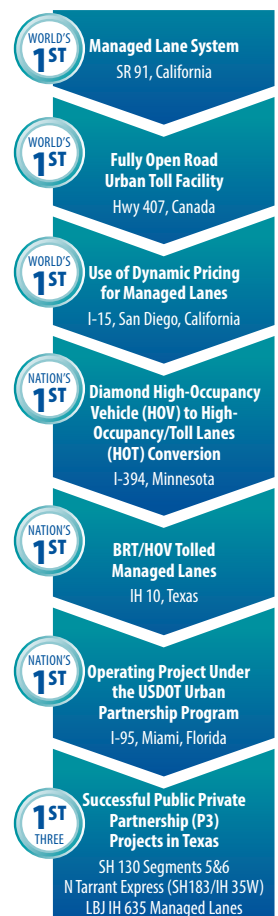
CDM Smith has extensive experience in Texas and other states across the nation in corridor traffic studies, to assist with the environmental assessment and project design support. Our expertise is in modeling and evaluation of design options for express and general use lane improvements and express lane access, environmental studies of mobile source air toxics, and project and regional environmental justice toll impact assessments.

CDM SMITH BRINGS INNOVATION TO EVERY TASK UNDERTAKEN

The comprehensive CDM Smith tolling experience from planning concepts to final implementation and monitoring nationally, has enabled CDM Smith to develop state-of-the-art techniques, tools, and databases necessary to support financing of toll facilities and bring innovation and efficiencies into every aspect of CDM Smith's T&R services.

CDM Smith takes pride in being widely recognized as a leader for confronting an ever-changing environment with innovation. Current corporate leadership continue to blaze new trails, particularly in the areas of next

CDM Smith is committed to continuously advancing the state-of-the-practice to higher levels to better serve the industry as shown by this list of many firsts we have supported.



generation tolling applications—from all-electronic toll collection conversions to vehicle-miles-traveled tolling research—CDM Smith remains committed to the toll industry and our clients. We have developed and undertaken many special studies and reports to highlight critical and relevant findings of trends within the toll industry and have presented these in multiple industry forums, including IBTTA, TRB, ARTBA, WTS, and other regional conferences. Our team brings to CTRMA:

- **Comprehensive understanding of regional travel patterns:** The CDM Smith team has undertaken numerous toll studies within the greater Austin region and thus has a solid understanding of the regional demographics, key movements and distribution of traffic throughout the region, for example our work on MoPac North/South Express Lanes and US 183A.
- **Unmatched understanding of the toll behavioral characteristics:** Our current work pertaining to toll market behavioral assessments for other tolled and express lane facilities nationwide and in the region provides some unique perspectives on the value-of-time/value-of-reliability distributions and factors affecting the traveling markets willingness-to-pay characteristics and state-of-the-art procedures in the collection of these.
- **Unique toll diversion, toll setting, and risk analysis methodologies:** We have pioneered many of the industry standard methodologies being implemented for toll feasibility assessments to bring to CTRMA a state of the practice perspective in the development of the models and tools to assist in effectively informing decision makers. Our toll diversion methodologies are anchored in our observation of many express lane and tolled facilities around the country to lend further credibility to the developed and modeled results. Our dynamic pricing tools assist to improve the operational characteristics and/or to maximize the toll revenue of toll facilities and express lanes projects. Our cutting-edge risk analysis tools, techniques, and processes informed decisions regarding potential new tolling projects using Monte Carlo simulation. Our participation with IBTTA/TRB informs many special reports/white papers discussing all-electronic tolling (AET) conversion waterfall leakage models, impacts related to emerging technology initiatives for interoperability, autonomous /connected vehicles (AV/CV), and scenario planning for other disruptive technologies.
- **New tools for toll express lane operational analysis:** We have worked with every operational model platform and bring specialized approaches to incorporate these into feedback loops with the overall regional travel demand models. Development of VISSIM, CORSIM, and mesoscopic or alternative queue accumulator operational model to capture and refine the weaving and merging frictional characteristics associated with a project configuration. These specialized tools assist in the evaluation of operational characteristics of express lane projects and elasticities to toll rates and various project configurations.
- **Innovative use of data sources and analytics techniques:** We are constantly exploring new and innovative methods to collect and support our various assessments. This ranges from data sources such and INRIX for speed and delay profiles to StreetLight Data and AirSage data for origin-destination patterns. Our market research firm Resource Systems Group Inc. uses innovative capture techniques to evaluate and identify the key markets and drivers influencing values-of-time and travel characteristics of various user groups such as commuters, recreational travelers, carpoolers, transit riders, and commercial vehicles. We use cutting-edge software platforms to analyze very large datasets and interactive HTML-based dashboard interfaces and use Artificial Intelligence (AI) and machine learning to support monitoring and data processing elements.
- **Exemplary understanding of key influential drivers:** The levels and approaches to evaluating the diverse and different markets as it pertains to commuter traffic versus long-distance through-trip markets is something that the CDM Smith team has undertaken across the country. We have a unique understanding of the key influential factors that must be evaluated and the source databases that must be referenced in supporting the development and correlations to traffic generation. This understanding provides CTRMA with the confidence that the CDM Smith team will bring a defensible and robust assessment.
- **Full service thought leaders and pioneers:** The CDM Smith team provides a full cadre of specialized expertise to support the many needs that may arise in support of the CTRMA's T&R service needs. Our project principal and project manager and key

staff members have the unique background and longstanding experience having performed multiple T&R studies within Austin and other metropolitan areas in Texas and the nation. Our team is also skilled in the toll technology implementation process and back office support needed for electronic collection, video billing, pay-by-mail, and other toll payment alternatives.

- COVID-19 Related T&R Impacts Modeling:** To address the uncertainty and quantify potential T&R impacts of the COVID-19 pandemic, CDM Smith developed and applied scenario planning models to assist several toll agencies to assist with budgeting, bond refinancings and discussions with rating agencies/financial community. These models include scenarios based on our best understanding of travel restrictions that are mandated, followed by different phases of activity that will gradually be permitted. Given the uncertainty related to how this pandemic will play out, multiple scenarios are being developed assuming different phases of recovery, varying the duration and severity of impacts. COVID-19 related T&R impacts assessment is being done for the following clients: Illinois Tollway, E-470, TxDOT, MDTA, HCTRA, MDX, CFX, Pennsylvania Turnpike, New Jersey Turnpike, South Jersey Turnpike, NET RMA, and Oklahoma Turnpike.

C. Firm's Traffic and Revenue Engineering Experience

CDM Smith has supported many toll authorities for trust indentures and has developed procedures and dashboard tools to assist with system monitoring. These tools assist in evaluating various factors that may affect CTRMA's traffic and toll revenues. We have extensive experience in providing annual reviews, short- (monthly/quarterly) and long-term forecasts as required by trust indentures for distribution to the bond holders. CDM Smith has issued T&R certificates in support of the financing or refinancing efforts of more than \$120 billion in bonds, \$33 billion for tolled facilities within Texas. As part of an agency's annual budgeting process, the monitoring tools we use support the short-term forecasting of system revenues. They help us understand national, regional, and local transportation trends and, more specifically, toll road trends. **Our team brings extensive experience and a deep understanding of how to meet the financial community's expectations**, which is invaluable as CTRMA pursues innovative financing delivery mechanisms. In addition,

CDM Smith has supported toll agency clients with TIFIA application process. **Appendix A** table A-1 shows a recent representative projects that obtained a TIFIA loan based on CDM Smith T&R estimates. Additional services rendered as part of the trust indenture requirements may include capital improvement plan changes, toll rate policy changes, system connectivity changes, project scope changes or enhancements, and facility widening projects. Our T&R experience ranges from initial screening/conceptual all the way through to investment grade T&R studies - that includes traffic count collection, stated preference surveys, origin-destination surveys, economic land use and socioeconomic tracking, model refinements, T&R estimation, and sensitivity testing and risk analysis. CDM Smith has extensive experience in the use and enhancement of existing planning models to facilitate the evaluation of toll facilities at various levels of feasibility, as illustrated in **Appendix A** table A-2.

The combination of our experience, knowledge, and innovative analysis methods will assist CTRMA in presenting to investors, implementing new projects, and maintaining existing operations.

D. Firm's Traffic Modeling Experience

The firm's Texas toll finance professionals are continually refining or developing new and innovative tools to monitor, forecast and analyze T&R projections for existing and proposed toll road projects. These tools have increased our data processing efficiency and helped summarize origin/destination and stated preference survey databases. We have also developed mechanisms to streamline the interaction between modeling and simulation software packages as well as complete comprehensive evaluations of historical socioeconomic trends. The CDM Smith team is extremely proficient in advanced technology and complex transportation engineering software programs including Synchro/SimTraffic, CORSIM, VISSIM, TransCAD, and CUBE Voyager.

CDM Smith was involved with the very first express lane system, SR 91 in California, and has performed services on over 50 percent of the nation's express lane systems. Backed by this wealth of experience, we know the kinds of data to be collected, including traffic counts, travel times, economic data, historical growth, etc., as well as how to develop, calibrate, and analyze models to determine the appropriate balance for reduced congestion and revenue potential. CDM Smith's approach to forecasting express lanes usage, toll rates, and revenue

is a proven method, with years of experience on real projects. Our express lane approach combines the broader elements of global demand patterns and growth with a more focused corridor model and simulation model that can properly analyze and respond to the unique interactions between the general purpose lanes and the parallel express lanes over a variety of demand levels. We clearly understand the data needed to form a solid foundation from which to calibrate and base our modeling approach on. We also understand the policy trade-offs that can materially affect revenue generation (positively and negatively) for a express lane facility.

The 4-step travel demand modeling expertise our team brings from working with many regional MPO models across Texas will provide the benefit of first-hand experience as key enhancements as CTRMA continues the development of projects such as the MoPac South Express Lanes project.

CDM Smith has also led several projects on the planning, design, testing, evaluation, and deployment of technology. We are leading the advanced connected and autonomous vehicle (CV/AV) platooning deployment program in Columbus, Ohio under the Smart City Columbus initiatives where our team is modeling the impacts of CV/AV on multimodal travel behavior and the transportation infrastructure. As new advancements, such as CV/AV and shared mobility, are implemented on a wider scale, they pose new challenges to transportation planners. In anticipation of emerging trends, CDM Smith is developing scenario planning models to assist transportation agencies to better prepare for uncertainties and make smarter investments for future mobility.

E. Firm's Toll Rate Analysis Experience

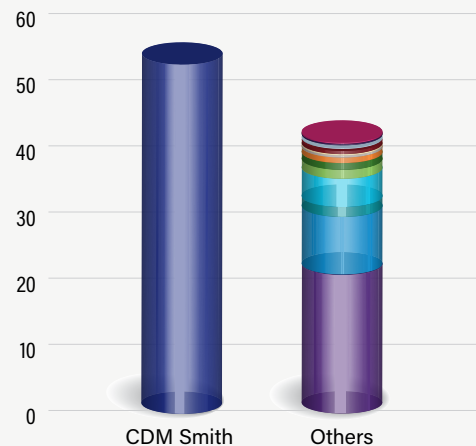
By drawing upon our diverse toll industry experience both nationally and around the globe, CDM Smith staff has provided innovative expert opinions to help clients make informed decisions. Databases compiled through our many clients allow us to evaluate trends and patterns to establish historical benchmarks and tools upon which we can draw when undertaking studies and formulating opinions. CDM Smith has developed computer software designed specifically to estimate motorists' sensitivity to toll charges, an invaluable tool in any comprehensive toll sensitivity analysis that includes periodic toll rate adjustment analysis. Innovation in our analyses has also led to the development of a toll rate database and the tracking of toll traffic characteristics from around the country informs our recommendations



FINANCIAL CREDIBILITY

CDM Smith's Record of Over \$120B in Bond Issues Outranks the Competition

With the CDM Smith name, CTRMA gains recognition and confidence from the rating agencies and markets, which is often important for bond sales.



Total Value of Revenue/Refunding Bonds Issued (01/2010–7/2020)

Data Chart Sources: MuniOS, EMMA, Official Statements

to our toll agency clients on potential refinements to the tolling policies or dynamic pricing algorithms to achieve the required mobility or revenue objectives.

CDM Smith's continuous innovation and expansive expertise will assist CTRMA to ensure timely and on budget delivery of high quality results that are defensible and are accepted by the financial community. Specifically, our toll rate evaluation is unmatched, given the advice we provide to a majority of the public toll agencies in the US.

F. Summary of Professional Fees

Every aspect of our operation is designed to provide CTRMA with the greatest value through the highest quality products, the highest level of customer service, and the highest level of responsiveness without any wasted effort or extraneous expenses. Our work authorizations have been and will continue to be based upon actual labor costs multiplied by the firm's audited overhead rate resulting in a loaded labor cost figure. The loaded labor is then multiplied by the agreed upon profit percentage resulting in the total labor fee. We will work closely with CTRMA to develop the scope, schedule, and budget for each new work order that establishes the appropriate level of effort and cost for each new work assignment based on what CTRMA is trying to accomplish and will be subject to final approval by CTRMA

before issuance of a formal notice to proceed or before any work commences. We will recommend services and the appropriate level of effort for the proposed assignment and work closely with CTRMA to ensure the fee works within your budgetary constraints under a lump sum for well-defined and scoped requests, cost plus fixed fee for typical complex preliminary or investment grade studies, or specified rates for meeting support and technical services as needed.

A schedule of professional fees will be negotiated and will include an average and a maximum hourly rate for each respective labor classification. Both the average and maximum hourly rates will be subject to annual adjustments accounting for annual salary adjustments. The average hourly rates will be used in the calculation of work authorization fee estimates based upon the anticipated level of effort required for each classification. Staff charged time to a particular project will be invoiced on a monthly basis, maintaining the maximum amount agreed upon for each work authorization. Our hourly rate, multiplied by the number of hours worked determines the raw labor cost. The raw labor is then multiplied by the firm's audited overhead rate resulting in a loaded labor cost figure. Direct expenses and outside professionals (subconsultants) costs are then added arriving at the final invoiced amount. CDM Smith typically invoices all active contracts on a monthly basis.

G. Conflicts of Interest

CDM Smith is not aware of any conflicts or potential conflicts of interest.

PRIOR/EXISTING RELATIONSHIPS WITH CTRMA

As the current T&R consultant to CTRMA, CDM Smith has professional

working relationships with all CTRMA staff, board members, consultant team members, and the executive director. CDM Smith has a variety of contractual relationships with both Atkins and WSP through existing contracts with TxDOT, NET RMA, and various other clients.

OTHER PRIOR/EXISTING RELATIONSHIPS

CDM Smith provides extensive planning, engineering, and consulting services to TxDOT on several contracts throughout the state, including within CTRMA's member area. CDM Smith also provides services to the cities of Austin, Georgetown and Round Rock, and Brazos River Authority. In addition, CDM Smith is on the bench contract for T&R study peer reviews for TIFIA.

CTRMA'S CONFLICT OF INTEREST POLICY

CDM Smith has reviewed and will comply with CTRMA's Conflict of Interest disclosures policy adopted by the CTRMA Board.

Section II

Firm Organization, Staffing, and Procedures

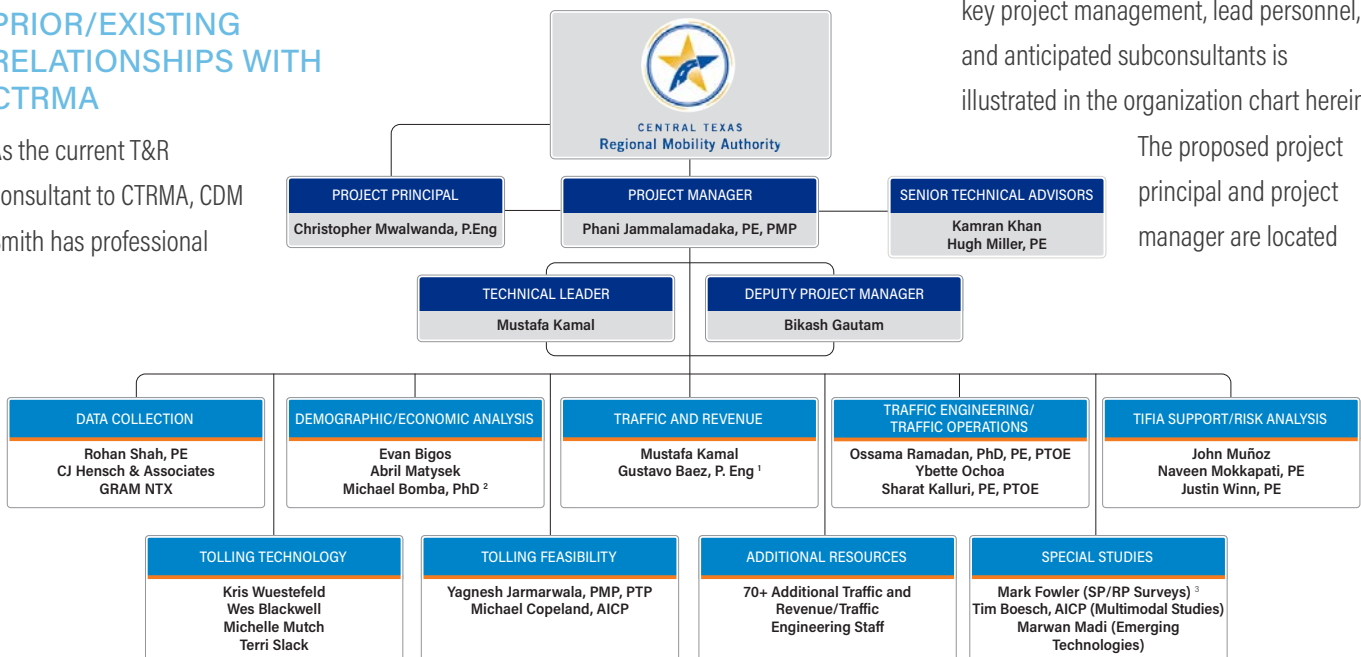
For more than 11 years, CDM Smith has diligently partnered with CTRMA's staff, board of directors, and customers. Our key personnel have been working for you for nearly 11 years and are committed to continuing to provide you with industry-leading T&R consulting services.

A. Organizational Chart

The proposed organizational structure for the CTRMA contract with

key project management, lead personnel, and anticipated subconsultants is illustrated in the organization chart herein.

The proposed project principal and project manager are located



LEGEND: Baez Consulting 1 | Bomba Consulting 2 | RSG 3

in CDM Smith's Austin and Dallas offices, respectively. Austin will be designated as the principal office reporting directly to CTRMA. Phani Jammalamadaka, project manager, will be assisted by Bikash Gautam and Mustafa Kamal, who will serve as deputy project manager and technical leader, respectively, to provide the day-to-day contact and interface with the CTRMA staff. Phani, Bikash and Mustafa have experience in managing large and complex toll projects and bring an extensive knowledge base and expertise regarding T&R services.

CDM Smith personnel located in our Illinois, California, Florida, Washington, and Connecticut offices will be used as warranted, based upon the scope and the complexity of the individual projects and the schedule requirements of CTRMA. **Christopher Mwalwanda, as a vice president, has full authority to obligate the company contractually and to mobilize and commit resources to assure appropriate staffing levels for all assignments.**

OUR SUBCONSULTANTS WILL LEVERAGE LOCAL AND INSTITUTIONAL KNOWLEDGE TO SUPPORT THIS CONTRACT

We have enlisted the support of the following subconsultants:

BAEZ CONSULTING: 20+ YEARS OF TRANSPORTATION/TOLLING EXPERIENCE

Baez Consulting, LLC (Baez) specializes in forecasting traffic and toll revenue for transportation projects. Gustavo A. Baez, president, has 21 years of experience in toll feasibility studies, travel demand modeling, congestion pricing, risk analysis, economic growth evaluation and traffic simulation. He has participated in more than \$20B in bond financing for toll projects in the USA. Gustavo has managed, directed, and evaluated toll projects for public entities such as NTTA, ArDOT, LaDOTD, CTRMA, Alamo RMA, NET RMA, TxDOT's TTA Division, the Hidalgo County RMA, and OTA.

C J HENSCH & ASSOCIATES: 23 YEARS OF TRAFFIC DATA COLLECTION EXPERIENCE

Established in 1995, C J Hensch & Associates is a Houston-based corporation. The firm specializes in traffic data collection and provides engineering studies for governmental agencies, engineering firms, and developers. C J Hensch has well-qualified staff and modern equipment available to conduct multiple data collection efforts simultaneously.

GRAM TRAFFIC NTX: 15 YEARS OF TRANSPORTATION DATA COLLECTION EXPERIENCE

GRAM NTX provides traffic data collection services for projects that range from small intersection analyses to large-scale, area-wide data collection programs. Specific services provided include video license plate surveys, ATR counts, turning movement counts, parking surveys, radar speed studies, ball-bank studies, and travel time studies.

BOMBA CONSULTING: 25 YEARS OF DEMOGRAPHIC/ECONOMIC ANALYSIS EXPERIENCE

Bomba Consulting prepares transportation planning and economic development studies. The primary focus of the firm is to support T&R studies that assess the feasibility of proposed toll road projects and that fund their construction. Specifically, Bomba Consulting independently reviews and adjusts the socioeconomic data incorporated into travel demand models that predict future traffic and toll revenue on a facility. Recent projects have included supporting a \$1.2B debt refinance for TxDOT for the Central Texas Turnpike System (CTTS) and acquiring roughly \$500M from federal loans and municipal bonds for the CTRMA construction of the US 183 South project. Bomba Consulting's staff have completed socioeconomic reviews for more than 40 T&R studies.

RESOURCE SYSTEMS GROUP: 29 YEARS OF SP SURVEYS/MARKETING RESEARCH

Founded in 1986, Resource Systems Group (RSG) is a consulting firm that specializes in market research and travel demand model estimation and has been partnering with CDM Smith on toll studies since 1991 and have worked on more than two dozen projects, including the MoPac North Express Lanes, NTTA Systems facilities, and Grand Parkway Segments D through I. RSG will support the conduct of special surveys, such as stated and revealed preference surveys, and provide support related to toll division refinements. This work has included extensive qualitative research, design, and administration of stated and revealed preference surveys; use of those data in the development of multinomial and nested logit route, time-of-day, express lane type, and payment method choice models; and use of those models for estimating willingness-to-pay and traveler choice for aggregate segments or distributions of individual values.



TRUSTED LEADERSHIP

EXPERIENCE OF KEY PERSONNEL - TRAFFIC AND TOLL REVENUE STUDIES



PROJECT MANAGER: PHANI JAMMALAMADAKA, PE, PMP

Phani is a tolling professional who has worked with major agencies such as CTRMA, TxDOT, NET RMA, NTTA, E-470, and FDOT. He has supported successful issuance of \$15B+

in toll bond financing/refinancing.

Phani serves as your current project manager and has more than 16 years of experience in T&R studies. He leads and assists many of the firm's key tolling projects, and specializes in project coordination, T&R studies, toll diversion modeling, travel demand modeling, risk analysis, and computer programming. Phani brings project management experience on all levels of T&R studies for toll roads and express lane facilities and has served as the project manager for various T&R studies. He has undertaken more than 25 conceptual/sketch-level T&R studies, seven Level 2 T&R studies, nine investment-grade T&R studies. Phani supported several rating agency/investor/TIFIA presentations and due diligence discussions for project financing. He was also instrumental in the development of risk analysis methodologies using Monte-Carlo simulation procedures which supported the assessment of equity/bidder risk ranges. He is currently serving as the project manager for T&R studies CDM Smith performs for NET RMA, CTRMA, E-470, and FDOT/FTE. **Since late 2017, Phani has been serving as project manager for the CTRMA MoPac North and MoPac South T&R and traffic evaluations.**



PROJECT PRINCIPAL: CHRISTOPHER MWALWANDA

Christopher has spent nearly two decades helping public and private clients secure the funds needed to rebuild and maintain their transportation systems, including more

than \$18B in toll project financing. He has served as the project director on all T&R studies performed for CTRMA since 2008.

Christopher is a vice president with 21 years of experience in traffic modeling, revenue forecasting, financial feasibility assessments, traffic simulation, public outreach, presentations to rating agencies,

strategic privatization and market valuation support, creation of innovative tools for toll traffic demand modeling applications, and peer reviews. Christopher has been serving as the project director for T&R services we offer for several agencies, including CTRMA, TxDOT, and NET RMA. He has directly supported as project manager over \$18 billion in traditional and P3 toll financing for projects such as the greenfield SH 130 Segment 5 and 6 in Austin, SH 99 Grand Parkway, SH 288 Express Lanes in Houston, North Tarrant Express (Segment 1&2W, Segments 3A&3B, and Segment 3C), IH 635 LBJ Express Lanes, IH 35E Express Lanes, SH 183/SH 114/Loop 12, SH 121, SH 161 in Dallas/Fort Worth, the Gordie Howe International Bridge in Windsor/Detroit, several Oklahoma Turnpike Authority bond issues, and many other multi-billion dollar mega-projects. **Christopher has been the project director on the T&R studies for MoPac North, including the ongoing Level 3 T&R Study, and the MoPac South related T&R analyses and traffic analyses for ongoing environmental studies.**



DEPUTY PROJECT MANAGER: BIKASH GAUTAM

Bikash has been involved in all CTRMA T&R studies since 2010—he has an intimate knowledge of the background models, assumptions, and T&R trends associated

with all the Austin toll roads and supported the MoPac North and MoPac South express lanes projects.

Bikash has more than 17 years of experience in general civil engineering and more than 13 years of experience in the development of travel demand and revenue forecasting models and T&R analysis. His areas of interest include toll diversion modeling and financial analysis, urban, intercity and statewide regional travel demand forecasting, urban and statewide emergency mass evacuation modeling, dynamic and static traffic assignment modeling and analysis. He has been providing technical support and task management support for work with several agencies, including CTRMA, TxDOT, NET RMA, and Alamo RMA. **He continues to serve as a deputy PM on the ongoing CTRMA MoPac North Express Lanes T&R study, existing MoPac North Express Lanes T&R monitoring, and the MoPac South corridor traffic forecast development for environmental evaluation.**



TECHNICAL LEADER: MUSTAFA KAMAL

Mustafa has been involved with travel demand modeling and T&R forecasting for various CTRMA projects for over 10 years and has developed various levels

of T&R forecasts for MoPac North, MoPac South and US 183 express lanes as well as US 290E toll road. He has also developed T&R forecasts to evaluate financial feasibility of the proposed IH 35 managed lanes, Oak Hill Parkway and SH 45 Southeast toll corridors for TxDOT.

Mustafa has 31 years of experience in the development of traffic and toll revenue forecasts for proposed managed lanes and toll roads. He is also experienced in travel demand modeling for large multimodal projects, including regional planning studies, major investment studies, roadway improvements, and corridor studies. He has worked on travel forecasting and T&R studies using over a dozen MPO models for major metropolitan areas throughout the country. In addition to Austin, he has also been involved with the development of T&R forecasts for various toll roads and managed lanes projects throughout Texas, including Dallas-Fort Worth, Houston, San Antonio, El Paso, Tyler and Brownsville. These T&R forecasts were conducted for various levels of analysis, from sketch-level studies to investment-grade studies which were used to secure bond financing and TIFIA loans. He has developed various enhancements to T&R modeling for tolled managed lanes, including incorporation of reliability measures and simultaneous application of different tolling

algorithms to estimate demand for toll roads and managed lanes within a regional travel demand model. His areas of interest also include traffic simulation modeling for planning studies and dynamic traffic simulation.



SENIOR ADVISOR: KAMRAN KHAN

Kamran has been providing senior technical oversight to our clients for 29 years and is one of the most experienced and strongest T&R leaders in the industry and our firm.

Kamran is a senior vice president and is currently the National Practice Leader for CDM Smith's national tolling services. He has more than 32 years of professional experience, the last 29 years with CDM Smith, and has an extensive background in toll-related studies. He has made numerous presentations to rating agencies, investors roadshows, and to the FHWA's Transportation Infrastructure Finance and Innovation Act program. Most recently, Kamran has served as senior advisor and project principal for several major toll agencies, including Illinois State Toll Highway Authority, New Jersey Turnpike, Miami Dade Expressway, and Washington State Toll Division. In the role of lead senior advisor, Kamran brings not only his many years of experience, but also his national tolling perspective and expertise.

B. Names and Experience Resumes

Members of the CDM Smith team are available to dedicate their time to CTRMA contract work as required. Detailed resumes of the key task members of the CDM Smith team are shown in **Appendix B**, and the following highlights the experience of the key Texas-based staff.

Additional Key Texas Staff

Yagnesh Jarmarwala, PMP, PTP - Traffic & Revenue / Tolling Feasibility

- Leads and assists many of the firm's key tolling projects, and specializes in project coordination, T&R studies, toll diversion modeling, travel demand modeling, risk analysis, financial analysis and computer programming
- Has served in project management and task leader roles for numerous T&R studies, including having served as the project manager to evaluate corridor performance and perform routine monitoring along the I-35E Express Lanes in the Dallas area, and the Grand Parkway System and HCTRA System of facilities in Houston

Abril Matysek - Development/Economic Analysis

- Transportation planning experience in analysis, modeling, data collection and summarization, and research

Rohan Shah, PE - Data Collection

- Planner with experience in T&R studies for toll projects, macroscopic and microscopic travel models, managed lane studies, urban planning and environmental analysis, and transportation public policy
- Skilled in travel demand model development, calibration/validation, traffic assignment modeling, traffic microsimulation, network development, traffic surveys and counts, data analysis and computation

Michael Bomba, PhD (Bomba) - Development/Economic Analysis

- 26 years of experience assessing the reasonableness of MPO's population/employment estimates/forecasts for various T&R and toll road planning studies, adjusting the forecasts as necessary
- Has worked on more than 40 T&R studies, mostly throughout the state of Texas; to date, these studies have supported the successful sale of approximately \$7B of municipal bonds for green field projects, reconstructing roadways as toll roads, or to refinance existing debt

Additional Key Texas Staff

Gustavo Baez, P.Eng. (Baez) - Traffic & Revenue

- 20+ years of experience in toll feasibility studies, travel demand modeling, congestion pricing, risk analysis, economic growth evaluation, and traffic simulation
- Has participated in more than \$20B in bond financing for toll projects in the U.S.
- Managed and directed projects for public entities, private investors, and financial advisors
- During his 5-year tenure with the NCTCOG, led several travel demand modeling projects, including the region's first managed lane project

Ossama Ramadan, PhD, PE, PTOE - Traffic Engineering/Traffic Operations

- Nationally recognized traffic engineering expert with a demonstrated record of publications and presentations
- 20 years' experience in traffic engineering studies; traffic engineering design; traffic control design; intersection control evaluation; microscopic and mesoscopic traffic simulation modeling; data-driven highway safety; transportation performance measurement; connected vehicle (CV) data analysis; corridor and subarea planning; ITS planning; Mobility as a Service (MaaS) system planning; and sustainability rating

Ybette Ochoa - Traffic Engineering / Traffic Operations

- 8 years of experience in a variety of transportation planning, traffic operations, and ITS projects, including safety assessments, crash reports, speed limit studies, and development of dynamic message sign prototypes for the Illinois Toll Authority
- Proficient in VISSIM, HCS, Synchro, SimTraffic, ArcGIS, AutoCAD

John Muñoz - TIFIA Support/Risk Analysis

- P3 Practice Leader supporting several clients with P3 contracts with construction values totaling \$14B
- 14+ years of P3 experience leading technical, financial, and legal advisors in the completion of P3 procurements
- Assisted with securing five TIFIA loans for a total of \$3.3B
- 25 years at TxDOT; led their competitive P3 procurements and development of related credit agreements; successfully developed over \$13B in P3 and DB projects and procured multiple alternatively delivery projects using various financing mechanisms

Justin Winn - TIFIA Support/Risk Analysis

- Experienced with modern methods of toll collection, including automatic vehicle identification, video tolling, cash toll collection, as well as single point and point-to-point collection
- Currently serves as project manager for CDM Smith's current contract with NTTA, as well as for various ongoing toll studies in Texas and Oklahoma
- Has developed an executive dashboard tool facilitating efficient and ongoing review of key toll system and economic parameters

Michelle Mutch - Tolling Technology

- 30+ years of experience in tolling and transportation industry
- Specializes in toll violations and enforcement customer service centers, business rules, strategy and planning, project controls, procurement, and contract management

Michael Copeland, AICP - Tolling Feasibility

- More than 32 years of experience in transportation planning, ranging from data collection and analysis to managing comprehensive T&R studies for multi-billion dollar toll road bond financing efforts

C. Number of Staff by Location

CDM Smith maintains an entire division of 85+ staff members dedicated to providing specialized services to the toll industry. The staff distribution by geographic location and by specialty is shown in Table 1. These toll industry specialists are supported by many additional planners, engineers, and economists throughout the firm.

Table 1: CDM Smith Staff Specialties and Locations

Texas	
Project Principal	Miscellaneous Tasks:
Project Manager	1 Sr. Technical Advisor
Deputy Project Manager	1 Sr. Toll Technology Consultant
Technical Leader	1 Sr. TIFIA Advisor
T&R, Analytics, Modeling Tasks:	1 Project Controls Specialist
7 Jr. Engineers/Planners	3 Administrative Professionals
2 Engineers/Planners	
2 Sr. Engineers/Planners	
Illinois	Satellite (FL, WA, CA, GA, CT)
1 Sr. Technical Advisor	5 Sr. Toll Tech. Consultants
1 Jr. Engineer/Planner	3 Jr. Engineers/Planners
1 Engineer/Planner	3 Engineers/Planners
2 Sr. Engineers/Planners	9 Sr. Engineers/Planners
1 Sr. Toll Tech. Consultant	2 Sr. Toll Technology Consultants
	1 Economist

Section III

Experience

A, B, C, D. Relevant Projects Included in Official Statements

It should be noted that there is considerable uncertainty inherent in forecasting T&R for any toll facility. Our techniques and expertise help to identify the key risk elements associated with global economic issues, changing political climate and regional policies that may influence future outcomes. Table 2 presents a representative listing

Table 2 - Projects CDM Smith Provided T&R Engineering and General Bond Support for Since January 1, 2017

COMPARISON OF OFFICIAL STATEMENT (OS) ESTIMATES VS ACTUAL OPENING YEAR REVENUE						
Project Name / Location / Description	OS Date	First/ Opening Year	First/Opening Year Revenue (000s)		Actual vs Est. Revenues	Client Contact
			OS Estimate	Actual		
North East Texas Regional Mobility Authority (NET RMA) - Toll 49 Comprehensive T&R Study Texas. Comprehensive Study with System T&R Report related to then existing Toll 49 (Segment 1, 2, 3A, 3B and 5) and the Segment 4 Project. ^{*1}	5/24/16	2019	\$19,931	\$19,006	-4.6%	Everett Owen (NET RMA) 1001 ESE Loop 323, #420, Tyler TX 75701 903.630.7894
North Texas Tollway Authority (NTTA) Texas. September 2017 T&R Study involved a detailed evaluation of Mobility 2040 - the new metropolitan transportation plan adopted by the North Central Texas Council of Governments (NCTCOG), and incorporated updated travel demand model networks	10/20/17	2018	\$843,189	\$841,491	-0.2%	Horatio Porter (NTTA) 5900 West Plano Pkwy., #100, Plano, TX 75093 214.224.2247
Grand Parkway Transportation Cooperation Texas. Grand Parkway System (SH 99) Segments D through I Comprehensive Study (September 2017) and Bringdown Letter (March 2018) prepared to evaluate the T&R potential of Segments D (Harris County), E, F-1, F-2, G, H, I-1. I-2. ^{*2}	5/23/18	2019	\$176,428	\$200,599	13.7%	Sara Ulbrich (TxDOT) 125 E. 11th Street Austin, TX 78701 512.334.3827
E-470 Public Highway Authority - Bring Down Letter Colorado. 2018 Bring Down Letter to review and update the 2018 Comprehensive T&R Study titled E-470 T&R Study: New Toll Structure	2/21/19	2019	\$248,626	\$249,013	0.2%	Jason Mayers (E-470 Public Highway Authority) 22470 East 6th Parkway Aurora, CO 80018 303.537.3715
Central Florida Expressway Authority (CFX) - General Traffic and Earnings Consultants Annual Report Florida. FY 2016 General Traffic and Earnings Consultant's Annual Report: provides annual forecasts for each of the six facilities constituting the CFX System - SR 528, SR 408, SR 417, SR 429, SR 414, SR 453 - over a 30-year period and reflecting the new toll rate policy	12/13/17	2018	\$430,500	\$441,768	2.6%	Lisa Lumbard (CFX) 4974 ORL Tower Road Orlando, Florida 32807 407.690.5000
Illinois State Toll Highway Authority (ISTHA) - T&R Update Study Illinois. Updated T&R estimates to support the 2017 Series A bond sale and replace the May 2016 update, and extending the forecasts through 2041 ^{*3}	11/15/17	2018	\$1,454,439	\$1,424,809	-2.0%	Michael Colsch (ISTHA) 2700 Ogden Avenue Downers Grove, IL 60515 630.241.6800 x 4000
Maryland Transportation Authority (MDTA) - Systemwide T&R Study Update Maryland. High-level update of systemwide T&R projections for the seven Legacy bridges, tunnels and highways operated by MDTA, based on actual FY 2017 in-lane transaction and revenue data contained within the Traffic Volume and Toll Income (TVI) reports ^{*4}	7/12/17	2018	\$718,930	\$719,700	0.1%	Deborah Sharpless (MDTA) 2310 Broening Highway, Baltimore, MD 21224 410.537.1004
North Carolina Turnpike Authority - Monroe Expressway Toll Revenue Bonds North Carolina. Study performed in November 2016 to develop a forty-year annual T&R forecast for the proposed Monroe Expressway from its assumed opening year (2019) through 2059, and support bond financing ^{*5}	1/25/17	2019	\$6,420	\$5,710	-11.1%	David Roy (NCDOT) 1 South Wilmington St. 1578 Mail Service Center Raleigh, NC 27699-1578 919.707.2729
New Jersey Turnpike Authority New Jersey. Provide traffic and toll revenue forecasts for the New Jersey Turnpike and Garden State Parkway of the NJTA. ^{*6}	12/18/17	2018	\$1,601,251	\$1,612,326	0.7%	Donna Manuelli (New Jersey Turnpike Authority) P.O.Box 5042 Woodbridge, NJ 07095 732.750.5300
South Jersey Transportation Authority (SJTA) New Jersey. SJTA 5 year T&R Forecast 2019-2024 (September 2019); 2019 Estimates of Atlantic City Expressway T&R and Certification of 2019 Debt Coverage/Net Revenue Requirements (September 2019); Atlantic City Expressway 2019-2020 T&R Estimates (September 2019) ^{*7}	10/10/19	2019	\$82,955	\$83,474	0.6%	Karen Davis (SJTA) P.O. Box 351 Hammonton, NJ 08037 609.965.6060
Oklahoma Turnpike Authority (OTA) Oklahoma. November 2017 OTA System Comprehensive T&R Letter Update to the January 2017 forecasts, including a comprehensive assessment of economic conditions and demographic growth projections, to support the issuance of Series 2017CDE bonds	12/13/17	2018	\$310,588	\$317,716	2.3%	Wendy Smith (OTA) 3500 N Martin Luther King Ave Oklahoma City, OK 73111 405.425.7431

- (1) T&R study was conducted to include Segment 4 which opened November 2018. For comparison, we considered the 2019 full year of operation for the entire Toll 49 System
- (2) Revenues shown also include estimated collected revenues from Pay by Mail transactions
- (3) Actual revenues from Illinois State Toll Highway Authority
- (4) Estimated OS forecasts do not include the I-95 ETLs

- (5) Facility still in ramp-up and FY 2019 comparison is only for six months
- (6) Actual revenues from New Jersey Turnpike Authority Traffic Statistics and Revenue Reports
- (7) Excluding revenue concessions

of the recent projects that have been supported by CDM Smith for successful financing/refinancing and bond issuance.

CDM SMITH EXCEEDS YOUR MINIMUM REQUIREMENTS

CDM Smith team members service the majority of toll agencies within Texas and around the nation. The following projects are detailed with relevant items that represent the scope of work identified as minimum requirements in your RFQ.

INSTITUTIONAL KNOWLEDGE

CENTRAL TEXAS REGIONAL EXPERIENCE

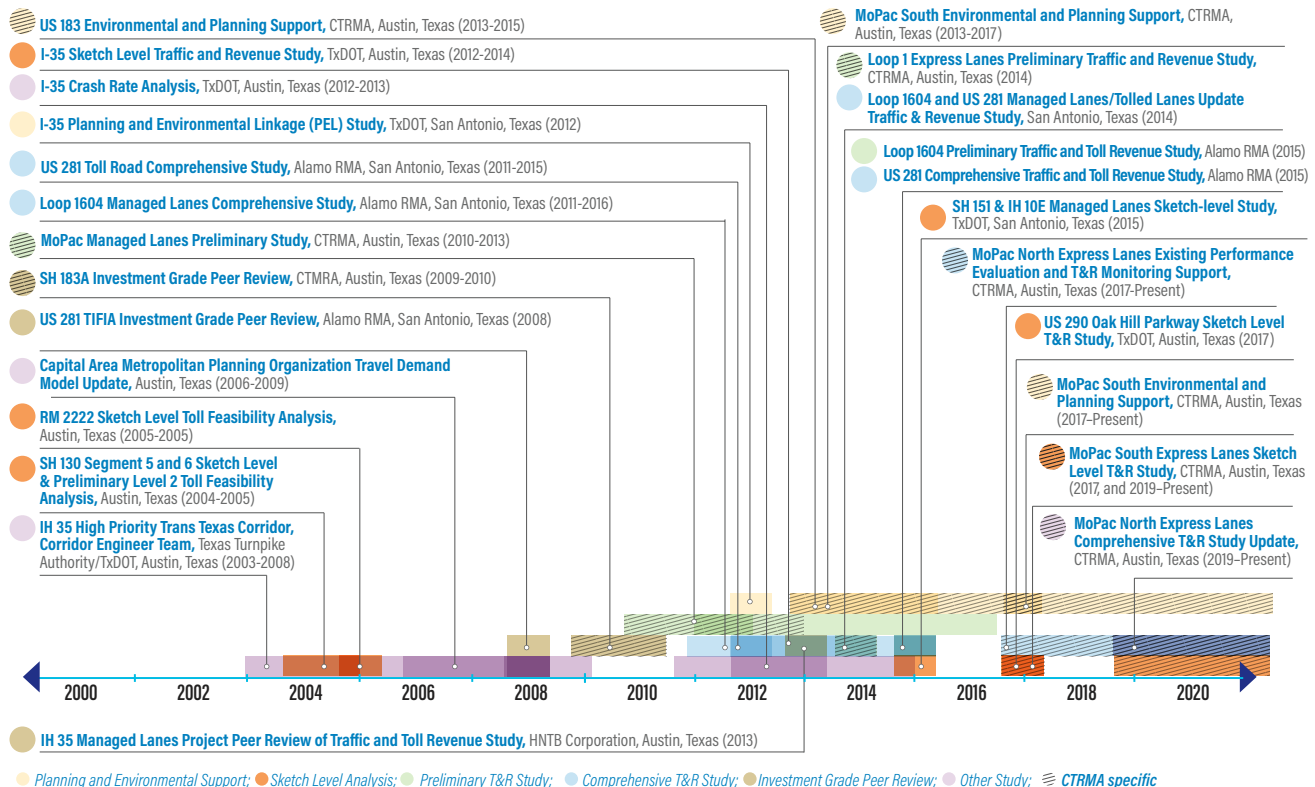
CDM Smith has extensive T&R experience within the Central Texas region including our work for CTRMA, TxDOT, and other regional agencies, as illustrated below. This established history proves that we are the best team to help you with future regional challenges, such as congestion management, operational needs, capacity improvements system expansions, and alternative tolling solutions. The following outlines some key tasks undertaken as part of planning and pre-operational toll traffic impact analyses for the MoPac North/South project express lanes in Austin between 2010 to present.

- Key planning tasks performed included traffic data collection (traffic counts, vehicle classification and origin-destination

patterns), traffic analysis support for highway design, policy analysis for the public involvement process, development of a corridor calibrated travel demand model for performance measures, traffic simulation analysis, conceptual toll T&R forecasts, development of tolling schemes, evaluation of design options for express and general use lane improvements and express lane access, environmental studies of mobile source air toxics, and both project and regional environmental justice toll impact assessments.

- Key tasks during the pre-operational stage included assessment of managed lane policies (minimum toll rates, incentive discounts, opening toll rates), coordination with the toll integrator to review the dynamic toll pricing algorithm, review of alternative technical concepts provided by the contractors, signage considerations (locations, formats and frequency of change), access point and feeder roadway considerations (signal timing and traffic redistribution), review of in-corridor express bus/transit utilization and toll rate adjustment considerations, and coordination of before and after studies to quantify observed travel pattern changes and project benefits.

Important considerations that enable successful outcomes include the ability to present complex express lane concepts to stakeholders



in a simplified way to facilitate consensus building during the concept development phases and to help them understand the impacts that their decisions have on the facility operations. Our team worked with CTRMA and their extended project staff to support a myriad of operational assessments that included support of the environmental process to determine the preferred concept, project concept refinements involving access points and downtown ramp connections, optimization of toll revenue generation, support of financing and pre-operational activities such as determination of toll plaza locations and toll collection concepts.

The toll operation concept developed as part of the MoPac North planning phase warranted the development of dynamic pricing algorithms that carefully consider zonal based pricing and maintenance of reserve capacity on the single lane facility. The team worked closely with the CTRMA staff and the toll integrator to develop toll operational models to emulate the dynamic pricing envisioned for the project. The coordination allowed the development of toll pricing procedures that closely reflected the T&R studies used to secure project financing.

Several changes were made to the original MoPac North project concept including the connection to downtown. This required a reassessment of corridor toll operations and revised connections to feeding facilities. The tools and procedures already developed during the planning phase allowed for a seamless assessment of the impacts and streamlined the concept development evaluation process.

We are currently performing a Level 3 T&R Study on the MoPac North express lanes project to assist with a potential refinancing of the debt. In addition, we are performing a traffic forecast analysis to assist the environmental evaluation of the MoPac South express lanes project.

T&R Engineering Consultant, North Texas Tollway Authority (1960s-Present)



CDM Smith has solidified its position as the NTTA's trusted tolling

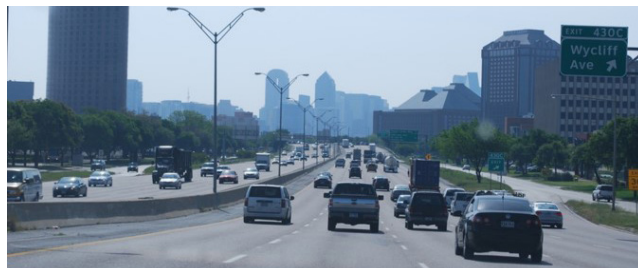
partner with 50+ years of planning and operational analysis support that has grown into a comprehensive partnership, including fulfillment of Trust Agreement requirements; successful financing/refinancing of over \$13B in toll revenue bonds; investment-grade T&R studies; AET conversion assistance; strategic planning support for toll collection, rate changes, and revenue recovery; annual budgeting-related toll revenue estimation; and development of 140+ centerline miles of operational toll roads, two bridges, and one tunnel.

Bonding: We assisted in the completion of investment-grade studies and bring-down letters for each of NTTA's tolling facilities to secure toll revenue bonds. Our long-range, comprehensive T&R estimates have been used in these bond financings.

T&R Studies: Throughout our history with NTTA, CDM Smith has completed T&R studies for long-term transportation planning, bond financing, and demographic forecasting, including NTTA System 2017 (supporting the merger of the CTP and PGBT-WE into the NTTA System); Chisholm Trail Parkway (2011); PGBT-EE (2008); and SH 121/Sam Rayburn Tollway (2007).

Comprehensive, Strategic Tolling Initiatives: We have always been dedicated to NTTA's varied needs, supporting more than just T&R studies to ensure the toll roads continue to serve travelers with efficient and safe movement.

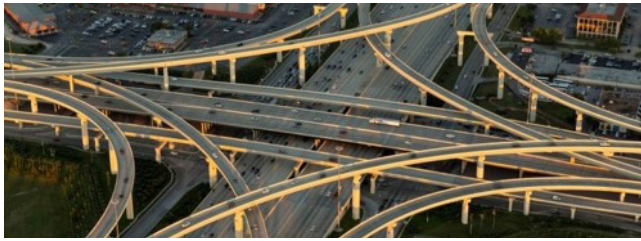
Texas Statewide Tolling Program, Texas Department of Transportation (2002-Present)



CDM Smith was retained by TxDOT to support their statewide T&R services that range from conceptual planning to investment grade studies. The support included statewide toll feasibility efforts to provide a broad range of services for projects that range in size from small network improvements to statewide initiatives. The toll feasibility work undertaken as part of this contract included support of several TxDOT Regional Districts that include Dallas, Fort Worth, Tyler, Houston, Corpus Christi, El Paso and Austin. CDM Smith also served as trusted advisors in regards to public private partnership (P3) concessions projects in the

Dallas Fort Worth Region related to the North Tarrant Express (Segments 1 and 2W), North Tarrant Express (Segments 3A&3B), IH 635 LBJ Express Lanes, North Tarrant Express (Segment 3C), the SH 121, and SH 161. More recent examples of project financing being support by CDM Smith T&R services within the DFW region includes the IH35E express lanes and the Midtown Express Lanes (SH183, SH 114, and Loop 12).

T&R Advisor, Harris County Toll Road Authority (1980s-Present)



CDM Smith has served as the T&R advisor for HCTRA since its inception in the early 1980s. Over the past 30+ years, the HCTRA system has expanded to almost 83 miles of toll roads and operates three AET systems and a managed lane facility. Our work has extended to all levels of T&R services such as toll model development, calibration, operations analysis, and simulation; risk analysis; and bonding support. Our services for HCTRA have included T&R forecasting and updates; toll rate policy setting and studies; congestion management and value pricing; managed lane evaluations; travel demand modeling; and systems advisory services. Throughout our partnership, CDM Smith has delivered annual T&R estimates and impacts of toll rate changes. To determine future toll rate policy, we analyzed pricing strategies such as toll rate adjustments, advised on the potential mechanics of toll policy modifications, and prepared toll policy documents. Specific T&R work has included Comprehensive Systemwide Investment Grade T&R Studies and the Tomball Tollway T&R Study. We also performed a variety of preliminary studies for the Sam Houston Tollway-Northeast segment, which is now open to traffic as an AET facility.

E. Summary of Regulatory/Legal Proceedings

Because of its size and volume of business, over the years CDM Smith Inc. has occasionally been involved in legal proceedings. **There are no past or currently outstanding legal proceedings, judgments, or contingent liabilities that could adversely affect the financial position or ability of CDM Smith to perform its contractual**

commitments. CDM Smith will provide a 5-year litigation history upon the execution of a confidentiality agreement by the party requesting the information.

Section IV

HUB and DBE Participation

A. Provisions Made for HUB and/or DBE Participation

We are fully committed to support CTRMA's business diversity program. Our team understands CTRMA's commitment to the development and growth of HUB/DBE and small businesses through the encouragement of inclusion and opening new opportunities. We have developed a solid business diversity plan designed to, first and foremost, provide CTRMA with superior professional service, and second, support CTRMA's business diversity initiatives of inclusion and building the capacities of HUB/DBE firms. Achieving the program goals is not viewed as merely an obligation, but a true opportunity to expand the capacities of professional firms who desire to serve CTRMA as well as other sophisticated clients in the Central Austin area, across the state of Texas, and to points beyond our state borders. Partnering with small firms, mentoring start-up enterprises, and opening doors ensures a much stronger transportation consulting industry well into the future. We understand how an investment of our time and resources now will pay long-lasting dividends.

We have a long history of working closely with subcontracting firms that we have proposed to partner in this contract, including CJ Hensch and Associates (DBE/HUB), Gram NTX (DBE/HUB), Bomba Consulting, and Resource Systems Group. We are excited to add Baez Consulting (DBE/HUB) to the team. We have partnered with Baez Consulting on several other T&R contracts in Texas, and have been mentoring this firm as part of NTTA's Relationships and Opportunities Advancing Diversity (ROAD) program.

B. Women/Minority Employees by CDM Smith

CDM Smith values and embraces diversity in our own workforce. We have sought out and built a team of highly qualified individuals from a variety of cultural backgrounds. At CDM Smith, it is not a requirement – it is simply the right thing to do to foster a vibrant and diverse team of the best and brightest in the industry.

The CDM Smith Texas team is comprised of professional staff with diverse backgrounds. Women and minorities are expected to hold more than 15 key staff positions for the CTRMA contract. Their roles in this contract will include the project manager, deputy project manager, project principal, senior technical advisors, data collection, T&R task leader, traffic engineering/traffic operations task leader, TIFIA support task leader, tolling technology support, and special studies support. A list of CDM Smith's women/minority employees to be assigned to the CTRMA T&R contract is located in table A-3 in Appendix A.

C, D. Work to be Subcontracted and Women/Minority Participation within Subcontracting Firms

CDM Smith will subcontract CTRMA work to HUB/DBE firms whenever there is an opportunity. The CDM Smith team subconsultants each employ women and minorities in varying roles and responsibilities throughout their respective firms. It is anticipated that a minimum of 15 percent of work will be contracted to HUB/DBE firms. The following is a summary:

BAEZ CONSULTING (DBE/HUB)

They specialize in forecasting traffic and toll revenue for transportation projects. **Gustavo A. Baez**, president of Baez Consulting, and his team will provide assistance with toll feasibility studies, travel demand modeling, congestion pricing, risk analysis, economic growth evaluation, peer review support and traffic simulation. Expected utilization on the contract: 7%

C J HENSCH & ASSOCIATES (WBE/HUB)

The firm specializes in traffic data collection and provides engineering studies. **Carol Hensch**, principal of the firm, and the team will provide assistance with traffic counts, speeds and Origin/Destination and other data collection efforts. Expected utilization on the contract: 4%

GRAM TRAFFIC NTX (WBE/HUB)

The firm specializes in traffic data collection and provides engineering studies. **Stephanie Swenson**, president/owner, and the team will provide assistance with traffic counts, speeds and origin/destination and other data collection efforts. Expected utilization on the contract: 4%

Even though Bomba Consulting and RSG are not DBE or HUB certified, they employ women/minorities in their firms. Bomba Consulting has 50% women employees, and RSG's employees are 35% female and 13% minorities.

E. Affirmative Action Plan



It is, and will continue to be, the policy of CDM Smith to provide equal employment opportunity to all employees and candidates for employment. The firm will assure that qualified applicants who are recruited and hired, and employees at

all levels, are not discriminated against because of their race, color, religion, creed, sex, pregnancy and pregnancy-related conditions, sexual orientation, gender identity, national origin, age, marital status, disability, protected veteran status, citizenship status, genetics, or any other characteristic protected by applicable law. CDM Smith will continue to promote the full realization of equal employment through a positive continuing program.

F. Conformance with CTRMA's Policy on the Participation of HUBs

CDM Smith will conform with the requirements of CTRMA's Business Opportunity Program and Policy on the participation of HUB/DBE firms and will evaluate opportunities for HUB/DBE participation. CDM Smith is committed to helping CTRMA meet its overall HUB/DBE goals. Previous experience has shown that CDM Smith typically exceeds the HUB/DBE utilization policy guidelines set by public agencies.

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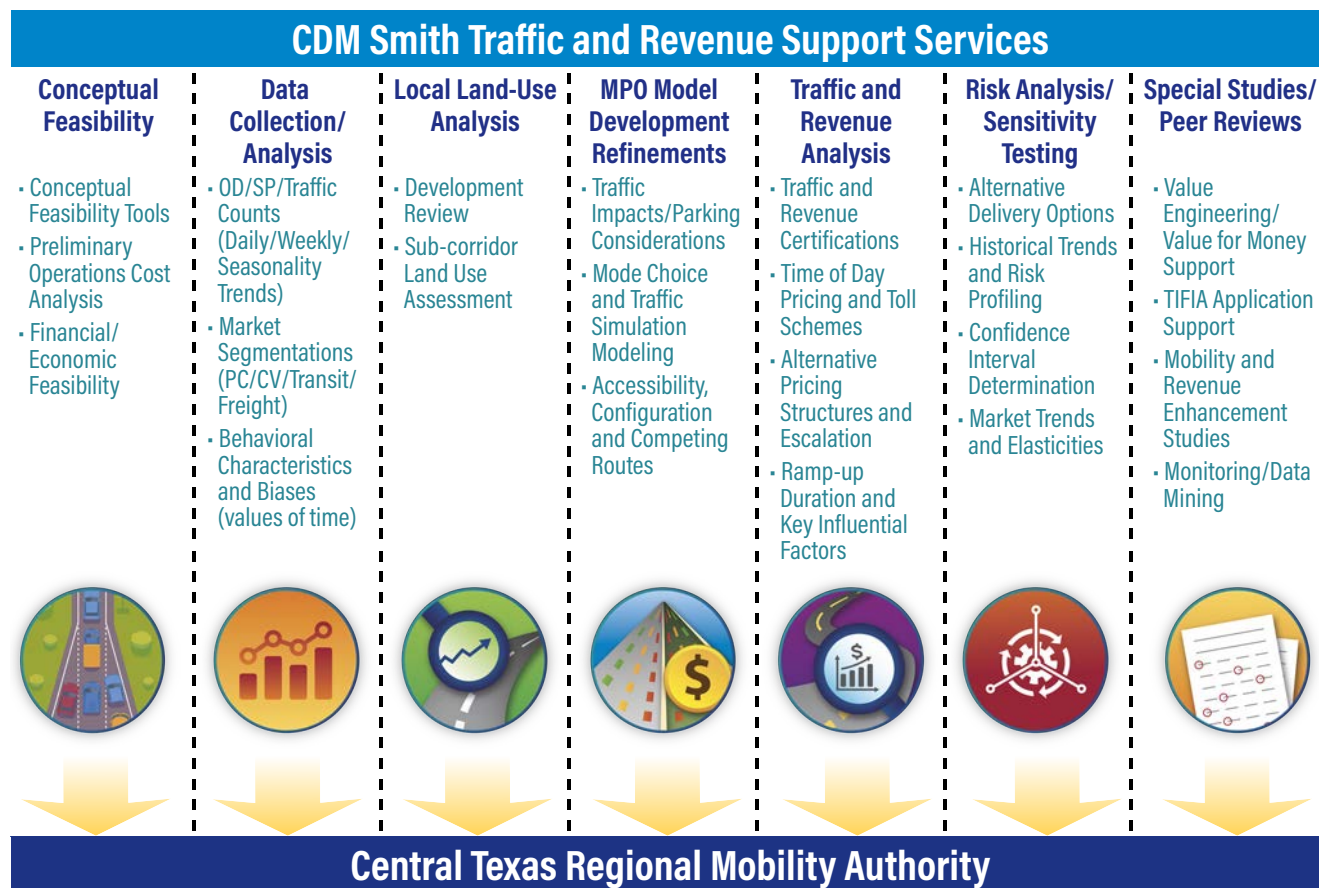
Appendix A

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TABLE A-1: RECENT TIFIA APPLICATIONS SUPPORTED BY CDM SMITH

Project (State)	TIFIA Loan Amount	Total Project Cost	Duration	Requirements/Challenges/Issues
Complete 540 Phase 1 (NC)	\$502M	\$1,520M	Fall 2018– Dec 2019	<ul style="list-style-type: none"> Support initial loan application summary of project benefits Rating agency presentation support
Monroe Expressway (NC)	\$166.5M	\$800M	Fall 2016– Nov 2018	<ul style="list-style-type: none"> Support initial loan application summary of project benefits Rating agency presentation support
Grand Parkway Segments H&I (TX)	\$605.33M	\$1.924B	Fall 2016– Nov 2018	<ul style="list-style-type: none"> Support initial loan application summary of project benefits Extensive due diligence to support assessment of traffic and revenue Rating agency presentation support
SBCTA I-10 Express Lanes (CA)	\$225M	\$928.9M	Fall 2016– Aug 2018	<ul style="list-style-type: none"> Support initial loan application summary of project benefits Rating agency presentation support
I-35E Express Lanes (TX)	\$285M	\$1.4B	Fall 2013– Nov 2016	<ul style="list-style-type: none"> Support initial loan application summary of project benefits Extensive due diligence to support assessment of traffic and revenue Rating agency presentation support
Wekiva Parkway (FL)	\$194M	\$587M	Fall 2013– Mar 2015	<ul style="list-style-type: none"> Worked through extensive sensitivity test to support risk assessments of traffic and revenue Required annual rating of bonds
Dulles Corridor Metrorail (VA)	\$1,867.6M (3 loans)	\$5.7B	Fall 2012– Aug 2014	<ul style="list-style-type: none"> Extensive due diligence to support assessment of traffic and revenue Requires an annual update to the traffic and revenue streams for duration of project to the rating agency
Grand Parkway D-G (TX)	\$841M	\$2.9B	Fall 2011– Feb 2014	<ul style="list-style-type: none"> Support initial loan application summary of project benefits Extensive due diligence to support assessment of traffic and revenue Requires a two-year update to the traffic and revenue streams for duration of project

TABLE A-2



The CDM Smith team will work closely with all parties and bring its T&R expertise, tools, and experience to meet CTRMA's needs.

TABLE A-3: CDM SMITH T&R CONTRACT - PROPOSED MINORITY/WOMEN EMPLOYEES

Employee	Responsibility/Classification	Level of Commitment
Adams, Lauren M	Administrative	10%
Belfi, Barbara J	Administrative/Project Controls	20%
Gutierrez Pena, Anny S	Administrative	2%
Kummerle, Julie	Administrative	2%
Kwong, Alison N	Administrative	2%
Mitchell, Lawanda	Administrative	2%
Parks, Meredith R	Administrative	2%
Wolfe, Julia	Administrative	2%
Bedi, Karan Yeshkumar	Junior Engineer/Planner	40%
Chen, Szu-han	Junior Engineer/Planner	5%
Du, Yucong	Junior Engineer/Planner	2%
Ghandour, Houssam	Junior Engineer/Planner	2%
Haque, Khademul	Junior Engineer/Planner	40%
Jadhav, Ajay	Junior Engineer/Planner	5%
Kalakuntla, Sai	Junior Engineer/Planner	2%
Lin, Laurent	Junior Engineer/Planner	50%
Matysek, Abril E	Junior Engineer/Planner	40%
McGrath, Nicole	Junior Engineer/Planner	2%
Shabaanzaadeh Minaei, Negaar	Junior Engineer/Planner	2%
Naidu, Yugesh	Junior Engineer/Planner	20%
Narsaria, Isha	Junior Engineer/Planner	20%
Patel, Parth	Junior Engineer/Planner	20%
Sarikonda, Vishal	Junior Engineer/Planner	2%
Shah, Rohan J	Junior Engineer/Planner	40%
Singh, Kunal	Junior Engineer/Planner	20%
Zhang, Boyang	Junior Engineer/Planner	5%
Jammalamadaka, Phani Rama	Project Manager	50%
Khan, Kamran A	Senior Advisor	10%
Slack, Terri	Senior Advisor	5%
Mwalwanda, Christopher E	Project Principal	40%
Cavusoglu, Ozge	Engineer/Planner	5%
Amar, Elizabeth Runey (Liza)	Senior Engineer/Planner	5%
Gautam, Bikash	Deputy Project Manager	50%
Kamal, Mustafa	Technical Leader	50%
Kanike, Om Prakash	Senior Engineer/Planner	2%
Jarmarwala, Yagnesh	Senior Engineer/Planner	5%
Lam, Chi Ping	Senior Engineer/Planner	20%
Lu, Yandan	Senior Engineer/Planner	20%
Mokkapati, Naveen	Senior Engineer/Planner	20%
Murphy, Gina Louise	Senior Engineer/Planner	2%
Narayanasamy, Madhusudhanan	Senior Engineer/Planner	5%
Ochoa, Ybette	Senior Engineer/Planner	5%
Ramadan, Ossama	Senior Engineer/Planner	5%
Rima, Tarannum	Senior Engineer/Planner	10%
Mutch, Michelle	Senior Technology Consultant	10%

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Appendix B

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Phani Jammalamadaka, PE, PMP

Project Manager

Mr. Jammalamadaka has more than 17 years of experience in toll T&R studies. He leads and assists many of the firm's key tolling projects, and specializes in project coordination, toll T&R studies, toll diversion modeling, travel demand modeling, risk analysis, and computer programming. His experience includes serving in project management and quality assurance roles for numerous toll T&R studies, as well as the development and use of computerized modeling techniques for traffic planning analysis. Mr. Jammalamadaka has served as the project manager for various T&R studies, which were utilized for the successful issuance of more than \$15 billion in toll road financing/refinancing bonds.

Project Manager, MoPac North IG T&R Study, and MoPac South T&R Study and Traffic Analysis for Environmental Support, CTRMA (2018-present). Serving as a project manager on an IG T&R Study of the MoPac North and MoPac South express lanes traffic forecasting studies in Austin, Texas. These studies include detailed counts, speeds and origin-destination (OD) data collection. In addition, a revealed/stated preference survey was performed to estimate the values of time of the users of the MoPac North express lanes. An independent socioeconomic review was also performed. Toll rate optimization was performed in addition to the estimation of long-term T&R along the MoPac North express lanes. After the MoPac North express lanes opened, detailed evaluation of the toll rates, speeds and volumes was performed, along with the traffic sensor locations and dynamic tolling policies. Recommendations were provided to CTRMA to improve the traffic operational performance, sensor location changes and possible pricing updates. Traffic estimates are also being developed along the MoPac South express lanes to support environmental evaluation and design. In addition, a sketch level T&R evaluation was also performed for the proposed MoPac South express lanes.

Project Manager, Annual T&R Updates for 95-Express Lanes and 595-Express Lanes Projects, Florida Department of Transportation (FDOT), Miami/Fort Lauderdale, Florida (2017-2019). Mr. Jammalamadaka led a team to develop an annual update by evaluating the performance of the existing and future phases of 95-Express managed lane project in the Miami area. Analyzed historical toll traffic data, including toll and speeds trend data along the open sections of the 95-Express managed lanes project. In addition, led toll diversion modeling, incorporation of results of a previously developed VISSIM model by the team, and identification of performance and operational improvement opportunities.

Project Manager, I-4 Beyond the Ultimate South Express Lanes Planning Level T&R and Risk Analysis Study, FDOT, Orlando, Florida (2015-2016). Mr. Jammalamadaka served as a project manager for a planning level T&R study for the proposed express lanes on I-4 in Orlando. As part of this study, traffic counts, speed/delay were collected and a stated preference (SP) survey was administered to estimate the traveler values of time. An up-to-date traffic count profile was prepared for use as a key input in the calibration process for both the global demand and sub-area express lanes modeling efforts. A baseline set of T&R forecasts were developed. Also, the P75 forecasts, which correspond to a 75 percent probability that the actual revenue will be greater than or equal to the forecasted revenue, were developed. Mr. Jammalamadaka managed the internal resources,

Education

MS - Transportation,
Massachusetts Institute
of Technology, 2003

BTech - Civil Engineering,
Indian Institute of
Technology, Madras,
2001

Registration

Professional Engineer:
Texas, 2011 (#108661)

Project Management
Professional (PMP),
2150967

Years of Experience

Total: 17
CDM Smith: 16

Computer Skills

TransCAD (GISDK),
TRANPLAN, MS Excel
VBA, C/C++, @Risk

led the coordination efforts with the FDOT staff and several consultants, and led quality reviews that were performed on all deliverables submitted to the client.

Project Manager, Tampa Bay Express Lanes, FDOT District 7, Tampa, Florida (2015-2016). Mr. Jammalamadaka served as a project manager for a planning level T&R study for the proposed express lanes on I-275, SR-60 and I-4 in Tampa, FL. As part of this study, traffic counts, speed/delay, Bluetooth origin/destination (OD) data were collected and a stated preference (SP) survey was administered to estimate the traveler values of time. An up-to-date traffic count profile was prepared for use as a key input in the calibration process for both the global demand and sub-area express lanes modeling efforts. A baseline set of T&R forecasts were developed for four configuration scenarios. Also, the P75 forecasts, which correspond to a 75 percent probability that the actual revenue will be greater than or equal to the forecasted revenue, were developed. These P75 estimates were developed by performing a Monte-Carlo risk analysis.

Project Manager, Grand Parkway Segments H and I Level 2 T&R Study, Houston, Texas (2015). The Grand Parkway is planned to be Houston's third circumferential highway, around the metropolitan area. Segments H and I of the Grand Parkway traverse Montgomery, Harris, Liberty, and Chambers counties over a distance of approximately 53 miles. These two segments are to the north and east of downtown Houston, providing connectivity between US 59, US 90, IH 10, and SH 146. The proposed segments H and I-1 will be constructed as a two-lane controlled access toll road with discontinuous frontage roads along its alignment. The proposed segment I-2 will be constructed as a four-lane controlled access toll road. For the purposes of this T&R study, tolls were assumed to be collected by electronic toll collection (ETC) across the Grand Parkway corridor. This study involved detailed traffic count data collection, speed data collection using INRIX, an independent socio-economic review, toll sensitivity analyses and evaluation of T&R estimates under several project configurations. A base-case T&R forecast was developed and a Monte-Carlo simulation based project risk analysis was also performed to ascertain the projects of T&R probability ranges.

Project Manager, Investment Grade T&R Study, NTTA, Texas (2011). Mr. Jammalamadaka served as project manager for a comprehensive T&R study of all NTTA System toll facilities. This study involved a detailed evaluation of the new Mobility 2035 demographics, updated travel demand networks, assessment of current economic conditions and outlook, and other key factors influencing forecasted T&R on NTTA System facilities. This effort included an independent economic review of the Mobility 2035 demographics along NTTA System corridors, and incorporation of the 2011 NTTA travel survey results, latest traffic counts and travel time runs data. CDM Smith provided the client with 50-year T&R projections suitable for issuing long-term debt. Toll sensitivity analyses were performed to estimate the T&R impacts due to increased tolls and to estimate the revenue maximization tolls for current and future conditions. In addition, sensitivities to key input variables such as demographics and travelers' value of time were also estimated. He also provided oversight and quality assurance/quality control review of the written report, which was successfully utilized to finance over \$268.6M series 2011 revenue refunding bonds by the NTTA. He provided support to NTTA for Rating Agency and investor presentations in relation to the bond financing. In addition, he reviewed the official statements and provided traffic engineer certificates in relation to the bond sale.

Christopher Mwalwanda, P.Eng.

Project Principal

Mr. Mwalwanda is a vice president and serves as a project director/principal on T&R consultant contracts with toll agencies and DOTs. He has extensive experience in managing toll feasibility analyses and travel demand modeling projects for both private and public agencies. His areas of specialization include toll diversion modeling and financial analysis; urban, intercity, and statewide regional travel demand forecasting; AET feasibility analysis; new mode modeling and analysis; traveler's behavioral theory; discrete choice models; stated preference and revealed preference survey design and implementation; and software interface development.

Project Director, Loop 1 Express Lanes Preliminary (Level 2) T&R Study, CTRMA, Austin, Texas. Mr. Mwalwanda served as project director for the evaluation of an 11-mile express lane facility that extends from Lady Bird Lake in the south to Parmer Lane in the north in Austin, Texas. The preliminary study included various enhancements to the CAMPO travel demand model and the coordination of a comprehensive traffic count program to collect traffic counts, stated preference data, origin/destination data and speed and delay information within the corridor. The analysis included the evaluation of various toll pricing, project phasing and configurations to evaluate the financial feasibility of the corridor taking into consideration various transportation demand management objectives. The models developed as part of this effort also support the environment assessment of the corridor.

Project Director, US 183A Investment Grade Peer Review, CTRMA, Austin, Texas. Mr. Mwalwanda served as the project director performing a peer review in support of the USDOT TIFIA application by the CTRMA. The review included a study of all key variables likely to affect the investment grade T&R analysis that was performed.

Project Director, Toll 49 Comprehensive (Level 3) Traffic and Toll Revenue Study, NET RMA, Tyler, Texas. Mr. Mwalwanda served as the project director for the comprehensive Level 3 Traffic and Toll Revenue Study to evaluate the feasibility of the corridor. His responsibilities included coordination of several subconsultants that are performed the origin/destination surveys, stated preference surveys, traffic count collection and independent economic reviews, and presentations to the client, stakeholder, and bankers and lenders. He provided quality control and technical oversight for the development of the final report and participated in client discussions and presentations. An early assessment was undertaken to evaluate the feasibility of cash plazas compared to the AET facility options that were ultimately implemented.

Project Director, Grand Parkway SH 99 Segments E, F and G Investment Grade T&R Study, Houston, Texas. Mr. Mwalwanda serves as the project director for the implementation of the T&R study to support design-build financing efforts for the Grand Parkway SH 99 advisor for TxDOT. In this role, he has assisted in finalizing the investment grade study and the preparation of presentation to the rating agencies for the successful \$2.9 billion financing of the project. Mr. Mwalwanda provided risk analyses and technical reviews of the procurement documents and reports. The facility was first opened as a tag

Education

MASc – Transportation Engineering, University of Toronto, Toronto, Canada, 1999

BASc – Civil Engineering, University of Toronto, Toronto, Canada, 1997

only facility but subsequently converted to a pay-by-mail/video user facility that warranted reanalysis and presentation to the investor community and TIFIA.

Project Director, IH 35E Managed Lanes Comprehensive (Level 3) T&R Study, Texas Turnpike Authority/TxDOT, Dallas, Texas. Mr. Mwalwanda oversaw the evaluation of a 30-mile managed lane facility. The analysis included the evaluation of various toll pricing, project phasing and configurations to assess the financial feasibility of the corridor taking into consideration various transportation demand management objectives. Mr. Mwalwanda supported the financing of the project including multiple rating agency and TIFIA presentations.

T&R Advisor, T&R CDA Evaluator, Texas Turnpike Authority/TxDOT, Dallas, TX. Christopher serves as the T&R advisor to TxDOT as part of their Comprehensive Development Agreement (CDA) procurement (Public Private Partnership (P3) procurements). In this role, he is assisting in evaluating proposals submitted by developers for the multi-billion dollar IH 35E Managed Lane Project, SH 183 Managed Lane Project, and the North Tarrant Express (IH 35W/IH 820) in Dallas and Fort Worth, and the next segments of 184-mile SH 99 Grand Parkway project in Houston. Christopher provides risk analyses and technical reviews of the bidder's T&R reports and provides summary presentations of the finding to the evaluation committees.

Project Manager/Principal, I-105 Express Lanes Comprehensive and I-605 Express Lanes Level 2 T&R Studies, Los Angeles County METRO, Los Angeles County, California. Mr. Mwalwanda is serving as the project manager/principal for the ongoing T&R assessment of the I-105 and I-605 express lane corridors. The analyses will include the evaluation of various toll pricing, project phasing and configurations to assess the financial feasibility of the corridors and presentations of findings to key project stakeholders and board members.

T&R Advisor, T&R, Orange County Transportation Authority/ OCTA, Orange County, California. Mr. Mwalwanda serves as T&R advisor to OCTA as part of the SR 241 Express Direct Connector Peer Review Study. He evaluated the work undertaken by the OCTA consultant team and provided technical feedback on the analysis and made recommendations for further consideration. The advisory also included presentation of findings to key project stakeholders.

Project Manager/Principal, High Desert Multipurpose Corridor Level 2 T&R Study, Los Angeles County METRO, Los Angeles County, California. The analysis included the evaluation of various toll pricing, project phasing and configurations to assess the financial feasibility of the corridor taking into consideration various transportation demand management objectives. The advisory also included presentations of findings to key project stakeholders and board members.

Project Principal, Oklahoma Turnpike System, Oklahoma Turnpike Authority, Oklahoma. Mr. Mwalwanda serves as the project principal for the evaluation of the Oklahoma Turnpike System revenues and the consideration of AET conversions to support the Oklahoma Turnpike Authority (OTA). His involvement with the agency has historically included direct support of project financing and participation in rating agencies, presentations of recommendations to the OTA board and as a technical senior advisor in the assessment of AET conversion considerations and pilot study initiatives as several plazas within the system.

Bikash Gautam

Deputy Project Manager

Mr. Gautam is a transportation planner and has extensive experience while working on managerial role as well as technical role for several travel demand modeling projects and traffic and toll revenue studies ranging from toll feasibility analysis to investment grade level studies. His technical expertise includes data collection program development, network modeling and calibration, traffic and toll revenue analysis including technical report writing for traditional toll road projects, concurrent and reversible express lane projects with variable congestion pricing and under different toll collection strategies. His areas of interest include toll diversion modeling and financial analysis, urban, intercity and statewide regional travel demand forecasting, urban and statewide emergency mass evacuation modeling, dynamic and static traffic assignment modeling and analysis. He is skilled at various GIS based travel demand modeling tools, programming languages, and traffic modeling software.

Planning Analyst, MoPac Managed Lanes Level-2 Study, CTRMA, Austin, Texas. CDM Smith was retained by CTRMA to conduct an Intermediate Level-2 Traffic and Toll Revenue study for the proposed MoPac (Loop 1) Express Lane corridor. The project corridor is about 11.2 miles between W. Parmer Lane in the north to Cesar Chavez Street in the south. The MoPac Express Lane Improvement Project was proposed to better serve the highly congested traffic on the general purpose lanes with express lanes access using congestion pricing strategy. Mr. Gautam directed data collection encompassing socio-economic data, traffic counts, license plate capture, and data analyses, including leading development of model estimates for T&R and operational analyses; sensitivity analysis and optimum toll rates; select link analyses; development of T&R projections using travel demand model and operational analyses of selected locations. Several alternatives were tested for operational performance using VISSIM and recommendations were made to enhance the operational performance.

Deputy Project Manager/Task Leader, MoPac North Express Lanes Comprehensive T&R Study, MoPac South Environmental and Planning Support, and Ongoing T&R Monitoring Support, CTRMA, Austin, Texas. CDM Smith is under contract with CTRMA for the Level 3 comprehensive traffic and toll revenue study and T&R monitoring support for the MoPac North express lanes, and environmental and planning support for MoPac South corridor. The project limits for MoPac North is from W. Parmer Lane to Lake Austin Boulevard with approximately 11.2-miles and for MoPac South is from Lake Austin Boulevard to Slaughter Lane with approximately 8.2 miles. The study considered recent traffic and demographic growth trends within the Greater Austin region, origin-destination survey and stated preference survey to better understand the traffic characteristics along MoPac corridor and within the region. As a deputy project manager and task leader, Mr. Gautam supported in managing data collection program and traffic surveys, is performing comprehensive T&R analysis and several scenario evaluations including ongoing T&R trend monitoring for the MoPac North corridor and supported several traffic analysis for the MoPac South corridor.

Technical Analyst/Task Manager, Loop 1604 Managed Lanes Level-2 Study, Alamo RMA & TxDOT, San Antonio, Texas. CDM Smith was retained by the Alamo RMA and

Education

MS – Civil Engineering, University of Texas at El Paso, 2006

BS – Civil Engineering, Tribhuvan University, Nepal, 2002

Years of Experience

CDM Smith: 13
Total: 17

Training

AutoCAD and AutoLISP, Tribhuvan University

Visual Basic, PENTASOFT Nepal Centre

TxDOT to conduct an Intermediate Level-2 traffic and toll revenue study and subsequent scenarios testing for the proposed 33.5-mile managed lanes along Loop 1604 corridor between US 90 and Nacogdoches Road, in San Antonio region. This analysis was part of Alamo RMA's ongoing efforts to evaluate the financial feasibility of the proposed SL 1604 managed lanes project. Mr. Gautam served as the Technical Analyst for this managed lanes study and analyzed data collection program encompassing traffic counts, speed and delay, origin-destination data, license plate capture, socioeconomic review, stated preference data and technical analyses to develop T&R projections including review of San Antonio-Bexar County Metropolitan Planning Organization's socioeconomic data. He also managed the project budget, project schedule, and deliverables, and interaction with the client.

Project Technical Leader/Deputy Project Manager, NET RMA – Existing Toll 49 System T&R Monitoring Support and Proposed Segment 6 Environmental Support, Tyler, Texas. CDM Smith is retained by NET RMA to monitor the T&R trend for the existing Toll 49 System and present the summary to NET RMA staff and board members on a quarterly basis. CDM Smith is also assisting NET RMA and its consultants with the proposed Segment 6 Environmental Support task. Mr. Gautam oversees the tasks' progress and schedule, shares technical expertise and communicates with client and their consultants on a regular basis.

Task Manager, Midtown Express (SH 183, SH 114, and Loop 12 Managed Lanes) Sketch Level, Sketch-Level Plus, Level-2 and Level-3 T&R Studies, TxDOT Dallas, Texas. CDM Smith, under contract with TxDOT, provided procurement support to include several studies ranging between sketch-level, sketch-level plus, Level-2 studies and subsequently a Level-3 comprehensive T&R study for the SH 183, SH 114 and Loop 12 Managed Lanes projects in the Dallas region. These studies were in support of TxDOT's efforts to evaluate the financial feasibility of the project including technical support for the

\$285M Transportation Infrastructure Finance and Innovation Act (TIFIA) Financial Loan Application from TxDOT. Mr. Gautam served as the task manager for this managed lanes study from Sketch-level Plus and ultimately to a Level-3 study and analyzed data collection program encompassing traffic counts, speed and delay, origin-destination data, socioeconomic review, stated preference data and technical analyses to develop T&R projections including review of NCTCOG socioeconomic data. He managed the project budget, project schedule, and deliverables, and interaction with the client and project procurement team.

Task Leader, Toll 49 Level-3 T&R Study, NETRMA, Tyler, Texas. CDM Smith conducted a comprehensive traffic and toll revenue (Level-3) study for the NETRMA in 2010, to secure a Toll Equity Loan of \$50M and State Infrastructure Bank loan of \$39.2M. The study corridor is a two-lane limited access facility that would provide connection from US 69 north to IH 20 and SH 110S. CDM Smith updated the bring down report to evaluate the financing options for the proposed Segment 4 extension in 2014 and developed a Level-3 update in 2016 for the existing 25.6-mile segment and proposed 6.6-mile Segment 4 of the Toll 49 corridor in Smith County, Texas. This support included Moody's & S&P presentations and sale of \$200M in revenue bonds in June 2016. Mr. Gautam served as the Task Leader to oversee data collection, developing optimum toll rates, select link analysis, and T&R technical analyses using travel demand model and sensitivity analyses.

Mustafa Kamal

Technical Leader

With more than over 31 years of experience, Mr. Kamal offers extensive expertise in the development of traffic and toll revenue forecasts for proposed managed-lanes and toll roads. He is also experienced in travel demand modeling for large multimodal projects including regional planning studies, major investment studies, roadway improvements and corridor studies. He is experienced in developing demand forecasts using various software packages such as Cube/Voyager and TransCAD as well as Paramics simulation software. Currently, he serves as a project technical leader on many toll forecasts, responsible for ensuring quality performance.

Project Technical Leader, Modeling Task Leader, Mopac North (Loop 1) Express Lanes Investment-Grade Traffic and Toll Revenue Study, CTRMA, Austin, Texas. CDM Smith conducted this investment-grade traffic and toll revenue study for the Mopac (Loop 1) express lanes in Austin, Texas for CTRMA. The project limits were from W. Parmer Lane to Lake Austin Boulevard with an approximate length of 11.2 miles. Mr. Kamal served as PTL and lead modeler for this study and developed traffic and toll revenue forecasts for the express lanes. These forecasts were based on benchmarked models and behavioral data and included updated value-of-time (VOT) and reliability measures shown to have a significant impact on the demand for the Mopac North express lanes.

Senior Modeler and Project Technical Leader, Mopac South (Loop 1) Traffic Support for Environmental Analyses, CTRMA, Austin, Texas. CDM Smith was retained by CTRMA to provide environmental traffic support for the Mopac South corridor. The project limits for Mopac South are from Cesar Chavez Street to Slaughter Lane (approximately 8 miles). The project included providing traffic data for air quality and noise analyses, Mobile Source Air Toxics (MSAT), Regional Toll Analysis (RTA), Project-Level Toll Analysis (PLTA) and developing measures of effectiveness (MOEs) for five different alternative configurations for the corridor as well as the No-Build alternative. Mr. Kamal is serving as PTL and senior modeler for this project.

Senior Transportation Planner and Modeling Lead, Mopac South (Loop 1) and US 183 North Express Lanes, CTRMA, Austin, Texas. CDM Smith conducted sketch-level traffic and toll revenue studies for various alternative configurations for the Mopac South and US 183 North express lanes in Austin, Texas for CTRMA. The project limits for Mopac South were from Cesar Chavez Street to Slaughter Lane (approximately 8 miles) and from SH 45 North to Mopac (Loop 1) for US 183 North (also approximately 8 miles). These two express lanes corridors will connect to and extend the Mopac express lanes currently under construction in central Austin. Mr. Kamal served as the senior modeler for this project and also developed the conceptual toll feasibility of the proposed express lanes.

Senior Transportation Planner and Modeling Lead, Mopac North (Loop 1) Express Lanes Intermediate Traffic and Toll Revenue Study, CTRMA, Austin, Texas. CDM Smith conducted this intermediate traffic and toll revenue study for the Mopac (Loop 1) express lanes in Austin, Texas for CTRMA. The project limits were from W. Parmer Lane to Lake Austin Boulevard with an approximate length of 11.2 miles. Mr. Kamal served as the senior

Education

MS - Transportation Engineering, University of Wisconsin, Madison, Wisconsin, 1988

BE - Civil Engineering,

NED University of Engineering and Technology, Karachi, Pakistan, 1987

Years of Experience

Total Years: 31

CDM Smith: 10

modeler for this project and also developed the conceptual toll feasibility of the proposed express lanes. The express lanes opened to traffic in the Fall of 2017.

Senior Modeler, IH 35E Managed Lanes Investment-Grade Traffic and Toll Revenue Study, TxDOT, Dallas, Texas. CDM Smith was retained by TxDOT to conduct an investment-grade traffic and toll revenue study for the IH 35E managed lanes project. The traffic and toll revenue estimates from this study were used to successfully close on a \$285 million TIFIA loan for this project in November 2016. Mr. Kamal served as the senior modeler responsible for developing traffic and toll revenue forecasts as well as providing support for rating agency reviews. The managed lanes opened to traffic in Spring 2017.

Senior Modeler, SH 183 /SH 114/ Loop 12 Managed Lanes Investment-Grade Traffic and Toll Revenue Study, Dallas, Texas. This investment-grade traffic and toll revenue study for the managed lanes along SH 183, SH 114 and Loop 12 in the vicinity of Dallas Fort Worth (DFW) International Airport, connects both downtowns and provides access to the airport. For this innovative financing project, comprehensive data collection was conducted, including traffic counts, speed and delay data, as well as OD and SP surveys. Mr. Kamal served as the senior modeler. He also participated in meetings and presentations to Fitch rating agency in support of a TIFIA loan application for this project. This project opened to traffic in the fall of 2018.

Senior Modeler, I-605 Managed Lanes Intermediate Traffic and Toll Revenue Study, Los Angeles Metropolitan Transportation Authority, Los Angeles, California. CDM Smith was contracted by LA Metro for this intermediate traffic and toll revenue study for the proposed tolled managed lanes along I-605 in Los Angeles. The project includes 14 miles of managed lanes along I-605 between I-10 and SR-91. Mr. Kamal served as the senior modeler for this project responsible for the development and calibration of a detailed 11-period travel demand model with five different modes; SOV, HOV2, HOV3+ CAV (clean-air vehicles) and Trucks. The model was used to forecast traffic and toll revenue for several different HOV discount and operational scenarios for the project corridor.

Senior Modeler, I-64 HRBT HOT Lanes Intermediate Traffic and Toll Revenue Study, Virginia Department of Transportation, Hampton /Norfolk, Virginia. CDM Smith was contracted by the Virginia Department of Transportation for this intermediate traffic and toll revenue study for the proposed HOT lanes along I-64 through the Hampton Roads Bridge-Tunnel (HRBT) complex. The project includes 12 miles of HOT lanes along I-64 between I-664 and I-564. Mr. Kamal is served as the senior modeler for this project responsible for the development and calibration of a detailed 15-period travel demand model which is being used to forecast traffic and toll revenue for the project corridor.

Kamran A. Khan

Senior Advisor

Mr. Khan is a senior vice president leading CDM Smith's Transportation Finance and Technology group. He has more than 32 years of professional experience, the last 29 years with CDM Smith, and has an extensive background in pricing studies. Mr. Khan is familiar with travel data compilation, toll travel demand modeling for existing/new toll facilities, interstates and managed lanes, toll revenue forecasting, financial feasibility, and cost-benefit studies. Mr. Khan serves as a senior advisor and reviewer for major revenue and pricing studies within the national practice. Mr. Khan has been involved in major privatization studies of transportation infrastructure assets in Colorado, Florida, Illinois, Indiana, Oregon and Texas working for both public and private sector clients.

Project Principal, Illinois State Toll Highway Authority Annual Retainer. Senior management oversight on services provided to the Authority including traffic and revenue studies, traffic operations, ITS, and toll collection systems. Conducted various studies and tasks for the Authority including preparation of Comprehensive Traffic and Revenue Studies used for project financings for capital programs; providing guidance and recommendations with respect to toll rates, toll sensitivity, and toll collection systems; managing preparation of the annual traffic and revenue report by identifying traffic and revenue trends, economic conditions, and construction impacts; conducting interchange feasibility studies; assessing development impacts to the tollway; and evaluating mainline/arterial and toll plaza traffic operations using traffic simulation models.

Project Principal, E470 Toll Road. Project principal for investment grade study for the toll road. Study included data collection, review of annual transactions by plaza and account activity, independent economic corridor analysis, stated preference surveys, review of long-range needs and review of various pricing options, toll sensitivity analysis. Extensive use of DRCOG model data sets. Developed scenarios to reflect COVID-19, with presentation to rating agencies and investors. One of the first successful toll road bond transactions in the COVID-19 environment.

Project Principal, Osceola County Expressway. Project principal for investment grade study for the toll road. Study included extensive data collection, conduct of stated preference surveys, independent economic corridor analysis, review of long-range needs and review of various pricing options, toll sensitivity analysis. Extensive use of CFRPM model data sets. Made presentations to rating agencies and investors.

Project Principal, North Texas Tollway Authority, Traffic Engineering Retainer Services, Texas. Responsible for systemwide traffic and revenue monitoring of traffic and revenue for existing facilities as well as investment-grade studies for extensions including PGBT Eastern Extension, S.H. 161, and Southwest Parkway.

Project Principal, MWAA Dulles Toll Road. Project principal for ongoing traffic and revenue retainer services, includes monitoring of traffic and revenue performance, comprehensive traffic and revenue studies in support of project financings for the Silver Line Metrorail Service. Conducted extensive traffic data compilation, including stated preference surveys to measure values of time. Utilized MWCOG model data sets, to

Education

M.S. -
Transportation
Engineering and
Planning,
University of
Southampton,
UK, 1989

Bachelor of
Engineering,
Civil
Engineering,
Kingston
Polytechnic, UK,
1986

Experience

Total Years: 32
CDM Smith 29

2007-Present

Senior Vice
President

Transportation,
Finance and
Technology
Group

2003-2007

Vice President

Transportation,
Finance and
Technology
Group

Lisle, Illinois

estimate transit and highway demand, and incorporated tolling algorithms to simulate the impact of pricing.

Lead Practitioner, SH 183/SH 114/Loop 12 Managed Lane Investment Grade Study.

The Study team developed large freeway simulation model to evaluate existing and future traffic operations, and identification of bottlenecks. Travel demand model used to simulate new managed lane configurations, developed optimum tolls and toll revenue estimates. Extensive use of NCTCOG model data sets.

Project Principal, Interstate Tolling Project Planning and NEPA Services, Indiana

Department of Transportation. Leading CDM's Smith project team in assessing the impact of tolling on four interstate corridors. Initial efforts are focused on developing traffic and revenue forecasts, and diversion estimates on local routes. Study involves extension data collection, video surveys and analysis of current travel patterns and trip distributions. In addition, study team is developing a technical approach to traffic forecasting in support of future NEPA studies.

Project Principal, Miami Dade Expressway Traffic and Revenue Study, Florida.

Project Principal for investment grade study. Study evaluated the impacts of new toll collection system and conversion to an 'all-electronic tolling' scheme. In addition, provided annual retainer services, including monthly monitoring of facilities, short range and long-range planning.

Project Principal, SR520 Investment Grade Study, Washington DOT.

Project Principal for investment grade study for early tolling of existing and proposed bridge expansion for SR520. Work included extensive data collection, video surveys, and stated preference surveys to estimate values of time. The CDM team utilized the PSRC model, incorporating pricing algorithms to simulate time of day pricing. Participated in rating agency and TIFIA presentations.

Project Principal, Columbia River Crossing Investment Grade Study, Washington

DOT. Project Principal for investment grade study for the exiting I-5 bridge crossing. Work included extensive data collection, video surveys, and stated preference surveys to estimate values of time. The CDM team utilized the Metro model, incorporating pricing algorithms to simulate time of day pricing.

Project Principal Chicago Regional Congestion Pricing Study.

Project principal for a regional value pricing study to determine and quantify the potential for road pricing to improve regional mobility in the Chicago area. The project was jointly guided by the Metropolitan Planning Council (MPC) and the Illinois Tollway under the auspices of the Chicago Metropolitan Agency for Planning (CMAP). The project included an extensive public and stakeholder outreach effort to assess the level of support and feasibility of various pricing strategies.

Gustavo A. Baez has extensive experience in managed lanes evaluation, data analytics, travel demand forecasting, congestion pricing, risk analysis, electronic toll collection impact analysis, toll feasibility studies, and traffic simulation. He has participated in more than \$20 billion in bond financing for toll projects in the USA. Mr. Baez has more than twenty years of experience in transportation planning in the USA and Canada. Gustavo has managed and directed the analysis of toll projects for public entities such as the Arkansas Department of Transportation, the Central Texas Regional Mobility Authority (CTRMA), The Alamo Regional Mobility Authority, the North Texas Tollway Authority (NTTA), the Texas Turnpike Authority Division (TTA) of TxDOT, and the Oklahoma Turnpike Authority (OTA); for private investors such as OHL Infrastructure, CINTRA Developments, Zachary Construction, Macquarie Infrastructure Investment, Kiewit Development Company, Skanska Infrastructure Development, and ACS Infrastructure; and for financial advisors such as RBC Capital Markets, Estrada Hinojosa, and First Southwest Company.

Baez Consulting, LLC, President, 2007 – Present

Responsible and project director for managed lane optimization analysis, traffic and toll revenue forecast studies, traffic simulation, travel demand modeling, traffic and revenue auditing, and traffic data analytics for several projects such as:

I-35E, I-30, Midtown Express, and DFW Connector Managed Lanes Monitoring, Texas Department of Transportation, Dallas, Texas. January 2016; End Date: Ongoing

Gustavo is serving as a senior project manager evaluating and monitoring the I-35E, I-30, Dallas Fort Worth Connector (DFWC) and Midtown Expressway managed lanes corridors. He is analyzing the daily traffic data and performing traffic trend analysis for four managed lane facilities consisting of 34 gantries. The analysis included not only evaluating the traffic trend of the managed lanes but also the traffic trend of the general-purpose lanes for each managed lane corridor. Associated activities implemented to improve the operation of the managed facilities include: modified traffic operation information to optimize throughput or toll revenue incorporated into the dynamic pricing algorithm; customized decision-making tables to instruct managed lane operators to minimize speed reduction in the managed lanes; created computer programs in statistical packages and Excel to be able to summarize millions of transaction records produced by the managed lanes and general purpose lanes; developed a process to select the most optimum aggregation period in the dynamic pricing algorithm to optimize revenue considering the operation characteristics of the corridor such as peak-hour factor; truck percentage variations and managed lanes geometric configurations; selected the most appropriate AVI locations to summarize speed along the managed lane corridors; selected the most appropriate LoneStar general purpose lanes operation system locations to compare speed of the managed lanes with the general purpose lanes; created a data analytics system which allow to respond efficiently to questions from decision makers about the performance of the managed lanes; and created a monthly summary report for each of the managed lanes corridors.

Education

M.Eng. - Civil Engineering, University of Toronto, Canada, 1993

B. Eng. - Civil Engineering, Universidad Technologica de Panama, Panama, 1982

Registration

Professional Engineer: Ontario, Canada, #90219940

Expertise

Managed Lanes Analysis

Data Analytics

ETC Conversion Impact

Traffic and Revenue Forecast

Traffic Simulation

Travel Demand Modeling

Congestion Pricing

Feasibility Studies

Transportation Planning

North Texas Tollway Authority System (NTTAS), North Texas Tollway Authority, Dallas, Texas, January 2001; End Date: Ongoing

Gustavo is project manager in evaluating the daily traffic for the North Texas Tollway Authority System composed of nine operating toll facilities and one hundred and three toll gantries. He analyzed historical toll traffic data and performed traffic trend analyses on the performance and operation of the nine toll facilities. He has used several statistical techniques such as time-series trend algorithms, box-plot techniques, and coefficient of variation process to optimize the operation and revenue collection of the toll facilities. These statistical techniques have been used to forecast short-term revenue; correlate special events with revenue leakage; evaluate revenue risks and estimate expected forecast error.

I-66 Outside the Loop Managed Lanes, Skanska Infrastructure Development Inc, Alexandria, Virginia, 2016

Gustavo served as traffic and revenue advisor to Skanska for preparing a private offer to acquire the right to build and operate the I-66 Outside the Loop managed lane corridor. The analysis consisted doing trend analysis in existing managed lanes facilities such as the I-495 and I-95 in Virginia; I-95 in Florida; and SR 91 in California. The trend analysis of historical data from those managed lanes was used to calibrate toll revenue parameters in order to develop revenue risks profiles.

183A Extension Investment Grade Traffic and Toll Revenue Study Auditing and US 290E Investment Grade Traffic and Toll Revenue Study Auditing, Austin, Texas, 2008

Mr. Baez implemented a comprehensive review of the investment grades studies for the 183A and 290E proposed toll facilities. The final letter report recommended reviewing several assumptions in order to optimize the toll revenue for the facilities.

Wilbur Smith Associates (WSA), Vice-President, 2000 – 2007

In charge and responsible for all WSA traffic and toll revenue projects in Texas and Oklahoma. Managed the traffic and revenue contracts for NTTA, TxDOT, Oklahoma Turnpike and private concessionaries. Evaluated the feasibility of many toll projects in Texas and Oklahoma. Major highlights are:

NTTA Traffic and Toll Revenue Contract, Project Director: Responsible for all the projects evaluated for NTTA under the traffic and toll revenue contract including doing rating agency presentations, NTTA Board presentations, due diligence meetings and public meetings. Several VISSIM microsimulation projects were evaluated under this contract to evaluate operational impact of proposed improvements for the NTTA seven toll facilities.

TTA (TxDOT) Traffic and Toll Revenue Contracts, Project Director: Responsible for three five-million dollar contracts to evaluate toll projects around the State of Texas. More than 200 toll project-alternatives were evaluated under these contracts including many managed lanes projects such as the I-635 managed lanes and the North Tarrant Expressway managed lanes which are open to traffic and successfully operating in the Dallas-Fort Worth region.

Demographic/Economic Analysis

Mr. Bigos is a senior economist specializing in analyzing transportation, with responsibilities that include developing and applying economic and econometric models, conducting economic and financial feasibilities, and identifying fiscal impacts and funding requirements. Mr. Bigos is experienced with various economic modeling software, including IMPLAN and REMI, as well as forecasting and feasibility models. He has analyzed all major transportation modes and for both passenger and freight-related considerations.

Economist, Presidio Regional Freight Mobility Plan, Presidio, Texas. Mr. Bigos compiled a freight profile for the seven-county Presidio region in west Texas using data from IHS Transearch, and the BTS' TransBorder freight databases and conducted an economic impact of such freight movements and supply chain relationships.

Economist, US 190/IH 10 Feasibility Study, Texas. Mr. Bigos evaluated the economic feasibility (through a BCA) and the economic impacts (through a REMI application) of ten corridor alternatives, as well as various individual corridor sections, for the proposed US 190/IH 10 corridor improvement that traverses the width of Texas from El Paso to the Louisiana state line. Economic feasibility was conducted through a consumer surplus-based travel efficiency analysis, and the economic impacts were conducted for both the applicable efficiency benefits and the construction/operating expenditure activities.

Economist, Grand Parkway (Update), Houston, Texas. Mr. Bigos conducted an economic impact analysis of the proposed Grand Parkway segments H and I1, located in northeast Houston (Montgomery, Liberty, Harris, and Chambers counties), utilizing REMI PI+ modeling software. Impact included construction and travel-efficiency related considerations.

Economist, Central Florida Expressway Authority (CFX), Florida. Mr. Bigos updated a socioeconomic profile for the seven counties in Central Florida and the State; a historical and forecast compilation of population, employment, gross regional products, etc. for travel demand modeling and forecasting traffic and revenue.

Economist, Illinois Tollway, Illinois. Mr. Bigos conducted a socioeconomic profile for the Chicago area and the Nation, including compiling various short-terms forecasts for real Gross Domestic Product and national unemployment.

Economist, West Virginia Parkways Authority Traffic and Revenue Study. Mr. Bigos developed and updated growth forecasts through an econometric analysis for the three mainline plazas and side plaza for both passenger and commercial vehicles. A baseline, and optimistic and pessimistic alternatives were derived. Also, a quantitative and qualitative assessment of the socioeconomic data for West Virginia was conducted.

Economist, Socioeconomic Profile, Lee County, Florida. Mr. Bigos conducted a socioeconomic profile update for Lee County, FL, in comparison with Florida and the Nation, as a historical and forecast compilation of population, employment, gross regional products, etc. socioeconomic variables for purposes of use in travel demand modeling exercises and forecasting traffic and revenue in the county.

Education

BA - Economics, State University of New York at Buffalo, 2004

MBA - Rollins College, Florida, 2014

Technical Specialties

Economic Impact Analysis

Economic Feasibility

Input-Output Economic Modeling

Econometric Modeling

Financial Analysis

Return on Investment (ROI)

Benefit Cost Analysis (BCA)

Breakeven Analysis

Freight Analysis

Market Research

Socioeconomic Profiling/Forecasting

Impact Software

Impact Analysis for Planning (IMPLAN)

Policy Insight® (PI+) and TranSight, produced by Regional Economic Models, Inc. (REMI)

Wesley T. Blackwell, PMP

Tolling Technology

Mr. Blackwell is a detail oriented PMP Senior project/technical manager with over 24 years of experience in the tolling industry. His areas of tolling system project experience include AET, cordon zone pricing, managed lanes, electronic toll collection system operations and equipment design, ticketing and coin machine equipment design and integration, toll system procurement, toll system testing, business rules development, and systems analysis.

Toll System Technical Engineer, Texas Turnpike Authority Statewide Tolling Project, Statewide, Texas. Mr. Blackwell provided technical inputs to the team for developing comprehensive toll system technical provisions that were used as the basis for the comprehensive development agreement for the TTA Statewide Tolling Project. Additional work activities included toll system contractor oversight, design document review, testing, system commissioning oversight, and field performance testing.

Project Manager, NTTA ACM Supply Project North Region, Texas. Mr. Blackwell served as project manager for the supply of 198 lanes of new ACM equipment for the North Texas Tollway Authority. His responsibilities included confirmation of system requirement adherence to the RFP, contract monitoring, equipment installation oversight, equipment factory and field testing, documentation, training, and future warranty period monitoring.

Project Manager, Harris County Toll Road Authority ACM Supply Project, Harris County, Texas. Mr. Blackwell served as project manager for the supply of 118 lanes of new ACM equipment for the Harris County Toll Road Authority. His responsibilities included confirmation of system requirement adherence to the RFP, contract monitoring, equipment installation oversight, equipment factory and field testing, documentation, training, and future warranty period monitoring.

Project Manager, Santa Clara Valley Transportation Authority SR 85 Express Lanes, San Jose, California. Mr. Blackwell was responsible for the system design and development of procurement documentation for the SR 85 Express Lanes Extension (Phase 2) project. His responsibilities have included toll system design coordination with the authority, review and evaluation of technical and cost proposals, toll contract monitoring, factory and field-testing, assisting staff during system deployment and commissioning, and system performance evaluation. Prepared Systems Engineering Management Plans and Concept Of Operations Plans.

Project Manager, Minnesota Department of Transportation (MnPass) I-394 and I-35 West HOV/SOV Lanes, Minneapolis, Minnesota. Mr. Blackwell was responsible for the oversight and coordination of the project's operations/customer service subcontractor on the all-electronic toll collection system for HOV/SOV lanes on I-394 and I-35W in Minneapolis. His duties included coordination with the project's systems and operations subcontractors for daily operation and system expansion as well as directing day-to-day project activities. Coordinated media buys with marketing and advertising subcontractors to promote and educate the public. Provided and supervised personnel for MnPASS public outreach events. Oversight of toll system maintenance and maintenance subcontractor. Presented quarterly operations and system reports to MnDOT for use in reports to FHWA.

Education

BS - Electrical Engineering Technology, Southern Polytechnic University, Marietta, Georgia, 1988

Certifications

Project Management Professional (PMP), 2019

Timothy J. Boesch, AICP

Multimodal Studies

Tim Boesch has over 20 years of transportation planning experience. Over the course of his career, Mr. Boesch has supported a wide range of services regarding toll collection technology, traffic and toll revenue forecasting, downtown circulation, highway corridor analysis, and transit corridor planning. He is skilled at providing expert testimony for public agencies, solid analytical analysis for transportation planning, and translating complicated material for stakeholder comprehension.

Project Staff, Loop 1604 and US 281 Tolled/Managed Lanes Level-2 Intermediate T&R Study, Alamo Regional Mobility Authority/TxDOT, San Antonio, Texas. Mr. Boesch oversaw existing conditions review for multiple corridor tolling study. The work included review of hundreds of traffic counts, traffic class counts, origin-destination surveys, speed and delay studies, and traveler characteristics. Mr. Boesch wrote extensive existing conditions chapter based on data collected.

Deputy Project Manager, Roosevelt to Downtown High Capacity Transit Study, Seattle Department of Transportation, Washington. This project examined existing transit, traffic, and alternative mode conditions, current and expected sociodemographics, and high crash locations. Rapid streetcar vs. bus rapid transit mode choice analysis was developed and executed with BRT being selected. Alternatives were developed for analysis including center and side running full BRT, basic King County Metro RapidRide service, and targeted investments designed to align with project budget.

Project Manager, Rapid Ride BRT Branding and Facilities Design, King County Metro, Seattle, Washington. Mr. Boesch was involved in all aspects of the planning and design process. This project involved brand identity development; brand application to transit vehicle design, signage, information documents, and passenger facilities; architectural schematic design services; cost estimation for passenger facilities including civil work; and a significant public and jurisdictional involvement process. A second phase included preliminary, intermediate, pre-final, and final architectural, structural engineering, civil and electrical engineering, and lighting design, as well as construction period services.

Project Manager, Washington State Bike Facilities and Pedestrian Plan, Washington State Department of Transportation (WSDOT), Bellevue, Washington. Mr. Boesch oversaw the development of Washington's statewide pedestrian and bicycle plan. Responsibilities included managing client contacts, quality control, staff coordination, participation in steering committee meetings, and public outreach.

Project Manager, SR 520 Investment Grade Traffic and Toll Revenue Update 2015, WSDOT. This project includes analysis of detailed actual tolling experience data, revised economic forecast, and revision of toll travel demand model to update 40+ year forecast reflecting tolling experience to date. The updated model and forecast is being used for continued financing including meeting bonding requirements, TIFIA loan requirements, monthly and quarterly T&R performance monitoring, support for additional bonds issuance, and developing and testing multiple scenarios for toll rate setting by the Washington State Transportation Commission.

Education

MS - Transportation,
Massachusetts
Institute of
Technology, 1996

BS - Mechanical
Engineering, The Ohio
State University, 1991

Certifications

American Institute of
Certified Planners
(AICP # 024138)

Years of Experience

Total Years: 20
CDM Smith: 15

Professional Activities

Women's
Transportation
Seminar Puget Sound –
CDM Smith
Representative, Board
member 2015-16

Transportation
Choices Coalition –
CDM Smith
Representative

Seattle Chamber –
Transportation Task
Force

Member, American
Planning Association

Member, Institute of
Transportation
Engineers

Michael S. Bomba, Ph.D.

Bomba Consulting, LLC

Professional Experience

- Managing Member, Bomba Consulting, LLC, 2013-Present
- Research Associate Professor, Center for Logistics & Supply Chain Management, University of North Texas, 2016-Present
- Research Scientist and Associate Director, Center for Economic Development and Research, University of North Texas, 2013-2016
- Research Associate and Adjunct Professor, Center for Economic Development and Research, University of North Texas, 2008-2013
- Alliance Transportation Group, Inc., Senior Associate, 2007-2013
- Bomba & Associates, Inc., Principal, 2004-2007
- Research Associate, Center for Transportation Research, University of Texas at Austin, 2003-2005.
- Independent Consultant, 1998-2004
- Applied Economics Consulting Group, Inc., Data Analyst, 1999-2000
- Hicks & Company, Environmental Planner, 1994-1998

Education

- Ph.D., University of Texas at Austin, Public Policy
- M.S., University of Texas at Austin, Community and Regional Planning
- B.A., University of Texas at Austin, Economics and Government

Additional Courses

- Training on GTAP computable general equilibrium model, Purdue University, 2017.

BACKGROUND AND EXPERIENCE

Dr. Michael S. Bomba has more than 20 years of professional experience contributing to traffic & revenue studies. In a support role to the project engineers, Dr. Bomba has assessed the reasonableness of metropolitan planning organization's (MPO's) population and employment estimates and forecasts at the zonal level, adjusting them as necessary. To date, he has completed almost 50 studies and these model inputs have been used to successfully sell approximately \$8 billion of municipal bonds for green field projects, major facility upgrades, building connecting ramps, and refinancing existing municipal bonds. Toll road projects in the Austin, Texas region that have been financed and constructed using these studies include: SH 130 (Segments 1 through 4), SH 45, Loop 1 North, US 183-A, US 290 East, SH 45 Southwest, and US 183 South. Dr. Bomba's efforts have included participating in presentations to rating agencies (Moody's, S&P, and Fitch) in New York City and presentations to major institutional investors (e.g. BlackRock, PIMCO, Vanguard, etc.) in New York City, Philadelphia, and Boston.

Past projects include:

- 2020 Central Texas Regional Mobility Authority Demographic Update. 2019-2020. Central Texas Regional Mobility Authority.
- MoPac Connector Feasibility Study. 2019. Central Texas Regional Mobility Authority.
- Loop 1 North/Loop 1 South Managed Lanes. 2018-2019. Central Texas Regional Mobility Authority.
- Cibolo Parkway Project. 2018-2019. Cibolo Turnpike LP.
- U.S. 183 North Managed Lanes Investment Grade Study. 2018. Central Texas Regional Mobility Authority.
- 2017 Central Texas Turnpike Project Update (Level II study). 2017. Texas Department of Transportation.
- Cibolo Turnpike Investment Grade Study. 2017. Cibolo Turnpike L.P.
- US 290 Direct Connectors Investment Grade Study. 2016. Central Texas Regional Mobility Authority.
- LBJ East Managed Lanes Study. 2016. Texas Department of Transportation.
- 2016 CTRMA Bond Refinance. 2016. Central Texas Regional Mobility Authority.
- Commercial Truck Toll Rate Study for the Tornillo-Guadalupe Bridge. 2015. El Paso County.

Michael S. Bomba, Ph.D.

Bomba Consulting, LLC

Professional Organizations

- North American Working Group, George W. Bush Institute. Member. 2016-Present.
- North American Strategy for Competitiveness (NASCO). Board Member, 2018-Present.
- Transportation Research Board – National Research Council, National Academies – 1999-Present
Committee Memberships:
 - Agricultural and Food Transportation - AT030 (Past Member — 3 years)
 - International Trade and Transportation – AT020 (Immediate Past Chair — 6 years)
 - Freight Systems Group Executive Committee – AT000 (Member - 6 years)
 - Intermodal Freight Terminal Design and Operations – AT050 (Past Member and Secretary – 11 years)
 - Ports and Channels – AW010 (Past Member – 9 years)
- American Planning Association – 2009-2013, American Institute of Certified Planners (AICP) #24082

- US 183 South Investment Grade Traffic and Revenue Study. 2014. Central Texas Regional Mobility Authority.
- Second South Padre Island Bridge Level 2 Traffic and Revenue Study. 2014. Texas Department of Transportation.
- Loop 1604 Corridor (Bexar County) Level 2 Traffic and Revenue Study. 2014. Texas Department of Transportation.
- IH 10 Corridor (Bexar County) Level 2 Traffic and Revenue Study. 2014. Texas Department of Transportation.
- IH 35 Corridor (Bexar County) Level 2 Traffic and Revenue Study. 2014. Texas Department of Transportation.
- 2014 US 281 Toll Road Investment Grade Study. 2014. Bexar County.
- 2014 Central Texas Turnpike Project Update (Bond refinance study). 2014. Texas Department of Transportation.
- Southern Gateway Level 2 Traffic and Revenue Study. 2013-2014. Texas Department of Transportation.
- Regional Demographic Update for the North Texas Tollway Authority's Service Area. 2013. North Texas Tollway Authority.
- US 183-A Toll Road Investment Grade Study Update. 2013. Central Texas Regional Mobility Authority.
- SH 288 Level 2 Traffic and Revenue Study. 2012. Texas Turnpike Authority.
- Loop 1604/US 281 Toll Road Investment Grade Study. 2012. Alamo Regional Mobility Authority.
- 2012 Central Texas Turnpike Project Update (Bond refinance study). 2012. Texas Turnpike Authority.
- SR 125 Toll Road Evaluation Study (Border traffic study). 2011. San Diego Association of Governments.
- 2010 US 301 Toll Road Investment Grade Study Update. 2010. Delaware Department of Transportation.
- 2010 Central Texas Turnpike Project Update (Bond refinance study). 2010. Texas Turnpike Authority.
- SH 130 Truck Toll Study. 2010 (Toll rate adjustment study). Texas Turnpike Authority.
- US 290E Toll Road Investment Grade Study Update. 2010. Central Texas Regional Mobility Authority.
- US 183-A Toll Road Extension Investment Grade Study Update. 2009. Central Texas Regional Mobility Authority.

Michael W. Copeland, AICP

Tolling Feasibility

Mr. Copeland has more than 31 years of experience in transportation planning ranging from data collection and analysis to managing investment grade traffic and revenue studies for multi-billion-dollar toll road bond financing efforts. Mr. Copeland has managed a team of engineers and planners conducting a variety transportation and toll project feasibility analyses; provided on-going traffic monitoring services that included weekly, monthly, and quarterly reporting activities; conducted and managed a myriad of special studies such as alternative toll rates, congestion pricing, occupancy-based tolling, speed limit analyses, fuel-price impacts/effects, capacity and widening analyses, ramp improvement and modification analyses, economic analyses and origin/destination studies.

Project Director, NTTA System Comprehensive T&R Study. Mr. Copeland guided and directed a team of professional engineers and planners in conducting a complex T&R study. This study provided the traffic projections and the toll revenue estimates for an expanded NTTA System (five toll roads, two toll bridges, and one toll tunnel). The resulting NTTA system included adding two toll facilities that were originally constructed and operated as a separate toll road system called the Special Projects System (SPS). This T&R study supported a major bond sale to refund the SPS toll bonds and refinance NTTA System bonds. At \$2.5 billion, this bond sale was the second largest municipal bond sale in the US market in 2017.

Project Director, HCTRA Systemwide T&R Study. This comprehensive T&R study included all of the necessary steps and procedures employed to develop 40-year traffic projections and toll revenue estimates. Mr. Copeland provided senior oversight regarding all phases of the project. This study included extensive data collection as well as a detailed population and employment growth projection review, which were both conducted by independent subconsultants. The study included the development and calibration of a travel demand model based upon the H-GAC's regional travel demand model.

Project Director, OTA System Comprehensive T&R Study. Mr. Copeland provided senior guidance and oversight to the project team throughout all phase of this T&R study. Working daily with the project manager and various project team members, Mr. Copeland helped ensure that the project had the necessary resources, that the client remained informed regarding the progress of the project, and that the work being done met CDM Smith's standard T&R procedures and quality control requirements. Mr. Copeland led the effort to present the results to the client, which also included subsequent presentations to credit rating agencies in support of bond financing efforts. This also included joining the client on a multi-city investor tour, presenting the findings of the T&R study to several current and potential future toll road bond investors. The client was extremely appreciative of our efforts to support their very successful bond sale.

Project Director, PGBT-EE Investment Grade T&R Study, Texas. Mr. Copeland directed the development of traffic and toll revenue projections for a proposed 10-mile extension of the PGBT. The study consisted of analysis of existing demographic projections, proposed parallel transportation improvements and current travel demand in the project corridor.

Education

Master of City and Regional Planning, University of Texas – Arlington, 1992

BS – Environmental Design, Texas A&M University, 1986

Certifications

American Institute of Certified Planners
#018333

Years of Experience

Total: 31

CDM Smith: 10



MARK FOWLER

Director

EXPERIENCE | 16 Years

EDUCATION | BS, Physics, Bates College

BIO

Mark Fowler helps clients understand how travelers will respond to the pricing of transportation infrastructure. Mark has managed dozens of research projects focused on the behavioral response of travelers to road pricing and congestion management techniques, including toll roads and bridges, managed/HOT lanes, area/cordon pricing, congestion pricing, VMT fees, and parking fees. The results of these studies are used to support investment-grade traffic and revenue forecasts for transportation infrastructure projects across the United States and Canada. His focus includes the design and implementation of survey questionnaires as well as data collection and statistical analysis.

PROJECT EXPERIENCE

Road Pricing Studies

Virginia DOT, Elizabeth River Tunnels. Directed a stated preference survey to estimate willingness to pay for travel time savings and willingness to pay for travel time reliability of users who travel between Portsmouth and Norfolk, VA using the Downtown and/or Midtown Tunnels. The stated preference survey results supported an investment-grade traffic and revenue forecast for the facilities. (2019)

Florida's Turnpike Enterprise, Colonial Parkway, Orlando, FL. Directed a stated preference survey to understand how travelers would respond to the proposed Colonial Parkway project, a seven-mile facility along SR-50 with two toll lanes and three local travel lanes in each direction. The survey estimated travelers' value of time and propensity to use the proposed new toll lanes under various conditions. The results of the survey were used to support estimates of traffic and revenue for the corridor. (2018)

Texas Department of Transportation, Houston Grand Parkway Segments H&I, Houston, TX. Directed a stated preference survey to evaluate proposed segments H&I of the Grand Parkway, a new circumferential highway around the city of Houston, TX. The results of the survey were incorporated into the regional travel forecasting model to support estimates of traffic and revenue in the corridor. (2015)

Texas Department of Transportation, Houston SH 249, Houston, TX. Directed a stated preference survey to evaluate the proposed tolled extension of State Highway 249 Northwest of Houston, TX. The proposed facility would link Montgomery and Grimes Counties to Northwest Harris County, TX. The results of the survey were incorporated into the regional travel forecasting model to support estimates of traffic and revenue in the corridor. (2015)

Northeast Texas RMA, Tyler Toll 49, Tyler, TX. Directed a stated preference survey to evaluate the traffic and revenue potential of Toll 49, a partially completed circumferential highway around the city of Tyler, TX. The results of the survey were incorporated into the regional travel forecasting model to support estimates of traffic and revenue in the corridor. (2015)

Florida's Turnpike Enterprise, Wellness Way Parkway, Orlando, FL.

Directed a stated preference survey to evaluate the traffic and revenue potential of the Wellness Way Parkway, a proposed toll facility southwest of Orlando in Lake County, Florida. The proposed toll facility is unique in that it will be a four-lane, rural, arterial with a 55 mile per hour design speed limit and several traffic lights at intersections with roads used to access the proposed development along the corridor. The survey was used to estimate the willingness to pay for travel time savings and the willingness to pay to access proposed residential, commercial, and retail development along the corridor. Estimates of travelers' willingness to pay for travel time savings or willingness to pay to access the proposed development will be used by Florida's Turnpike Enterprise to forecast traffic and revenue in the corridor. (2014)

Florida's Turnpike Enterprise, Orlando I-4 Beyond the Ultimate, Orlando, FL.

Directed a stated preference survey to evaluate proposed express lanes in the I-4 corridor between Kirkman Road and US 27 in Polk County and between SR 434 and SR 472 in Volusia County. RSG conducted a stated preference survey in the I-4 corridor to estimate travelers' willingness to pay for travel-time savings and their propensity to use the proposed express lanes under different travel conditions. The results of the survey were used to support estimates of traffic and revenue for the proposed express lanes. (2014)

Texas Department of Transportation, Dallas/Fort Worth Regional Managed Lanes, Dallas/Fort Worth, TX.

Directed a stated preference survey for a proposed system of express lanes in the Dallas/Fort Worth region, including SH 183, SH 114, Loop 12, I-820, and I-35W. Separate values of time were estimated for each corridor by trip purpose and time of day. Estimates of values of time were used to support investment-grade traffic and revenue estimates for the proposed lanes. (2014)

North Texas Tollway Authority, Chisholm Trail Parkway, Fort Worth, TX.

Managed a stated preference survey to estimate the value of time of travelers in the Chisholm Trail Parkway corridor in the Fort Worth, TX region. The survey collected data from travelers who currently use the Chisholm Trail Parkway as well as travelers who use competing toll free routes. Estimates of values of time were used to update traffic and revenue forecasts for the newly-opened toll facility. (2014)

Mark.Fowler@rsginc.com

Yagnesh Jarmarwala, PMP, PTP

Traffic and Revenue / Tolling Feasibility

Mr. Jarmarwala is a senior transportation planner and a senior project manager with more than 15 years of experience in transportation planning and engineering. He is a PMI certified Project Management Professional (PMP) and ITE certified Professional Transportation Planner. He leads and assists many of the firm's key tolling projects, and specializes in project coordination, toll T&R studies, toll diversion modeling, travel demand modeling, risk analysis, financial analysis and computer programming. He has experience serving in project management roles for numerous toll T&R studies, as well as the development and use of computerized modeling techniques for traffic planning analysis and financial analysis. Mr. Jarmarwala has also supported several rating agency/investor/TIFIA presentations and due diligence discussions in support of project financings in more than \$8.5B in toll road financing/refinancing bonds.

Project Manager – Harris County Toll Road Authority (HCTRA) Investment Grade T&R Study. Mr. Jarmarwala serves as a project manager working with project team to develop investment grade T&R forecasts for HCTRA System. This includes review of toll violations, leakage assumptions and determine the T&R impacts of the removal of cash.

Project Manager, Midtown Express Managed Lanes TIFIA Financing Support, TxDOT, Dallas, Texas. Mr. Jarmarwala is managing TxDOT T&R program. This is one of the five work authorizations that Mr. Jarmarwala is managing under the TxDOT contract. This project is to provide assistance to TxDOT in securing financing and TIFIA loan for this project.

Project Manager, North Tarrant Expressway Segment 3A, 3B, 3C T&R in support of negotiations with private developer, TxDOT. As a project manager, Mr. Jarmarwala is responsible for managing work for Traffic Forecasting and Traffic Operations Analysis. This requires coordination with various parties and negotiations with the private developer for change orders.

Project Manager, SH 288 Managed Lanes, BCTRA, Houston, Texas. Mr. is involved with the forecasting that will support the TIFIA financing of the project.

Project Manager, TxDOT Monitoring. Mr. Jarmarwala serves as a project manager and is responsible for analyzing transaction data and preparing dashboard to present the results of actual performance data in comparison to the forecast. Review of toll rates, tag penetration, video transaction shares, truck shares, weekday transactions, peak period transactions, monthly revenues and economic factors

Project Manager, Grand Parkway SH 99 Segments E, F and G Investment Grade T&R Study, Houston, Texas. Mr. Jarmarwala serves as the project manager for the investment grade T&R study to support design build financing efforts of Grand Parkway. Mr. Jarmarwala led various sensitivity tests analysis requested by the rating agencies and preparation of the presentation to the rating agency for the financing of \$2.9B in revenue bonds. Analyzed impact of pay-by-mail implementation by TxDOT with various surcharge scenarios.

Education

MS - City and Regional Planning, University of Texas at Arlington, 2004

Diploma in Construction Technology, Construction Management, 2001

Certifications

Project Management Professional (PMP)

Geographic Information System Professional (GISP)

Years of Experience

Total Years: 17
CDM Smith: 15

Areas of Specialization

Project Management, Transportation Planning, Geographic Information System (GIS), Demographic Analysis & Statistical Analysis, Risk Analysis

Sharat K. Kalluri, PE, PTOE, PMP

Traffic Engineering/Traffic Operations

Mr. Kalluri has extensive experience in traffic engineering and transportation planning, completing assignments for both public and private clients that include conducting traffic impact studies, corridor studies, developing context sensitive solutions, pedestrian and school related studies, traffic calming, access management, and traffic simulation modeling. He has taught courses in traffic engineering and traffic/simulation modeling at the University of Connecticut.

Senior Traffic Engineer, MoPac Traffic Operations Analysis, Austin, Texas. Mr. Kalluri evaluated the traffic operational issues associated with the construction of a managed lane along the MoPac corridor. Six operational models were developed in VISSIM to evaluate the freeway merging, diverging, and weaving operations. Mr. Kalluri was involved with the operational evaluation of the MoPac/183 interchange and the MoPac South corridor. As part of this effort, he was responsible for the evaluation of a diverging diamond interchange at Slaughter Lane.

Senior Traffic Engineer, SL 1604 and US 281 Managed Lanes Study, San Antonio, Texas. Mr. Kalluri evaluated the traffic operations along Loop 1604 and US 281 corridors associated with the construction of a managed lane. A 40-mile-long VISSIM model was built for this effort.

Traffic Engineer, LBJ Freeway (I-635) Investment Grade/HOT Lanes Study, Dallas, Texas. Mr. Kalluri developed a VISSIM model to measure impacts associated with the introduction of HOV toll lanes/managed lanes between Luna Road and I-30. A comprehensive analysis was undertaken to evaluate various roadway concepts associated with the managed lanes and effect in travel speeds as a result of the managed lanes.

Rhode Island Turnpike and Bridge Authority (RITBA) On-call Services, Rhode Island. Mr. Kalluri provided traffic study services to RITBA on several tasks including serving as senior technical reviewer of the traffic operations analysis and the final report addressing safety along the Pell Bridge.

Project Manager, U.S. Route 1/CT Route 53 Intersection Improvements, Norwalk, Connecticut. Mr. Kalluri serves as the project manager for the preliminary and final design for improvements on U.S. Route 1, primarily for the addition of a left turn lane at the intersection of Route 1 and CT Route 53. The purpose of the project is to provide safety and traffic operational improvements at the intersection.

Project Manager, Traffic Diversion Plans for I-84, Routes 7 and 8, Connecticut. Mr. Kalluri was project manager on a study to develop traffic diversion plans for I-84, US Route 7, and CT Route. Tasks undertaken in this study are the development of GIS based diversion plans, stakeholder outreach, and the development of implementation guidelines for the diversion plans.

Traffic Engineer, Route 28/Route 625 Interchange Traffic Study, Virginia. Mr. Kalluri developed a NETSIM traffic flow model for the Route 28/Route 625 corridor with the help of Synchro 3.2 and ITRAF software packages to evaluate different alternatives for an interchange at the intersection of Route 28 and Route 625.

Education

MS - Transportation Engineering, University of Connecticut, 1996

BS - Civil Engineering, Regional Engineering College, Tiruchirapalli, India, 1992

Registration

Professional Engineer: Connecticut and North Carolina

Certifications

Professional Traffic Operations Engineer

Project Management Professional

Emerging Technologies

Mr. Madi has more than 16 years of experience in management consulting and transportation management. He leads CDM Smith's global technology practice. His work focuses on the planning, design, testing, evaluation, and deployment of technology. He is a nationally-recognized thought leader on emerging technologies and innovation and is leading the development of a cutting-edge, multimodal platform that will include big data capabilities and analyses in Rhode Island, Montana, Illinois, and Jordan. Marwan also serves as National Chair for the IBTTA Big Data Committee.

Administrative Project Manager, USDOT, Office of the Secretary, Smart City Challenge Truck Platooning Deployment. Mr. Madi is leading the development of a concept of operations for a truck platooning initiative (planning, design, demonstration, evaluation). in Columbus, Ohio. The City of Columbus is the winner of the USDOT and Vulcan Foundation Smart City Challenge. CDM Smith is leading the engineering firms that are supporting the Smart Columbus Program Office deploying ITS as well as the electrification projects. These deployment projects will be staged into three parts: planning, design/test, and deploy/operate. Many of these advanced transportation technologies are not COTs equipment and they will operate as a system by sharing critical information.

Task Lead, Greater Amman Municipality (GAM) Smart City Roadmap and Traffic Monitoring Platform, Amman, Jordan. Consistent with the accelerated global adoption of smart platforms and data-driven urban planning, Mr. Madi is leading and assisting GAM is preparing a strategic roadmap to define how smart city technologies can help meet the municipality's public service objectives.

Data Specialist, Montana DOT Data Architecture Plan, Montana. Mr. Madi is working with the Montana DOT to develop new protocols and architectures for sharing and receiving data with third parties including OEMs, traveler information applications, commercial vehicles, and others.

Task Lead, Illinois Tollway CV/AV Testing Guidelines, Illinois. Mr. Madi developed CV/AV Testing Guidelines for the Illinois Tollway to maximize potential benefits and minimize potential threats. Recommended strategies and implementation actions centered around 1) ensuring that CV/AV advance the Tollway Authority's multiple transportation goals and policies, including vision zero, climate pollution reduction and cleaner air, equity, physical activity, economic opportunity, great places, cost-effectiveness, mode share, and reducing vehicle mile traveled; and 2) Using a full range of tools to ensure that CV/AV and private data communications devices installed on Tollway Authority right of way contribute to achieving transportation system plan goals and policies.

Program Manager, Ohio DOT Impact Evaluation of CAV on Multimodal Transportation Systems and Infrastructure, Columbus, Ohio. Mr. Madi is leading this project that requires the framing of CAV scenarios and modeling to understand the potential impacts on travel behavior and infrastructure capacity from the implementation of new CAV technologies. CDM Smith is developing new and expanding existing planning and modeling tools to help better understand the uncertain behavioral and infrastructure impacts of emerging technologies in Ohio.

Education

MS - Transportation Systems and Public Policy, University of Texas, Austin, Texas, 2001

BE - Civil Engineering, American University of Beirut

Relevant Expertise

- Program, Project and Contract Management
- Advanced Transportation Deployment and Operations
- Program Evaluation
- Data Analytics
- Stakeholder Engagement/ Outreach/Training
- Systems Engineering
- Freight and logistics
- Transportation operations
- Public-Private Partnership
- ITS Planning, Design, Operations, Deployment
- ITS policy

Abril Estefania Matysek, EIT

Development/Economic Analysis

A recent graduate of Texas A&M, Abril Matysek joined CDM Smith, a full-service engineering and construction firm, as a transportation planner, following an internship with the Texas toll practice – one of the firm’s largest toll teams. As an EIT, she offers direct experience with transportation planning tasks such as analysis, modeling, data collection and summarization, and research specifically in the Houston, Dallas, and El Paso regions. With demonstrated leadership skills, Abril takes an active role in her community, looking for opportunities to combine her fluency in Spanish and diverse outreach abilities to advance personal and professional growth.

SH 249 Comprehensive Study, Texas DOT, Toll Operations Division, 2016-2018. Ms. Matysek provided a variety of transportation planning tasks for this study, which was part of an on-call Traffic & Revenue contract. As an active member of this project team, CDM Smith’s role includes management and coordination of all procurement related efforts for TxDOT, its consultants and partner agencies, advising TxDOT on its procurement processes and procedures, development of the procurement documents and selection criteria, support in the selection process, transition to award, and implementation.

SH 31 Traffic Analysis and Planning Study, TxDOT, 2017-2019. Ms. Matysek served as the engineer/analyst for the SH 31 study in Tyler, Texas. Such work included analyzing and summarizing traffic data, developing existing conditions balanced profiles, identifying growth trends from travel demand models and preparing a traffic projections memorandum to then perform an operations analysis for the corridor.

Horizon Boulevard (FM 1281) Corridor Master Plan, TxDOT, 2017-Present. The Horizon Boulevard Corridor Master Plan will identify current and future transportation needs along Horizon Boulevard to enhance efficiency, safety, and mobility. As part of this ongoing study, Ms. Matysek has assisted with the traffic data collection program, analyzing the traffic count data and developing an existing conditions balanced profile for the corridor to use for modeling purposes. Ms. Matysek has also been part of the public involvement process for this study.

US 67 Corridor Master Plan, TxDOT, 2017-Present. The US 67 Corridor Master Plan consists of a 142-mile stretch of US 67 from the Presidio Port of Entry to I-10 in Fort Stockton. As part of this study, Ms. Matysek has assisted by analyzing existing conditions and preparing traffic projections along the corridor. This work consisted of observing traffic conditions as well as performing a safety analysis along the corridor. Ms. Matysek has also been part of the public outreach and involvement for this study by helping create maps, presentations, and using her fluency in Spanish to better convey the project goals to the residents of the project area.

Education

BS – Civil Engineering,
Texas A&M University,
2017

Languages

Spanish

Certifications

EIT, Certificate no.
59553

Hugh W. Miller, Jr. PhD, PE

Senior Advisor

Dr. Miller has extensive experience in transportation engineering and planning, working in consulting and academic positions. His management experience ranges from project management to the supervision of large, diverse professional groups. Dr. Miller has a proven ability in marketing, sales and business development. He has a varied technical background in toll studies, travel demand modeling, traffic engineering, multimodal/corridor planning, preliminary engineering, environmental studies, and land use modeling.

Technical Expert, Manor Expressway T&R Study, Central Texas Regional Mobility Authority, Austin, Texas. Dr. Miller served as technical expert on the investment-grade traffic and revenue study for the Manor Expressway. This included a thorough review of travel demand modeling and toll revenue calculations, as well as contributions to the Traffic and Earnings Report. He made technical presentations to bond rating agencies, bond insurers and other analysts from the investment community.

Technical Reviewer, Alamo Regional Mobility Authority-Texas Turnpike Authority Division, Texas. Dr. Miller provided an independent technical review of this investment-grade traffic and revenue forecasting study for Texas Department of Transportation and the Alamo Regional Mobility Authority (ARMA). The study products included 40-year traffic and revenue estimates for an 8-mile toll road in northern San Antonio.

Quality Manager, Traffic and Revenue Services for Miami-Dade Expressway Authority (MDX), Miami-Dade County, Florida. CDM Smith has been instrumental in the implementation of the MDX All-Electronic Tolling (AET) system, SunPass® at all toll plazas. CDM Smith is also supporting financing for the first series of improvements under MDX's significant Five Year Work Program. Our team has served MDX as a General T&R consultant for several years. As part of this partnership, our firm has performed extensive traffic and revenue studies for some of MDX's most significant project work. In the early years, we conducted a T&R study that supported financing the first series of improvements in MDX's Five Year Work Program, including the implementation of MDX's all-electronic system, SunPass at all toll plazas. As quality manager, Dr. Miller is responsible for implementing requirements of CDM Smith's Quality Management System (QMS) for the work performed under this contract.

Project Manager, General Traffic and Earning's Consultant, Central Florida Expressway Authority (CFX), Orlando, Florida. Dr. Miller leads the team performing T&R studies for CFX. This work includes the preparation of an annual report with updated T&R estimates, support for project and program financing (e.g., revenue refunding bonds and TIFIA application and BANs for the Wekiva Parkway), construction and maintenance of the CFX Model v2, studies that contribute to CFX planning activities (e.g., 2040 Master Plan and the SR 408 Eastern Extension PD&E Study), review of various proposals (e.g., the developer-sponsored Marden Road Interchange and an agreement with All Aboard Florida), and review of products produced by other agencies (e.g., Osceola Parkway Extension). Contract Amount: \$1M per year.

Education

PhD and MA – City and Regional Planning, University of Pennsylvania, 1987

MS – Transportation Engineering, University of Connecticut, 1976

BS – Civil Engineering, Rensselaer Polytechnic Institute, 1972

Registration

Professional Engineer: Florida (1995), Georgia (1999), Alabama (1999), Pennsylvania (1979), and Connecticut (1977)

Naveen Mokkapati, PE

TIFIA Support/Risk Analysis

Mr. Mokkapati began his professional career in 2007 as a transportation analyst and modeler responsible for traffic and revenue research and analysis and financial feasibility studies. His experience includes working with state agencies, tollway authorities, metropolitan planning organizations, and others on projects from sketch level traffic and revenue studies to highly detailed investment grade traffic and revenue studies that are used for selling bonds.

Analyst, NTTA System Comprehensive Traffic and Toll Revenue Study. Mr. Mokkapati led the project to develop traffic and revenue estimates on NTTA System. The major responsibilities include calibration of base year model, reviewing demographic updates done by independent economist, developing traffic and revenue estimates and conducting sensitivity analysis to understand the impacts of various input assumptions.

Analyst, VMT Estimation on NTTA Facilities. Mr. Mokkapati estimated Vehicle Miles traveled (VMT) on the NTTA toll roads in Dallas-Fort Worth region. The VMT estimates are computed by creating a balanced daily traffic schematic using the transactions data on the toll gantries and traffic counts collected on non-toll ramps.

Analyst, Fort Bend County Toll Road Authority Systemwide Comprehensive Level Traffic & Toll Revenue Study. Mr. Mokkapati assisted in developing traffic and revenue estimates on Fort Bend parkway and West park toll roads. The key tasks involved reviewing the model output from future year travel demand model and estimating traffic and revenue for various alternatives using toll assignment algorithms and conducting risk modeling to understand the high and low estimates for traffic and revenue. Other responsibilities include evaluating toll sensitivity, understanding the impact of various assumptions like revenue recovery, value of time, ramp-up, revenue days, opening date, etc.

Analyst, NTTA System Investment Grade Study Update, Texas. Mr. Mokkapati assisted in reviewing and updating traffic and revenue estimates on NTTA System which includes DNT, PGBT, AATT, MCLB, LLTB, SRT, and PGBT EE. The key events considered in this updated study included impact of adoption of new mobility plan, changes to project schedule, updated stated preference survey, and revenue recovery assumptions.

Analyst, Chisholm Trail Parkway Investment Grade Study Update, Dallas, Texas. Mr. Mokkapati assisted in reviewing and updating traffic and revenue estimates on Chisholm Trail Parkway. The key changes incorporated in this updated study included adoption of mobility plan 2035, updated independent economic review, and revenue recovery assumptions.

Analyst, President George Bush Turnpike Access Ramp Alternatives, Texas. Mr. Mokkapati evaluated the traffic and revenue impacts of the proposed access ramps on PGBT under different toll alternatives. The responsibilities included forecasting the future year traffic based on CDM Smith traffic assignment model, examining the reasonableness of the projected traffic volume effects, and providing the traffic and revenue impact estimates.

Education

MS – Civil Engineering,
Texas A&M University,
2007

B. Tech – Civil
Engineering, Indian
Institute of Technology,
Madras, 2005

Registration

Professional Engineer:
Texas, 2012
(License #107570)

Years of Experience

Total Years: 13
CDM Smith: 11

TIFIA Support/Risk Analysis

Mr. Muñoz is a practice leader for Public-Private Partnerships (P3), supporting clients in navigating the complex world of P3 project delivery. He has successfully procured five P3 contracts with construction values totaling over \$8.2 billion, and four design build contracts with construction values totaling over \$5.7 billion. Mr. Muñoz has over 25 years of state government experience moving up the ranks of TxDOT.

Advisor, Alaska Department of Transportation and Public Facilities (ADOT&PF), Knik Arm Crossing Project. Mr. Muñoz provided advice to ADOT&PF on a design-build procurement and obtaining a \$350 million TIFIA loan for a \$900 million bridge project. He provided advice on the TIFIA loan process, the design-build with long-term capital maintenance procurement process including document development, negotiation and selection.

Advisor, TxDOT, Programmatic Support. Mr. Muñoz has been extensively involved over the last year with the updating of programmatic contract documents, developing guidelines and commercial and technical documents that utilizes lessons learned from previous procurements as well as experiences in other jurisdictions. Mr. Muñoz has also prepared multiple white papers to help supplement training activities for personnel who are implementing P3 and design-build contracts. Mr. Muñoz also worked on the standardization of the cost estimating process across projects through development of an Excel-based model and instruction guide for cost estimators.

Deputy Director, Innovative Financing/Debt Management Office, TxDOT, Austin, Texas. Mr. Muñoz successfully led the financing legal and technical advisory teams in the delivery of design-build and P3 projects for TxDOT's innovative project delivery program. Under his leadership, Texas successfully developed over \$13 billion in P3 and design-build projects and procured multiple alternatively delivery projects using a variety of financing mechanisms. Mr. Muñoz also led a team that secured over \$3.3 billion of TIFIA loans for 5 projects and over \$1 billion of private activity bonds (PABs) for three projects. As a leader of procurements for innovatively delivered projects, Mr. Muñoz' responsibilities included confirming the availability of federal, state and local funding needed to advance projects; reviewing and approving drafts of documents for commercial reasonableness and consistency with the direction of executive leadership.

North Tarrant Express Phase I Project. Mr. Muñoz led the procurement team that successfully procured a 52-year P3 concession project with revenue risk transfer. The project scope rebuilt 13 miles of Tarrant County's most congested highways. This project leveraged a \$573 million TxDOT investment into a \$2.05 billion project that reaches from north Fort Worth to near the DFW Airport.

Lyndon Baines Johnson (LBJ) /IH-635 Project. Mr. Muñoz led the procurement team and negotiated terms and conditions for financial and technical documents for the delivery of this P3 concession project with revenue risk transfer. The joint project with LBJ Infrastructure Group (LBJIG) leveraged a \$490 million TxDOT investment into \$2.6 billion project. The LBJ Express project rebuilds one of the busiest and most congested highways in North Texas in September 2015.

Education

BA – Business Administration, University of Texas at Austin, 1986

Certifications

Certified Public Accountant

Certified Internal Auditor

Honors/Awards

2011 Luther DeBerry Award recipient for outstanding contributions to the field of transportation in Texas presented by the Texas Transportation Institute and TxDOT

Michelle Mutch

Tolling Technology

Ms. Mutch has more than 30 years of experience in the tolling and transportation industry. Skilled in tolling customer service management and administration, she specializes in designing and implementing program improvement processes. She is an expert in toll violations and enforcement customer service centers, business rules, strategy and planning, project controls, procurement, and contract management.

Senior Business Systems Analyst, Tollplus, LLC, Plano, Texas. Ms. Mutch assisted with the development and delivery of the Tollplus back office tolling system to the North Texas Tollway Authority. She participated in the development of functional specification to align the current system with the client's business needs.

Project Manager/Business Systems Analyst, Austin, Texas. Ms. Mutch developed and implemented successful operational project offices, including nationwide call centers and tolling back office, that optimized the efficiency and effectiveness of administration of Toll operations for several toll and transportation agencies. She led the complete startup and operations of customer service centers and violation processing centers, as well as developed violation court processes, including civil and administrative hearings. She oversaw the following projects:

Contract Manager, Texas Department of Transportation Procurement Engineering. Ms. Mutch managed two, five-year contracts with a total value of \$45million, and a \$20 million general construction consultant contact. She developed and maintained project budgets, and was responsible for procurement, establishing contracts, instituting contractor procedures, and ensuring contractor contract compliance. She developed and implemented improvement processes, and led contract negotiations.

Project Manager, Statewide Customer Service Center and Toll Implementation Programs, Washington Department of Transportation and TxDOT. Ms. Mutch led the development and implementation of a new statewide customer service center and back office operations for each of the states. She focused on developing a new administrative adjudication process, and the integration of a third-party collection agency and a Lockbox service provider. She established standards and procedures, including spreadsheets and a wide variety of routine cost analyses, cash flow, and other cost-related evaluations. Ms. Mutch also assisted with the authority's customer service operations, which included developing the business requirements, customer service systems development, violation processing, and system testing. She also provided review and oversight of the functional availability and performance requirements and quality assurance and control. She developed scope, oversaw the project lifecycle, and reviewed milestones for client vendors.

Customer Service Center Manager, North Texas Tollway Authority, Plano, Texas. Ms. Mutch Managed assigned services and activities of TollTag and Violation Process and Enforcement systems, including procurement of goods, services and materials. She developed and maintained budget information, expenditure information, commitments, and forecasts into the cost reporting system(s). She also negotiated and maintained contracts for services providers. She served all TollTag and Violation customers in all service areas of customer walk-up, call center, support services, and website.

Education

High School
Diploma

Traffic Engineering/Traffic Operations

With broad experience across the U.S., Ms. Ochoa offers over 12 years of professional experience, serving in leading roles for complex projects with DOTs, toll authorities, and transit agencies. Understanding that today's challenges require data-driven, modern solutions founded on a blend of technical skill and a long-view of technology and mobility options, her work spans a wide variety of transportation planning, traffic operations, and ITS projects. Her technical skills include extensive knowledge in conducting signal timing and optimization studies, transit mobility planning and operations, traffic analysis of freeways, tolled facilities and arterial networks, traffic simulation of large networks and database management using SQL. She is proficient in Vissim, HCS, Synchro, SimTraffic, and ArcGIS. She is a previous recipient of the Institute of Transportation Engineers (ITE) Young Engineers' Award and proudly supports improving mobility options and quality of life for all transportation users.

Traffic Engineer, US 183/MoPac Interchange Study, CTRMA, Austin, Texas. This study included 12 interchanges located along 3 miles of US 183 and 6 miles on MoPac. Ms. Ochoa developed and calibrated Vissim models for existing conditions and two future scenarios that included different managed lane configurations. She also developed a database and excel spreadsheets to automate modeling output post-processing to optimize the process and provide results more efficiently.

Traffic Engineer, US 183/ SH 114 and Loop 12 Managed Lanes, TxDOT, Austin, Texas. This project is a Level 3 comprehensive traffic and revenue study for the US-183, SH-114, and Loop 12 in the Dallas-Fort Worth region. As part of this project, managed lanes are planned along 16 miles of US 183, 3 miles along Loop 12, and 11-mile SHs along 114. Ms. Ochoa assisted the project team in post processing the traffic data counts and INRIX speed data, and evaluating traffic operations of the existing corridor and the future scenarios with the implementation of the managed lanes using VISSIM.

ITS Engineer, I-35 ITS Plan, City of Austin, Texas. Ms. Ochoa was responsible for supporting the development of an ITS plan for the City of Austin, TX. This includes drafting the Goals and Objectives (G&O) for the City of Austin's ITS department, recommend projects that fulfill the proposed G&O and can be implemented in the short term.

Lead Traffic Engineer, Grand Parkway Traffic Analysis, TxDOT, Houston, Texas. When fully built, the 184-mile Grand Parkway will encircle the greater Houston metropolitan area. In addition to helping relieve traffic congestion in some of the area's fastest-growing communities, the Grand Parkway will provide additional hurricane and emergency evacuation routes. This comprehensive traffic study specifically measured the impact of the proposed alternatives to alleviate the known recurrent congestion between I-45 and Kuykendahl Road. As part of this, Ms. Ochoa led the traffic analysis of a 5-mile section of this corridor. She performed the traffic analysis in Vissim, modeling Existing, 2025 and 2035 No Build and five build scenarios in the PM peak. Ms. Ochoa also prepared the final traffic report.

Education

MS – Civil Engineering
University of Idaho, Moscow, Idaho, 2007

BS – Civil Engineering,
Universidad Nacional San Antonio Abad del Cusco, Perú, 2004

Registration

Texas EIT No. 68957

Languages

English

Spanish

Honors/Awards

ITE Amy Polk Young Engineer of the Year, 2010

Ossama Ramadan, PhD, PE, PTOE, ENV SP, PMP

Traffic Engineering/Traffic Operations

Dr. Ramadan is a project technical leader and subject matter expert for traffic engineering and transportation planning projects. He is a nationally recognized expert with a demonstrated record of publications and presentations. His 20 years of extensive and varied experience include over 12 years managing projects and leading the technical delivery. His technical areas of expertise include traffic engineering studies; traffic engineering design; traffic control design; intersection control evaluation; microscopic and mesoscopic traffic simulation modeling; work zone traffic control; data-driven highway safety; transportation performance measurement; connected vehicle (CV) data analysis; corridor and subarea planning; ITS planning; Mobility as a Service (MaaS) system planning; and sustainability rating.

Subject Matter Expert, US 183 North Mobility Project, TxDOT, Austin, Texas. Dr. Ramadan performed a Subject Matter Expert review of a traffic microsimulation model in VISSIM. He prepared a technical memorandum detailing the review method and key findings. In addition, Dr. Ramadan conducted a Subject Matter Expert review for alternative technical concepts.

Project Technical Leader, North Houston Highway Improvement Project (NHHIP) Segment 1 Traffic Engineering Study, TxDOT, Houston, Texas. Dr. Ramadan is leading the study team in conducting a traffic engineering study for a 9-mile corridor along I-45 in support of an Interstate Access Justification Report (IAJR).

Project Technical Leader, El Paso 4-Year Safety Study, TxDOT, El Paso, Texas. Dr. Ramadan is leading the study team in performing a data-driven highway safety study for the 6-county El Paso district, to identify crashes hotspots, crash types, contributing factors, and recommended improvements to address identified safety issues. In addition, Dr. Ramadan is leading the development of HSIP-compliant prioritized safety project list.

Project Technical Leader, Houston Urban Core Planning Study, TxDOT, Houston, Texas. Dr. Ramadan is leading the study team in developing, analyzing, and reporting on 25 mesoscopic traffic simulation scenarios in DynusT/DynuStudio to determine the performance/resiliency of the transportation network within the Houston urban core.

Project Technical Leader, Horizon Boulevard Corridor Planning Study, TxDOT, El Paso, Texas. Dr. Ramadan led the study team in preparing a Corridor Master Plan to determine needed improvements for a 9.42 mile section of FM 1281 between SH 20 and Ascension Street. He supervised the development of alternatives, signal warrant analysis, intersection control evaluation, and operational analysis.

Subject Matter Expert, US 67 Corridor Planning Study, TxDOT, El Paso to Odessa, Texas. Dr. Ramadan guided the development of, and reviewed, a traffic microsimulation model in CORSIM for the section of US 67 passing through Alpine, TX and a corridor-wide mesoscopic model in DynusT/DynuStudio in support of a plan to determine needed improvements for a 142-mile-long section of US 67 between the I-10 intersection near Fort Stockton and the Presidio International Bridge.

Education

PhD – Civil Engineering, University of Alabama at Birmingham, Birmingham, Alabama, 2016, GPA 4.0

MS – Civil Engineering, Carleton University, Canada, 2003

Hons BEng – Construction Engineering, Arab Academy for Science, Technology and Maritime Transport, Egypt, 1999, GPA 4.0

Registration

Professional Engineer (**PE**), Civil – Transportation: KY, LA, TX

International Professional Engineer (**IntPE**), NCEES IRPE, USA

Registered Engineer (**RE**), Civil: Egypt

Certifications

Professional Traffic Operations Engineer (**PTOE**)

Envision Sustainability Professional (**ENV SP**)

Project Management Professional (**PMP**)

Florida's Turnpike Enterprise and the Florida Department of Transportation, Turnpike Integrated Congestion Pricing Plan, Florida.

Conducted a stated preference survey for travelers in the Southwest, Central, and South Florida regions to evaluate proposed congestion pricing alternatives on Turnpike facilities. Developed and implemented a stated preference survey and estimated discrete choice models to provide estimates of values of time. Supported implementation of the survey results into the traffic and revenue forecasting model. (2013)

Florida's Turnpike Enterprise and the Florida Department of Transportation, 95 Express Phase 3 and 4, Palm Beach and Broward Counties, Florida.

Conducted a stated preference survey for travelers in Palm Beach and Broward Counties to understand travel behavior related to proposed express lanes on a 70-mile section of I-95 between Ives Dairy Road and West Indiantown Road. Developed and implemented a stated preference survey, estimated discrete choice models, and supported implementation of the survey results into the traffic and revenue forecasting model. (2013)

Florida Department of Transportation, Florida's Future Corridors – Tampa to Jacksonville, Florida.

Conducted a stated preference survey for travelers making long-distance trips in the region between Tampa, FL and Jacksonville, FL to understand travel behavior related to proposed new toll corridor between these cities. Developed and implemented a stated preference survey, synthesized the data with data from several other value-of-time studies that had been recently been conducted in Tampa, Orlando, and Jacksonville, estimated discrete choice models, and supported implementation of the survey results into the traffic and revenue forecasting model. (2013)

West Baton Rouge Parish, Louisiana Route 1 / I-10 Connector.

Conducted a stated preference survey to forecast the behavioral response of passenger and commercial vehicle travelers to a potential new 1.5-mile bypass between Louisiana Route 1 and Interstate 10 in West Baton Rouge Parish, LA. The survey data were used to estimate the value of time of travelers making trips within the corridor. The estimates of value of time were incorporated into the travel forecasting model to forecast traffic and toll revenue. (2012)

Louisiana Department of Transportation and Development, Louisiana Route 1, Port Fourchon, Louisiana.

Managed a survey effort to forecast the behavioral response of passenger and commercial vehicle travelers to potential changes to the toll structure on Louisiana Route 1 (LA1) between Golden Meadow and Port Fourchon. The survey data were used to estimate the suppression of vehicle trips on LA1 by vehicle type and trip purpose for three different toll rate increases. The estimates of trip suppression were incorporated into the travel forecasting model to forecast changes in traffic and toll revenue. (2012)

Harris County Toll Road Authority, SH 288 Managed Lanes, Houston, Texas.

Managed a stated preference survey of travelers on SH 288 south of Houston, TX to support a traffic and revenue forecast for proposed managed lanes in the corridor. (2012)

Florida's Turnpike Enterprise and the Florida Department of Transportation, South Florida Managed Lanes System, Miami-Dade and Broward Counties, Florida.

Conducted a joint stated and revealed preference survey for travelers in South Florida to understand existing

travel behavior on the I-95 Express Lanes as well as potential travel behavior related to proposed express lanes on I-75 and the Palmetto Expressway. Developed and implemented a joint stated and revealed preference survey, estimated discrete choice models, collected origin-destination data using Bluetooth scanners, and validated and calibrating the choice models using the Bluetooth origin-destination data and I-95 Express volume and toll information provided by FDOT. (2012)

Georgia Department of Transportation, Georgia Statewide Pricing Study, Georgia.

Conducted a statewide stated preference survey for automobile and commercial vehicle drivers in Georgia to evaluate behavioral response to potential future pricing projects, including the addition of express lanes to existing facilities as well as the construction of new toll roads between major population centers. RSG developed and implemented survey questionnaires for automobile and freight traffic and estimated discrete choice models to support feasibility analysis for the potential pricing projects. (2011)

North Texas Tollway Authority, System-wide Update, Dallas, Texas.

Senior technical advisor for a stated preference survey effort to support updates to the North Texas Tollway Authority's (NTTA) travel forecasting model. Recent evidence in the Dallas area suggests that actual values of time of travelers using the North NTTA system may be higher than the values that are currently used in the model. In order to verify the actual value of time, RSG conducted a computer-based origin-destination, revealed preference, and stated preference travel survey, the results of which will be used to update the system-wide travel demand model for the toll road system to forecast traffic and revenue. The survey also sought to identify factors other than travel time and toll cost that influence travelers choice of route and mode. (2011)

Harris County Toll Road Authority, Fort Bend Grand Parkway Toll Road Authority, Grand Parkway, Houston, Texas.

Managed a stated preference survey to support estimates of traffic and revenue for State Highway 99 (Grand Parkway), a proposed circumferential highway traversing seven counties and encircling the Greater Houston region over a distance of approximately 180 miles. Conducted a stated preference survey for passenger vehicles to estimate the value of travel time savings (VTTS) of travelers who are candidates for using segments D through G of the Grand Parkway. Estimates of travelers' time and cost sensitivities were used to support estimates of highway traffic and toll revenue. (2011)

Texas Department of Transportation, SH 183 Managed Lanes, Dallas, Texas.

Conducted a stated preference survey for passenger vehicle drivers to estimate values of time for the proposed addition of managed lanes along a 10 mile section of SH 183 in Dallas, TX. (2009)

Texas Department of Transportation, Tyler Loop 49, Tyler, Texas.

Supported a stated preference survey for passenger and commercial vehicle travelers to estimate values of time for a proposed 22 mile bypass that will be built South and West of Tyler, TX. (2009)

Texas Turnpike Authority, SH 161, Dallas and Tarrant Counties, Texas.

A stated preference survey of potential users of the planned extension of SH 161 south through Western Dallas County. Designed and programmed interactive geocoding section of stated preference survey for computer-based administration. Estimated discrete choice models to obtain values of time for the corridor. (2006)

Rohan Shah

Data Collection

Mr. Shah is a transportation planner, analyst, and modeler. His specific experience includes working on T&R studies for toll projects, macroscopic and microscopic travel models, managed lane studies, urban planning and environmental analysis, and transportation public policy. He offers skills in travel demand model development, calibration and validation, traffic assignment modeling, traffic microsimulation, network development, traffic surveys and counts, data analysis, and computation. Since joining the firm, he has successfully delivered client reports and products, performed presentations, conducted new research, and participated in several enterprise research and development efforts to further advance the firm's toll practice and transportation services.

Modeler, Mopac South Express Lanes Project, CTRMA, Austin. This project proposes tolled express lanes and capacity expansion to improve travel time reliability along Texas Loop 1 (MoPac) from downtown Austin to Slaughter Lane. Mr. Shah is a traffic modeler responsible for analyzing the traffic operations using VISSIM microsimulation; assisting with the demand and traffic model calibration; performing on-field surveys and collecting data; modeling and recommending design alternatives based on traffic operations and congestion patterns; and preparing client deliverables, technical memorandums and exhibits for coordination meetings and workshops with clients and project partners.

Modeler, 183 North Mobility Project, CTRMA, Austin. This project includes tolled express lanes and operations improvements on the most congested eight-mile segment of US 183 between SH 45 North and MoPac. Mr. Shah was responsible for assisting with modeling traffic operations using VISSIM microsimulation; assisting with the demand and traffic model calibration; recommending design alternatives based on traffic operations analysis and congestion patterns; computing and analyzing traffic performance metrics; data analysis; and preparing client deliverables, technical memorandums and exhibits for coordination meetings and workshops with clients and project partners.

Analyst, Tyler Toll 49 System Comprehensive (Level-3) Study, North East Texas Regional Mobility Authority and TxDOT. CDM Smith has previously conducted various T&R studies for Toll 49 and has been retained again for a 2015 Level-3 Study. Mr. Shah analyzed regional traffic count data obtained from a comprehensive ongoing data collection program for the metropolitan Tyler area. He also assisted with count data, QA/QC and management, automating Excel procedures for big data sets, tracking development of background transportation facilities in the influence region; and helping with project report schematics.

Analyst, SH 151 and I-10 East Sketch-Level Traffic and Toll Revenue Studies, TxDOT San Antonio District. CDM Smith conducted a Sketch Level-1 T&R study for proposed managed lanes along SH 151 (between Loop 1604 and US 90), and along the I-10 East corridors (from North Foster Road/I-410 to SH 130). Mr. Shah researched and summarized historical traffic trends, extracted congestion profiles, created aerial maps, and helped produce additional schematics including line diagrams and functional plans to serve as visual aids in client presentations and discussion on future traffic operations and access planning.

Education

MS – Transportation Engineering, University of Texas-Austin, 2014

B Eng – Civil Engineering, University of Mumbai, India, 2012

Certifications

MOVES for Modelers: US Environmental Protection Agency, Office of Transportation and Air Quality, Ann Arbor, MI

Introduction to ArcGIS: University of Texas 6th Annual Summer Statistics Institute 2013

Tolling Technology

Terri Slack has over 21 years of experience in the public sector, having served in leadership and executive management roles, as well as over 9 years of experience in the private sector supporting public agencies across the U.S. She has served on the Board of Directors for IBTTA, as well as serving as its Vice Chairman of Audit Committee and is a current member of the Finance Committee. She is recognized as a leader in the tolling industry with experience presenting to various professional organizations in transportation and tolling and has achieved successful bond sales resulting in excellent ratings from the Bond Rating Agencies. Ms. Slack has extensive knowledge of budgetary oversight with demonstrated experience in the implementation of organizational, process, and operational improvements, as well as experience in negotiations and management of large contracts.

Project Manager, Consulting Services Contract, Los Angeles International Airport (LAWA) for North Airfield Safety Improvement Program (NASIP). CDM Smith was engaged by LAWA to provide environmental technical and expert consulting services. Ms. Slack is responsible for oversight and successful project delivery of material in supporting LAWA for project advancement into the environmental review and entitlement processes.

Technical Support, Traffic Engineering Retainer Contract, New Jersey Turnpike Authority (NJTA), New Jersey. CDM Smith has been asked by the NJTA to provide a scope of work to determine if the current process of handling Image Tolls (iToll), Violation Tolls (vToll), and Violations can be improved. With Ms. Slack's expertise in toll operations and process improvements, she is assisting in analyzing the data to determine if and where improvements can be made. CDM Smith will prepare a "long list" of policy alternatives that could be utilized to limit the iToll, vToll, and Violations related revenue losses.

Technical Support, Traffic Engineering Annual Retainer, Illinois Tollway, Downers Grove, Illinois. CDM Smith has been asked by the Tollway to conduct an analysis of various approaches to revenue collection. Ms. Slack has knowledge and experience in assisting toll agencies in revenue collection and is overseeing the analysis being conducted to assist the Tollway in reviewing current revenue collection methods.

Technical Support, All Electronic Conversion Cost Analysis - November T&R Forecasting Services, Maryland Transportation Authority (MDTA) Toll Facilities, Maryland. Ms. Slack has extensive knowledge of budgetary oversight for toll authorities with demonstrated experience in the implementation of organizational, process, and operational improvements. She is providing technical oversight and management for the work in the All Electronic Tolling Conversion Cost Estimates.

National Toll and Finance Program Manager, Seattle, Washington. Ms. Slack was the program manager for the WSDOT General Toll Consultant (GTC) project providing a broad spectrum of management and technical services. The GTC team replicated the Toll Division with Ms. Slack serving in the leadership role supporting the WSDOT Assistant Secretary, Toll Division. Under her leadership, the various services were provided to WSDOT to complement and augment the WSDOT Toll Division to include HOV to HOT conversion program and feasibility study to replace the back-office systems and customer service center operations resulting in a client-funded \$28 million project.

Education

MBA – Southern New Hampshire University (formerly New Hampshire College), Hookset, NH, 1986

BA – Political Science, University of Pittsburgh, Pittsburgh, PA, 1982

BA – Economics, University of Pittsburgh, Pittsburgh, PA, 1982

Accounting courses – Florida Southern College, Orlando, FL, 1997-1999

Accounting courses – Florida Atlantic University, Boca Raton, FL, 1995-1996

Years of Experience

Total: 30

CDM Smith: 1+

Justin R. Winn, PE

TIFIA Support/Risk Analysis

Mr. Winn is experienced with all modern methods of toll collection, including automatic vehicle identification, video tolling, cash toll collection, as well as single point and point-to-point collection. He has been involved in the generation of T&R estimates to be used as a basis for financing toll projects, both by private entities and public agencies. He currently serves as a project manager for various ongoing toll studies, offering clients experience with modern methods of toll collection, as well as traffic and revenue estimation for financing public and private-funded toll projects. He has developed toll feasibility analyses for a variety of proposed toll facilities in Texas, Oklahoma, Louisiana, Iowa and Ohio.

Project Manager, East Texas Hourglass, Tyler/Longview Area, Texas. Mr. Winn served as project manager for traffic and revenue evaluation of the proposed East Texas Hourglass toll project connecting the Tyler and Longview metropolitan areas.

Project Manager, North Texas Tollway Authority Traffic Engineer Services. Mr. Winn is serving as project manager for on-call traffic and revenue support services including system monitoring, long-term traffic and revenue forecasts and short-term forecasts for budgeting purposes.

Project Manager, Oklahoma Turnpike Authority Traffic Engineer Services. Mr. Winn serves as project manager for on-call traffic and revenue support services including system monitoring, long-term traffic and revenue forecasts and short-term forecasts for budgeting purposes.

Project Manager, I-49 South Traffic and Revenue Study, Louisiana. Mr. Winn served as project manager for the development of preliminary traffic and revenue forecasts for the proposed I-49 South toll highway between Lafayette and New Orleans, Louisiana.

Project Manager, Ohio Toll Corridor Feasibility Assessment. Mr. Winn served as project manager for assessment of toll feasibility as a funding option for new projects in Ohio. Tasks included a review of standard practices and current experience around the country, development of a screening methodology for evaluating potential projects and completion of sketch level traffic and revenue forecasts for certain corridors.

Project Manager, Southern Dallas County Infrastructure Analysis, Texas. Mr. Winn developed assessment of existing and needed transportation infrastructure for the southern Dallas County area, including the cities of Dallas, Ferris, Hutchins, Lancaster and Wilmer.

Project Manager, SH 360 Sketch Level Traffic and Revenue Analysis, Texas. As the project manager, Mr. Winn monitored daily tasks and successfully kept the project on schedule and on budget, conducted quality assurance reviews, and developed a draft report for this sketch level traffic and revenue analysis in the Dallas/Fort Worth metropolitan area.

Project Manager, SH 170 Schematic Traffic and Sketch Level Traffic and Revenue Analysis, Texas. As the project manager, Mr. Winn monitored daily tasks and successfully kept the project on schedule and on budget, conducted quality assurance reviews, and developed a draft report.

Education

BS - Civil Engineering,
Texas A&M University,
2003

MS - Civil Engineering,
Texas A&M University,
2005

Registration

Professional Engineer:
Texas, 2011 (#108964)

Years of Experience

Total Years: 15
CDM Smith: 12

TxDOT Precertifications

1.3.1 Subarea/ Corridor
Planning

1.4.1 Land Planning/
Engineering

1.5.1 Feasibility Studies

1.6.1 Major Investment
Studies

7.1.1 Traffic Engineering
Studies

Kris N. Wuestefeld

Tolling Technology

As a CDM Smith vice president, Mr. Wuestefeld is responsible for managing the electronic toll collection (ETC), all electronic tolling (AET), electronic road pricing (ERP), and the intelligent transportation and parking systems design group. Major areas of project experience include ETC, open road tolling (ORT), and ERP system planning, evaluation, design, development of specifications, contractor selection, and implementation oversight. He is also experienced in overall contract and project management, system design documentation review, factory and field testing of systems, system implementation planning, and system performance evaluation.

Project Director, Texas Statewide Tolling Program, Texas. Mr. Wuestefeld provided managerial and technical support to the team in developing the comprehensive toll system technical provisions and other contract requirements that were used as the basis for the Comprehensive Development Agreement for the TTA statewide tolling project. Additional work activities included toll system contractor oversight, system design document review, factory and field testing, system deployment oversight, and system performance testing.

Deputy Project Director, MassDOT All Electronic Tolling System (AETS). MassDOT replaced their entire toll system with a new, state-of-the-art AET system under a design-build contract. He served as the deputy project manager for this Raytheon-lead \$130 million contract. Responsibilities included program administrative support to the Raytheon PM, coordination of the civil design effort, toll system design, development and testing work, as well as the integration with the back office system and review of the program schedule.

Project Director, Maryland Toll Facilities Electronic Toll Collection, Maryland. Mr. Wuestefeld is responsible for the system design and development of procurement documentation for the next generation ETC, ORT, and video tolling systems. His responsibilities include toll system design coordination with the authority, review and evaluation of technical and cost proposals, contract monitoring, factory and field testing, technical support of staff during system commissioning, and system performance evaluation.

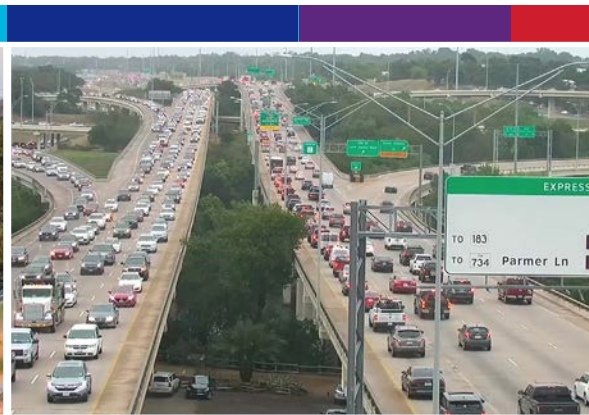
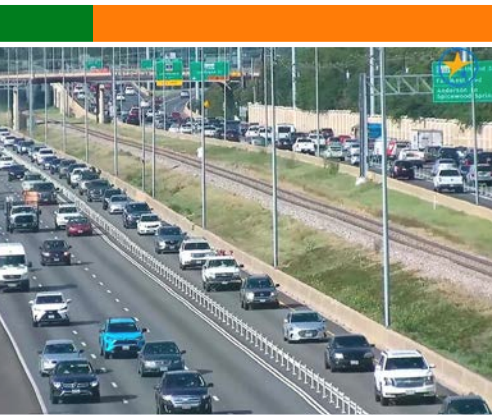
Project Director, Eastbound I-580 Express Lanes, Oakland, California. Mr. Wuestefeld provided managerial and technical support for the project's preliminary toll technology planning, system design, development of the concept of operations (including the systems engineering management plan [SEMP]), and development of the systems integrator RFP. Additional tasks included selection of the systems integrator and overseeing the contract via system design documentation review, participation in system design meetings, equipment/system testing, and system deployment oversight.

Project Director, I-680 Northbound Express High-Occupancy Toll (HOT) Lane, Alameda County, California. Mr. Wuestefeld provided managerial and technical support for the project planning, system design, development of the concept of operations and other system documents including the SEMP, and development of the procurement document. Additional work tasks included assisting in the proposal review and evaluation and selection of the electronic toll system (ETS) contractor.

Education

BA University of Connecticut, Storrs-Mansfield, 1982

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